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### KEY TO ABBREVIATIONS

B M L—Boston Medical Library	Misc—Miscellany
B R—Book Review	N—Notice
C—Correspondence	N E S S—New England Surgical Society
E—Editorial	N E U A—New England Branch of the American
M L N—Massachusetts Legislative Notes	Urological Association
M L S—Massachusetts Medico-Legal Society	N H M S—New Hampshire Medical Society
M M S—Massachusetts Medical Society	N H S C—New Hampshire Surgical Club
M P—Medical Progress	O—Obituary
M N—Meeting Notice	Or—Original Article
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# The New England Journal of Medicine

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## EDUCATIONAL SYMPOSIUM

### THE MASSACHUSETTS BOARD OF REGISTRATION IN MEDICINE

BY WALTER P. BOWERS, M.D.\*

THE early history of medical practice in the American colonies shows that the better trained doctors were dissatisfied with the standing of a proportion of the physicians of that period. This led to movements designed to improve conditions relating to medicine for some persons have seemed to believe that there were more charlatans than educated physicians all through the years preceding the enactment of laws providing for the registration of doctors. Dr. Sigerist however, in his address before the Congress on Medical Education, Hospitals and Licensure, February 18, 1935 expressed a contrary opinion. However that may be the doctors in Massachusetts began the movement for the registration of physicians very early, as recorded by Dr. Reginald Heber Fitz in his presidential address before the Association of American Physicians, May 29 1894, and in the annual oration before the Massachusetts Medical Society, June 10, 1894.

The references are not quoted verbatim but only in substance because of the peculiar literary construction of the earlier periods.

Massachusetts led in attempts at reform in medical practice in this country, for in 1649 an act was passed designed to regulate the practice of churgeons midwives, physicians and others which required of such practitioners conformity with the approved precepts of that day. In 1653 a petition to the "Honorable Court" asked to have it proceed to ascertain whether those who practice both physics and chirurgery to the hazarding of the lives and limbs and the detriment of many, being unskilled in those acts, be restrained until they be "exercised" by skilful and authorized physicians and chirurgeons, and these be approved and licensed by some magistrate. In 1737 arguments were submitted to the local medical society in Boston (founded in 1735 or 1736) in favor of regulating the practice of medicine through examination of a board of physicians. In 1781, when the Massachusetts Medical Society was incorporated, authority was conferred on this body to issue certificates of ap-

proval of such as were found competent to practice medicine. These were designated as licensed. In 1789 1803 and 1819 amendments to the charter of the Massachusetts Medical Society were adopted, one of which gave to licensed physicians the right to recover at law for services rendered and deprived the unlicensed doctors of this advantage.

Soon after the incorporation of the Massachusetts Medical Society medical graduates of Harvard were made licentiates and in 1837 similar authority was given to the Berkshire Medical Institution.

In none of the various acts however was there any provision for the prevention of any one not thus licensed to practice medicine so that quackery continued to flourish. In 1859 the Legislature rescinded all laws relating to the licensing of physicians and for the succeeding thirty five years no laws were passed relating to the practice of medicine in this Commonwealth, although the leading men in the Massachusetts Medical Society strove diligently to secure the enactment of appropriate bills. These efforts were blocked by the opposition of low grade practitioners aided and abetted by men prominent in public life who claimed that restrictive laws invaded personal liberty and created a favored class.

Thomsonianism seemed more popular in the early stages of this period than regular medicine. This phase of prejudice and credulity was so general, that a full recital of its history would require a volume of considerable size.

Meantime, a general sentiment among doctors throughout the Union was favorable to the regulation of medical practice and this led to the adoption of laws governing the registration of physicians in most of the states. Massachusetts, however, was among the last to take this important step.

The example of the more progressive states spurred the profession in our Commonwealth to vigorous action, designed to interest the people in the importance of raising the standards of medical education and practice.

The effective step which led to the passage of the act creating the Board of Registration in Medicine in Massachusetts was the appoint-

Bowers, Walter P.—Managing Editor, *New England Journal of Medicine*. For record and address of author see "This Week's Issue" page 32.

ment of a committee of eighteen by the Massachusetts Medical Society under the chairmanship of Dr G J Townsend of South Natick. This committee was strengthened by the addition of Drs George C Shattuck, B E Cotting, George H Lyman, H W Williams and Alfred Hosmer. The work of this committee consolidated and activated sentiment in the Society which was further roused by Dr R H Fitz, Dr George W Gay and Dr Edwin B Harvey. It will thus be seen that the stage was set for a successful attempt to bring Massachusetts into line with her sister states, especially so because Dr Harvey was, in 1894, a member of the State Senate. In association with the committee, Dr Harvey drafted a bill and worked diligently for its passage against bitter opposition, the character of which was described in the *New England Gazette* as follows:

"What a collection of them there was in the Green-room at first and afterwards in the large hall of the House of Representatives to which an adjournment was necessary on account of the crowds! Medical blacklegs of all kinds, deceitful clairvoyants, long-haired spiritualists, necromancers, wizards, witches, seers, magnetic healers, pain charmers, big Indian and Negro doctors, abortionists, harpies who excite the fears and prey on the indiscretions of the young of both sexes, who treat venereal diseases with the utmost secrecy and dispatch, who have good facilities for providing comfortable board for females suffering from any irregularity or obstruction, who sell pills which they are particular to caution patients when pregnant against using, *et id genus omne*. Some of them looked sleek, well fed and prosperous, others seemed to have come from the slums of destruction. Most of them had a coarse animal degraded look."

The bill was enacted only after several redrafts which, in the last one, provided for the exemption of certain forms of practice in the following words:

"This act shall not apply to commissioned officers of the United States Army, Navy or Marine Hospital Service, or to physicians or surgeons called from another state to treat a particular case, nor to clairvoyants, persons practicing hypnotism, magnetic healing, mind cure, massage methods, Christian Science, cosmopathic or any other method of healing, provided that such persons do not violate any provision of section ten of this act." Section ten provided that "whoever not being registered"

"shall advertise or hold himself out to the public as a physician or surgeon" "by appending to his name the letters M D or using the title doctor, meaning thereby a doctor of medicine, shall be punished," etc. That is, these several defined cultists could not legally practice medicine after the passage of the act.

The Board of Registration in Medicine came into being in July 1894 by the appointment by his Excellency, Frederick T Greenhalge, of Edward Jacob Forster of Boston, Augustus L Chase of Randolph, Daniel B Whittier of Fitchburg, Walter P Bowers of Clinton, Stephen H Blodgett of Cambridge, C Edwin Miles of Boston and Augustus C Walker of Greenfield. Dr Blodgett almost immediately resigned and his place was filled by the appointment of William C Cutler of Chelsea.

The Massachusetts Medical Society was represented by Drs Forster, Walker and Bowers, the State Homeopathic Society by Drs Whittier and Cutler and the State Eclectic Society by Drs Chase and Miles. The law provided that "no member of the board shall belong to the faculty of any medical college or university and not more than three members shall at any one time be members of any one chartered medical society." These restrictions still exist.

The board was duly organized July 10, 1894 with the choice of Dr C Edwin Miles, Chairman, and Dr Edward J Forster, secretary, and proceeded to register physicians as specified in the act with five designations:

- A To graduates of legally chartered medical colleges or universities having the power to confer degrees in medicine who were practicing medicine in this Commonwealth, July 10, 1894
- B To those who had been practitioners of medicine in this Commonwealth continuously for a period of three years next prior to June 7, 1894
- C To graduates of legally chartered medical schools or universities having power to confer degrees in medicine in this Commonwealth thereby being exempt from examination up to January 1, 1895
- D To graduates examined by the board
- E To non graduates examined by the board

The law provided a diagnet which swept into recognition a large number who were not educated physicians as classified under B and until 1915, the board continued to register applicants who could pass the examinations even though not possessed of a medical degree. Even though these earlier examinations were certainly elementary in character, a considerable proportion of applicants who came under the examination clause were rejected.

In reports of the board, subsequently submitted, repeated explanations were made, that the conditions relating to medical practice in Massachusetts were not satisfactory, in that complaints of irregular practice reported to police departments were not always followed by prosecutions and recommendations to the Legislature for changes which would tend to promote

protection of the people from incompetent or unscrupulous practitioners did not receive adequate attention. An amendment modifying section ten relating to the definition as to who might practice medicine was enacted May 10, 1895 and helped to clarify that situation relating to who could or could not practice medicine.

Since osteopaths were not included in the exempted classes and complaints were made that they were practicing medicine, they sought in elusion among the other cults and were successful in the passage of an amendment to the law. This was followed by the appointment of an osteopath to the board in 1907 and further recognition of this cult was taken by the Legislature in 1909 by an act which provided for the registration of osteopaths under two classifications in substance:

- 1 Any person who had been in active practice in this Commonwealth prior to January 1, 1909 and was a graduate of a school or college of osteopathy giving certain specified courses
- 2 Those who had practiced osteopathy in this Commonwealth for four years prior to the passage of the act

Such registrants were not allowed to prescribe or administer drugs for internal use or perform major surgical operations or engage in the practice of obstetrics. In this act, the Legislature decreed that the practice of Osteopathy is the practice of medicine. This had also been the decision of the Supreme Court in a case that went up on an appeal. As heretofore, osteopaths in common with other applicants could register under the regular procedure of examination because no requirement for a medical education had been adopted.

In 1910, at the time of the establishment of a Board of Registration of Nurses, the clerical functions of the boards of medicine and nurses were carried on in the same office, and the secretary of the medical board became ex-officio secretary of the nursing board.

About this time, chiropractors engaged the attention of the board and in 1914 eight were convicted of practicing medicine without being registered. This cult has been striving for state recognition ever since, even going so far as to attempt the establishment of a chiropractic school. This effort was frustrated in 1915 when a student sought to qualify for examination under a certificate of attendance from the New England College of Chiropractic located in Boston. Unfavorable court action followed and this institution folded its tent and silently stole away. In this year (1915) an important amendment to the medical registration law was enacted which provided that applicants for registration must show the possession of the degree of doctor of medicine or its equivalent from a legally chartered medical school having the power to confer degrees in medicine. This in-

cluded osteopathy under the decree of the Legislature.

Encouraged by this modest addition to the law, the Board of Registration petitioned for further requirements and in 1917 the specified time given to teaching medicine was defined as thirty six weeks in each year of a full four years' course. This was changed in 1933 to thirty two weeks, with more definite specifications of the time covered each year. Meantime, in 1922 the Legislature was persuaded to require of applicants for registration a premedical course equivalent to that required for graduation from a public high school and even only this after twenty seven years of continuous appeals to the Legislature for a law which would give reasonable assurance of average premedical experience of applicants for registration. No changes relating to premedical or medical education have been incorporated in the law since that time except that relating to the number of weeks required for a medical education as stated above.

At the present time forty state medical examining boards demand of applicants, graduation from medical schools which require two years of college work, four one year of college work and five require only a premedical training in high school courses. These last are Delaware, Missouri, Nebraska, Ohio and Massachusetts, but all except Massachusetts, have the power to demand of applicants, graduation from medical schools which are "accredited" or "reputable" or "approved" or "in good standing", that is, these boards can accept or reject candidates according to their estimates of the efficiency of each college from which applicants apply for examination. Massachusetts is alone in having no right to determine anything relating to the quality of instruction in medical schools but must accept for examination all who are graduates of chartered medical schools which give courses covering four years of thirty two weeks in each year. She stands in the lowest position in this regard in the United States.

Other amendments to the law provided for protection to medical students and hospital interns through limited registration because of a threat by enemies of the board to bring action against these men for practicing medicine without being registered. Certain other changes were made from time to time in order to give the board power to deal with various irregularities in medical practice.

The administration of the law to register chiroprodists was also assigned to the Board of Registration in Medicine. In 1924 authority was conferred to register the diplomates of the National Board without examination. The number so registered up to April 1935 is 239. This practice has been adopted by forty two states and three territories. There is an inconsistency in this, in that Massachusetts adopts the standards of an organization of which it is no or



game part, but will not allow its board to accept standards of other reputable evaluating organizations. In other words, this Commonwealth does not have any concern respecting the standing of medical schools and depends on the Board of Registration to determine the qualifications of candidates for licensure by an examination. The consensus among those regarded as authorities in medical education is, that such examinations by state boards, as are feasible under the Massachusetts law, do not prevent the registration of some unworthy applicants. Furthermore the most effective way to insure the training of qualified physicians is to control the source of supply.

Since the examinations, conducted by the board, seem to be its chief function relating to medical education and the prevention of incompetent medical practice, a detailed statement of the standing of out-of-state medical schools is not especially important, for there are only a very few unclassified medical colleges besides the osteopathic schools which are applying to our board for recognition. A slight change in our law would clarify this situation.

With the evolutionary changes in medical education which took place in this country in the early years of this century when we had about twice the number of medical schools as at present only a few of the unapproved schools are now able to carry on. The problem is how to bring them to a position of respectability or, if hopeless, how they may be eliminated. The facts should be faced.

In the early years of medical registration in this state the examinations were as elementary as the list of subjects employed. Written questions in the field of surgery, physiology, pathology, obstetrics and the practice of medicine covered the subjects. The list has been extended from time to time and now includes anatomy, histology, bacteriology, gynecology, diagnosis and therapeutics, pediatrics, toxicology, psychiatry, biology, chemistry, physics, and hygiene. It is probably impracticable to test the knowledge of applicants for examination in all of these subjects to a satisfactory degree under the present conditions, for it would mean a larger board and the expenditure of time beyond that at the disposal of busy practitioners. In addition, it is unlikely that the state would appropriate the necessary money, for appeals for larger appropriations have not met cordial responses although the revenue derived from the board's activities has contributed to the state treasury nearly forty-five thousand dollars in excess of its expenditures. Hence, it seems probable that the present system will have to be continued until other amendments will have been adopted.

The wide disparity in the comparative figures shown in the records of the rating of graduates of approved and non approved schools is significant.

The changes in subsequent years show improvement in the rating of graduates from approved schools, but no appreciable changes in the non approved schools. This last statement is confirmed by an analysis of the figures pertaining to eighteen years of results of examinations of the three unapproved schools in Massachusetts previous to 1934. Of graduates of one such school, the percentage of failures was 58+, of graduates of a second school, 54+, and of representatives of a third school 64+. With the added years another fact is significant in that the number of repeaters is growing and from non approved schools in a recent examination, 88 were thus designated. All of these facts tend to show that the probability of these non approved schools ever emerging from this class is unlikely, unless taken in charge by groups of persons of requisite ability and with adequate financial resources.

#### SUMMARY

This brief history of the Massachusetts Board of Registration in Medicine will convey an inadequate record of its accomplishments.

It was created in response to the efforts of organized medicine in this state over bitter opposition. The intent of its sponsors was to protect the people from evident improper and dangerous forms of medical practice. It has made only a partial success of this expectation because of hostility from within and outside of the profession. The original law was defective but was better than none. The Legislature has been persuaded to make certain changes which have added to the power of the board in dealing with criminal and unethical practices. The board has taken advantage of all powers conferred in the revocation and suspension of licenses in appropriate cases. It has consistently and persistently tried to raise the standards of medical education and service.

In the beginning it took away the right to practice of 618 persons who tried to qualify under the liberal provisions of the initial law, and under its examinations has on many occasions refused to license over fifty per cent of applicants for registration. For nearly twenty years it had to examine all comers who cared to apply regardless of their qualifications. It succeeded in 1915, in the passage of an act, in securing the requirement that only those possessed of an M.D. degree or its equivalent, would be accepted for examination, and later had amendments added defining the time and certain premedical studies which medical schools must observe in which applicants for registration have acquired their medical training.

Several other changes were for the protection of medical students and hospital internes. When the board began to function there were only three medical schools in this state. There are now six, three recognized and three unrecognized by the Council on Medical Education.

and Hospitals. The graduates of these unclassified schools now suffer most in the examinations conducted by the board, and the rejected candidates furnish a very large proportion of the repeaters. Furthermore it is largely the opposition of representatives of these three substandard schools which has prevented progress in raising the standard of medical education in this state so that Massachusetts stands with a wide open door to welcome all who are graduates of chartered medical schools, regardless of their standing. Its requirements in this respect are inferior to all of the other states of the Union.

His Excellency, Governor Currier, in his inaugural address last January said, "The Commonwealth of Massachusetts has always maintained an enlightened interest in matters pertaining to the health of the citizens." This is true of many of its citizens and institutions dealing

with the health of the people but is not true of its Legislature in certain particulars.

The immediate question of most importance is how long will Massachusetts claim to maintain "an enlightened interest in matters pertaining to the health of its citizens"?

The quality of medical practice reflects in a large degree the quality of instruction given by schools that train doctors. In order to bring about improvement in dealing with individual illness and to promote public health, it will be necessary to attack the problem at its source, that is, the medical school.

The Board of Registration has given loyal service to the state and should be accorded cordial cooperation. Its members have sacrificed their personal interests in giving freely of their time. Future progress will depend on a general demand for better laws.

#### MEMBERS OF THE MASSACHUSETTS BOARD OF REGISTRATION IN MEDICINE

	Date of Appointment	Date of Retirement		Date of Appointment	Date of Retirement
Edward J. Forster	1894	1895	Francis V. Corr	1921	1928
Augustus L. Chase	1894	1921	*Royal P. Watkins	1922	
Daniel B. Whittier	1894	1895	George H. Jones	1922	1924
Walter P. Bowers	1894	1922	Frank H. Vaughan	1923	1930
Stephen H. Blodgett	1894	1894	John M. Birnie	1924	1927
C. Edwin Miles	1894	1907	Henry L. Houghton	1924	1932
Augustus C. Walker	1894	1909	*Charles P. Sylvester	1925	
William C. Cutler	1894	1899	Irving J. Walker	1927	1928
Edwin B. Harvey	1895	1913	*Robert T. Hoyer	1928	
Samuel H. Calderwood	1895	1925	*Edward A. Knowlton	1928	
Nathaniel R. Perkins	1899	1922	Horace D. Arnold	1927	1931
Matthew T. Mayes	1907	1923	*Stephen Rushmore	1931	
Charles H. Cook	1909	1919	*Daniel J. Hurley	1931	
George L. Richard	1913	1915	*Mark Shrum	1932	
Michael F. Fallon	1915	1922			
Charles E. Prior	1919	1927			

Member of the board April 1935.

### THE VALUE OF THE MEDICAL LIBRARY IN MEDICAL EDUCATION

BY LINCOLN DAVIS, M.D.\*

THE value of the medical library to the medical student, the practising doctor, and the community has been emphasized over and over again and is, I think, very generally recognized in principle. Sir William Osler and other medical leaders have eloquently and often discoursed on this theme. We must remember however, that a new generation is continuously replacing the old and that old truths must be repeatedly restated although at the inevitable discount at

tending the display of second hand goods. The outstanding feature of the adequate library is that there the original sources of information may be found, the student or practitioner who is unacquainted with the benefits of the library habit is urged as a starter to peruse the addresses by Oliver Wendell Holmes, William Osler, George A. Vincent, and Harvey Cushing on that subject.

Let me quote from a few of the maxims of these bibliophiles.

"Our American atmosphere is vocal with the flippant loquacity of half knowledge.

Davis, Lincoln—President Boston Medical Library. For record and address of author see "This Week's Issue," p. 22.

Half knowledge dreads nothing but whole knowledge" O W Holmes in 1878

William Osler exhorts us in making use of the library to "cultivate the critical investigating faculty. Get closer to the great minds of the race."

Dr Vincent aptly calls the library the "social memory."

Harvey Cushing has said that the soul of an institution of learning resides in its library. One of the world's earliest and most famous libraries was that at Thebes in the time of Rameses II. It was said by Sículus to bear the inscription "Dispensary of the Soul."

Breasted tells us that the oldest known scientific document is a surgical treatise known as the Edwin Smith Papyrus written during the Pyramid age, perhaps by Imhotep himself. The surviving copy written in the 17th century B C although incomplete is well preserved, a priceless treasure brought to light by American research.

The respect and esteem in which the record of the written word has been held from the earliest times are shown by the large number of authentic manuscripts copied and transcribed from the classical periods of Greece and Rome, which have survived the vicissitudes of a turbulent history.

The confusion of historians concerning the calamitous destruction of the famous libraries of Alexandria variously ascribed to the accidental spreading of the fires set by the soldiers of Julius Caesar, and two centuries later to the harsh orders of the Emperor Aurelian, still later to the fanatical excesses of the Christians in carrying out the edict of Theodosius, and finally in 640 A D to the fury of the conquering Moslems under the Caliph Omar, is no doubt due in part to the desire to shift upon the other fellow the responsibility for a reprehensible act. In our own time something of the same kind is seen in the controversy as to the destruction of the Louvain library.

America is essentially library minded. Every respectable township has its general library so often the gift of some prosperous and loyal native son. Fine medical libraries exist in most of the principal cities. The splendid Surgeon General's Library extends a helping hand to every lesser medical or general library in the land, through its liberal policy of inter-library loans. The great national medical and surgical societies maintain reference libraries which furnish valuable assistance to their members. The medical schools have either libraries of their own or access to large urban medical libraries.

Massachusetts is preeminently equipped with facilities for consulting the literature of medicine. Our principal medical schools have splendid library facilities, the larger hospitals maintain adequate working libraries, and some of the larger cities have special medical collections. The Boston Medical Library with one of the

best medical collections in the country maintains a reading room open to all practitioners and students, with a system of inter-library loans which makes its books available to physicians wherever located. Our medical library resources are certainly ample. How about their use?

The average busy practitioner engrossed with the care of the sick and faced with the serious problem of earning his daily bread finds little time for reading. If he takes a medical journal or two and occasionally glances at them he feels that he is doing all that can be expected of him in keeping up with medical literature. He seldom enters a library. The equally busy but more ambitious man who attends medical meetings and occasionally prepares papers for presentation before them, may have the library brought to him through the services of the national library bureaus which furnish bibliographies, references, abstracts, translations, and packets of reprints, on almost every subject. "Complete research service at a reasonable charge." I do not question the value of this service if used by one who knows enough to know how much to use it. I do believe it encourages the production of a good many articles whose chief value is in their imposing bibliographies.

The doctor should have learned how to use a medical library while he was a medical student. He should have learned how to dig out the references himself and get at the original sources. Of course, if unfamiliar with some foreign language he must rely on a translation, but he should make his own abstracts and see with his own eyes every article quoted.

I believe it is now a part of the curriculum of most schools to require students to familiarize themselves with the technique of literary research. The reduction in the number of lectures and the increase of free time permit of independent reading. In a few advanced schools, courses are offered in the history of medicine and students are given an insight into the alluring field of classical medical literature. Familiarity with original sources is cultivated and the seed of literary scholarship is planted in those capable of germinating it. A student so educated will always come back to the library at every available opportunity in after years with real affection and with the knowledge of how to use his time to the best advantage.

Furthermore, he will be inclined to make time to do so. He is in a position to appraise scientific literature and discriminate between what is sound and reliable and what is not. He can go straight to original sources and will readily detect padded bibliographies.

Recently, in accordance with the trend of the times toward making learning easy and in the laudable endeavor to make available to the student classic medical texts, selected excerpts from

famous writings in medicine and the allied sciences have been published. These collections are of distinct value for ready reference and serve to stimulate deeper reading on the part of the student, but excerpts, and especially abstracts divorced from their context, are apt to give a somewhat distorted view and, unfortunately, in one or two instances at least inaccuracies have crept in which make reference to the originals more than ever necessary.

If advice might be ventured by one who does not pretend to have followed his own precepts I would say to the practitioners of medicine and surgery, go to your medical library in person and cultivate the habit of using it. If you do not know how, learn how. There are young librarians always eager to show the way. If you have not time, make a little time. Keep in touch with the world's progress as set forth in the current periodicals. Do not neglect the foreign periodicals, especially those in your own specialty. Look over the new books and occasionally glance at an old one. The library furnishes a liberal and inexpensive postgraduate course to its inmates.

To the young man starting on his career no matter where or in what circumstances I would say subscribe to two or three of the best periodicals

and do not let a single number get by you. Keep a card catalogue of articles which arouse your interest. At an early stage select some subject, never mind how minute, trivial or obscure—from carotids and the common cold, or the growth of the finger nails, to the interactions of the hormones of the ductless glands and keep abreast of all progress in your subject. Be an authority on the literature at least. This may be an encouragement of faddism perhaps but honest facts tempered by common sense do no harm and sometimes lead to real achievement. Visit your neighborhood medical library at regular intervals and check up on your progress. Familiarity with the work of others may suggest ways in which you can do a little worth while clinical research of your own.

Recently the Japanese surgeon Kyusaku Ogino made some simple observations on the ovulation of the human ovary which have changed the whole aspect of the physiology of conception. Any one of ten thousand operating surgeons in this country might have made such observations, if he had had the vision. In a select few vision may be innate for the majority it must be developed by reading, study and thought.

## THE COMMUNITY HOSPITAL AS A CENTER OF POSTGRADUATE EDUCATION

BY JOSEPH H. PRATT, M.D.\*

IN many ways the development of the rural hospital has advanced medical knowledge among the physicians within reach of its influence. The standards set up by the American College of Surgeons and the American Medical Association have been of help in improving the quality of the work of small hospitals, although only 15 per cent of these meet the requirements.

In discussing the subject of graduate training in medicine there is possibly a tendency to lay too much stress on the ways and means of furnishing instruction and too little on the attitude of the physicians whom the national and state organizations wish to have instructed. To be successful some thirst for knowledge and willingness to work must exist in the minds of the members of the staff of the small hospital and in those of the physicians in the surrounding countryside. Unless the local men wish to increase their knowledge by study the best methods will fail. Of the man who knows it all and for this reason does not attend the meetings of his county and state societies nothing can be expected. They are a waste of time, he says and he feels better at home and perhaps says Osler, "that is the best place for a man

who has reached this stage of intellectual stagnation."

The word student it may be recalled comes from the Latin word *studere* meaning to be eager, zealous or diligent. When these qualities are lacking spoon feeding is always desired but this is as poor a method of mental nurture for graduates as undergraduates. Now it is unfortunately true that lack of energy is a characteristic of advancing years. With youth behind us it is increasingly difficult to make sacrifices for the sake of knowledge, our minds like our bodies at a certain age become fixed (Jowett). Fortunately a few keep up their interest in acquiring knowledge throughout life. It is these rare minds that sometimes are able to leaven the dough in which they find themselves. To take an outstanding example consider what a stimulus James Mackenzie must have been to his colleagues in the provincial city of Burnley during his long career there as a general practitioner, that is if they were able to catch a little of his enthusiasm and zeal for the truth. At all times "many are the wand bearers and few are the mystics." Sir James Mackenzie himself felt that his influence was slight until the publication of his book on the pulse attracted attention in Germany and America to

\*Pratt, Joseph H.—Physician-in-Chief, New England Medical Center. For record and address of author see "This Week's Issue," page 22.

his work. In his own country it aroused little interest. He told me that during a period of fifteen years he read papers in Manchester, the medical center of Lancashire, detailing his observations and discoveries and not one of them drew forth any discussion.

In dealing with the subject of graduate medical education it seems that we should be content to provide practising physicians in the country with facilities for acquiring knowledge and not to be discouraged if the percentage of practitioners is small that takes advantage of them.

Measures for increasing the knowledge of practising physicians in diagnosis and treatment have multiplied in New England within the past decade. During the last two years in Massachusetts regular graduate courses have been given under the auspices of the Massachusetts Medical Society throughout the state. They have been admirably organized and well attended. The Connecticut Medical Society now gives a clinical course of graduate instruction at New Haven each fall lasting several days. Leading teachers from Boston, New York, Philadelphia, and other medical centers give instruction in addition to members of the Connecticut Medical Society. Some hospitals in neighboring states have offered attractive clinics. For example, the Central Maine General Hospital at Lewiston provides an all day session every month or so for practitioners. Some of the leading specialists in Boston have given clinics in this series and the attendance has been large and enthusiastic.

Fellowships paying an adequate stipend have been established in Massachusetts by the Commonwealth Fund of New York so that rural practitioners in this state are able to come to Boston for a month or more of study. The Bingham Associates Fund for the Advancement of Rural Medicine has given fellowships to practitioners in Maine for a period of study at the Medical Clinic of the New England Medical Center in Boston. These fellowships are available for from one to four months.

Within recent years facilities for diagnosis have been enlarged in the hospitals throughout New England by installing modern x-ray apparatus and equipping clinical laboratories under the charge of well-trained technicians. The chief hospitals in the larger cities employ full time pathologists. Many hospitals in the smaller cities within a range of fifty miles from Boston have visiting pathologists who are connected with the pathological departments of Harvard, Tufts and Boston University. In these hospitals the number of autopsies is increasing. In a recent month in a hospital ten miles from Boston autopsies were made on 100 per cent of the fatal cases.

Probably autopsies performed by able pathologists offer the soundest method of instruc-

tion that can be given in any hospital and are of the greatest value to those who have studied the cases during life. "Pathology is the basis of all true instruction in practical medicine" (Wilks). This was the motto Dr Osler selected for the title page of the first pathological report from the Montreal General Hospital. It was the guiding principle in his own education. "Problems in physiology and pathology," Osler said "touch at every point the commonest affection, and through exercise in these the man is chastened, so to speak, and can never, even in the daily round of the most exacting practice, degenerate into a money-making machine."

In his address on the Educational Value of the Medical Society Osler emphasized the importance of the demonstration of instructive specimens in morbid anatomy. "After all has been done many cases of great obscurity in our daily rounds remain obscure, and as post mortems are few and far between, the private practitioner is at a great disadvantage, since his mistakes in diagnosis are less often corrected than those of hospital physicians. No more instructive work is possible than carefully demonstrated specimens illustrating disturbance of function and explanatory of the clinical symptoms" (Osler). Next to the patient himself the hospital pathologist is the best teacher in the rural hospitals.

Staff meetings at which clinical cases are demonstrated can be of great educational value. The minimum requirements of the American College of Surgeons include a staff meeting to be held at least once a month. Members of the Staff are instructed "to review and analyze at regular intervals their clinical experience in the various departments of the hospital, such as medicine, obstetrics and the other specialties, the clinical records of patients free and pay, to be the bases for such review and analyses." The presentation of instructive cases by the physicians who have studied them adds interest and value to these conferences. Ingenuity should be exercised to make the meetings profitable. Dr Ochsner of New Orleans suggests four methods of assuring a thorough review of the clinical work at the staff conference of which the following two seem especially commendable.

"1. A week before the meeting abstracts of the cases are given to two members of the Staff, neither of whom has seen the case and whose only interest in it is scientific. These two persons open the discussion and this is followed by general comment, without any reference to the attending physician. Laboratory findings are presented, including the report on the pathology which is given by the pathologist himself. The discussion is closed by the chairman who reads a summary of the case, including the final diagnosis and treatment."

"2 The facts concerning the cases are presented by the physician in charge without any mention of the ultimate findings, the final diagnosis, or the treatment, and then general discussion takes place. With this method the staff is more apt to discuss the case impartially because being unaware of the ultimate findings, they cannot be accused of destructive criticism. After general comments by staff members the remaining details including operative and necropsy findings are presented by the attending physician."

Whenever possible the pathologist should show the gross and microscopic specimens. If the meetings are to be helpful those present must express their opinions freely even when they vary from those of the physician in charge of the case. When freedom of discussion is absent the meeting may be a means of disseminating error rather than truth and it will certainly fail to be inspiring. Not long ago, at a well attended staff meeting held in a suburban hospital, a physician reported a case of sudden death occurring in a patient under his care in the hospital as doubtless due to cerebral hemorrhage. There was no autopsy. No one questioned the diagnosis. In fact there was no discussion. After the close of the meeting I asked the member of the staff who had invited me to be present if he thought none of the hospital physicians present knew that coronary disease and pulmonary embolism are the usual causes of sudden death. "Of course we knew that," my friend replied, "but it would never have done to have disputed the old man's diagnosis. He would have regarded it as a personal affront." I am afraid such examples of unwillingness to speak the truth are not uncommon in staff conferences of other hospitals when autopsies are rarely obtained.

The fewer autopsies a physician sees on his own cases the more confident he is in the correctness of his diagnoses. There was truth in Osler's comment that morbid anatomy enables the physician "to correct his mistakes and if he reads its lesson aright may serve to keep him humble."

The importance of the hospital library in education should be stressed. The leading weekly and monthly journals should be taken and new books purchased. If each member of the staff contributes to its maintenance as he should, he will be more apt to take pride in the library and to use it, and his self sacrifice if he has made any, will do him good.

The Commonwealth Fund has sponsored six first class rural hospitals in different parts of the country for educational purposes. One of these is the Franklin County Hospital in Farmington, Maine. In the adjoining county in the town of Rumford the Bingham Associates have added to the facilities of the excellent Community Hospital by paying the salary of a resi-

dent physician and providing a new x ray equipment, an electrocardiograph, basal metabolism machine, new operating table and some apparatus for the clinical laboratory. In addition a library of about 200 recent medical and surgical books was given to the hospital, and leading periodicals furnished.

New means of diagnosis involving the use of instruments of precision are a hindrance rather than a help unless there is someone in a hospital who is skilled in their use and in the interpretation of the findings. Few clinicians have had as broad a knowledge of physiological and pathological chemistry as Friedrich v. Müller. Yet he is quoted by one of his pupils as having said that his percussive fingers are worth more to the practising physician than a whole chemical laboratory. There is certainly a tendency to overrate laboratory procedures and to underrate the importance of a careful history and a thorough physical examination. Often when asked in private practice to see patients in consultation the physician in charge has handed me a report of a urine or blood examination or an x ray examination with the implication that was all one needed to know about the case. A few years ago in making a visit with a physician in charge of the medical service of an exceptionally well equipped rural hospital, I was asked my opinion in a couple of cases. The first was one of pericarditis with effusion. Although the physical signs were typical they had not been detected. The diagnosis I learned had been made by the radiologist. Books were consulted and by some strange misreading of a standard text it was thought that to perform paracentesis the needle should be inserted just to the left of the sternum in the fourth or fifth interspace—exactly in the normal position of the internal mammary artery. A surgeon was called and he inserted a needle in the position just mentioned. Hemorrhage resulted and the patient collapsed. The second case was one of cough, continued fever, loss of weight, and rales over the upper lobe of the right lung in a young man. There had been a pleurisy with effusion a couple of months before admission. When I told the doctor it seemed to me to be a typical case of pulmonary tuberculosis he said that could not be the diagnosis as a guinea pig inoculated with the pleuritic fluid did not develop tuberculosis! The conclusion is justified that in these cases nothing was gained by having available an x ray machine and a bacteriological laboratory.

For the past three years members of the resident medical staff of the New England Medical Center have acted as residents at the Rumford Community Hospital for periods ranging from one to four months. They have made the examinations in all cases admitted to the hospital and have kept the records. As the men have had two to three years of hospital experi-

ence before going to Rumford they have been of more help to the hospital staff and to the patients than young graduates who had not served an internship would have been.

Bingham Fellowships offered to members of the visiting staff of the Rumford Hospital were accepted by nine out of the total of eleven physicians who are in attendance. These doctors when receiving graduate instruction all worked in the medical clinic of the Boston Dispensary where they took histories and made and recorded physical examinations under the supervision of one of the senior men of our staff. It was hoped that the educational value of personally examining patients and recording their findings would be so impressed upon these men that they would write good notes after resuming work in their own hospital.

The importance of careful case taking was possibly more appreciated a hundred years ago by the men who were establishing hospital services than it is by physicians similarly engaged today. Then the field of physical exploration had recently been opened up by the work of the French school especially Corvisart, Laennec and Louis. In 1811 when money was raised for the building of the Massachusetts General Hospital, Boston had a population of only 34,000. Conditions were in some respects comparable to those in many small cities today. The founders of the Hospital were two men then in the vigor of early middle life, James Jackson and John Collins Warren. They both realized the value of good hospital records. The case report of the first patient is still preserved. The painstaking penmanship indicates the importance attached to it. "It has long been my wish," wrote James Jackson, "to make the records of the hospital useful to the cause of science."

the observation of cases must be accurate and must be faithfully stated. If this is not done we shall be led into error, not to truth. It has been the practice at the Massachusetts General Hospital, in the medical department, to note the state of the patient every day, in acute cases as our records show. The records of Dr. Warren's hospital practice copied for his personal use filled six large folio volumes. The facts and observations contained in them furnished the basis for his work on tumors, the first monograph to be published on this subject. A reviewer of this volume describes the case reports as "clear, simple and graphic; they bear the unaffected impress of truth."

In planning graduate courses it is sometimes forgotten that "the bedside is always the true center of medical teaching." It has only been by observation of facts carefully recorded at the time and later analyzed that clinical medicine has made its advance, and this same method must be employed by every student if he is to educate himself. Speaking of his old master, Oliver Wendell Holmes says, "that to follow him in his morning visit was not only to take a lesson in the healing art, it was learning how to learn, how to move, how to look, how to feel, if that can be learned. To visit with Dr. Jackson was a medical education."

It is a question if much can be learned that is of lasting value from lectures or clinical demonstrations unless the information gained from them is made the starting point for personal work. When I entered Dr. Mall's anatomical laboratory as a student I was amazed to find that we were to have no lectures or demonstrations. "We demonstrate to ourselves from our own dissections," said a student and so we did. In his description of the anatomical course at the Johns Hopkins University, Mall said, "I believe that there is but one way to learn any subject, and that is through study. The very name student tells what the person so named should be doing. If we can make the student work thoroughly and carefully, a great result is achieved. It makes of him an artist, an actor, an expert, not a dilettante. He is upon the stage, not in the audience." This says Dr. Sabin was "Mall's fundamental contribution to education—the concept that self-education is the only form of lasting value, the inductive method with the student as actor."

In planning instruction for practitioners in clinical medicine should not an effort be made to make actors of them? Might it not be well if the visiting doctors who give graduate instruction in community hospitals adopted a rôle similar to that of a dramatic coach and taught the local men to put on their own show? By that I mean the working up and demonstration of their own cases with general comments based on a study of the recent literature dealing with the disease under consideration. The visiting teacher who had aided them in gaining increased knowledge of their subject might with profit then give a short lecture. I believe this reversal of the usual order would increase the value of such courses, and it would be the only kind of education as Mall maintained that really counts, namely self-education.

NOTES ON THE SMALL HOSPITAL AS A CENTER  
OF POSTGRADUATE EDUCATION

BY W. EDWARD STOREY, M.D.\*

1 A small hospital is easily accessible and familiar to physicians practising in the vicinity. A daily contact with the hospital pathologist and the house officers who have a frequent contact with leaders in large centers gives the practitioner the best *practical* opportunity to keep informed. In large centers where there is much routine work, research and advanced discussion of problems the practitioner is too often self-conscious, timid, and reluctant to ask questions. This difficulty is more easily overcome in the small hospital where there is more time for explanation and all are familiar to the practitioner.

2 There are those, such as the hospital pathologist and house officers, who are constantly available and who are glad to consult with the practitioner, to suggest accepted measures for diagnosis and treatment and to help him follow up the scientific side of the case.

3 Periodic teaching clinics conducted by leaders from large centers are easily organized and may give the practitioner an extra contact with the very heart of medical progress at no extra cost of time, money, or trouble. Clinics of this character were especially successful at Lewiston, Maine, recently, where they were attended almost unanimously by the staff and by other local physicians who were members of another hospital staff and even by physicians who lived as far as twenty-five to forty miles away (the exact percentage of attendance on these days can be obtained from the registry at the Lewiston hospital). Diagnostic clinics with the patient present were held in the mornings and those present had a first-hand opportunity to see how a difficult diagnosis may be arrived at by narrowing the number of likely possibilities. Ward rounds were made in the afternoon during which all interesting cases on the wards were

reviewed and helpful suggestions made. In the evening some topic of practical as well as scholarly interest was presented in the form of a lecture, often with lantern slides and pathologic specimens, followed by a general discussion in which all were encouraged to enter. The fruits of these clinical days become increasingly apparent in the technique and reasoning of the local practitioners.

4 The presence of a resident pathologist is highly desirable; he makes it possible for the practitioner to avail himself of tissue sections, gross specimen study, and to follow his patient to necropsy with more ease and less expense and embarrassment than would otherwise be possible. The advantage of getting all practitioners to consider as a matter of course the pathologic phase of their cases is obvious.

5 Library facilities, however modest, are a source of information and inspiration to those who otherwise might fail to do any reading or reference work on an interesting case or group of cases. The library at Lewiston was assembled through contributions of books from various staff members. Standard journals in several lines of work were provided through voluntary contributions. The library served a very useful place in the hospital's program of postgraduate education.

6 Through newspaper notices of the hospital activities, members of the community will become increasingly confident in the progressiveness of its local physicians and will be inclined to seek their advice first before going elsewhere.

7 By its welcome to all, the small progressive hospital makes it the accepted thing for a practitioner to manifest his natural interest in scientific medicine without feeling conspicuous or apart in doing so. Indeed, it makes it imperative with the consequent result of a better quality of work.

Storey, W. Edward—For record and address of author see "This Week's Issue," page 32.

## INTERNSHIPS IN MASSACHUSETTS HOSPITALS

BY CHARLES H. LAWRENCE, M.D.\*

MASSACHUSETTS has three approved medical schools from which there graduate a yearly average of three hundred doctors, practically all of whom seek to fit themselves for the actual practice of medicine by serving as interns in hospitals qualified to furnish them proper experience and instruction in return for the essential service which they render in the conduct of such institutions. There are in this

state thirty-five hospitals which are approved for internships by the Council of Medical Education and Hospitals of the American Medical Association. These offer a total of three hundred and forty-six internships for medical graduates. It is, therefore, possible, at least theoretically, for every graduate of a recognized school in Massachusetts to continue his medical education in an approved hospital within the state.

As a matter of fact, the most recent available

Lawrence, Charles H.—Physician Boston Dispensary. For record and address of author see "This Week's Issue," page 32.



figures show that 237 internships in approved Massachusetts hospitals are occupied by graduates of Massachusetts schools. Of the remainder, twenty-six are held by graduates of schools in other New England states and eighty-two by graduates of schools outside New England. Lacking a statement from each intern, of the reasons for his choice of hospitals no precise conclusions can be drawn from these figures, but they do indicate that practically 80 per cent of the graduates of the schools in Massachusetts find internships more or less satisfactory to them in the approved hospitals in the state, and that competition from other schools, and probably in a few instances personal reasons, compel about 20 per cent to seek internships elsewhere or in a few instances to begin practice immediately. It would be extremely interesting to learn the reasons which determine each intern's selection, and to obtain from him, at the end of his service, an opinion as to whether his choice had been justified by his experience. Such a compilation would furnish material of great value to medical schools, graduates seeking internships, and to trustees of hospitals desirous of increasing and improving their intern staffs.

In default of such information, any consideration of internships must necessarily be one-sided, since the only criteria of their value which can be applied are the rules formulated by the Council, which necessarily define the minimum requirements for approval rather than the imponderable values without which wealth of material and equipment are but sounding brass and tinkling cymbals. Mere numbers of patients in a hospital do not insure that an internship there will best fit a man for practice, nor can it be said that length or type of service are determining qualities, or that adequate laboratory facilities train an intern to appreciate properly the place and value of laboratory aids in the care of the sick. The fundamental quality which makes any internship valuable must be sought in the character and purpose of the hospital's staff and trustees, and consists of an eagerness to equip their juniors with practical training and possibly impractical ideals which shall enable them to maintain and improve the traditions of the profession. Without this spirit, the physical characteristics of a hospital are of little significance.

Since, however, physical characteristics are the only ones which can be accurately measured at present, some help for prospective interns and for the hospitals themselves may be derived from a consideration of this side of the problem. In what type of hospital can a recent graduate in medicine obtain the best training for the kind of work he intends to pursue? How much time can he give to this kind of postgraduate education without encountering sharply diminishing returns? What ratio of

beds to interns will give him the widest possible experience and at the same time afford opportunity and energy for adequate study of the material furnished? Does the "straight" service, limited to a single field, the "rotating" service, which includes successive periods in medicine, surgery, pediatrics, obstetrics, the clinical and x-ray laboratories, or the "mixed" service, in which he may work in more than one field at the same time, offer the best training for him? Tentative answers to these and other related questions can be attempted on the basis of an analysis of the reports on hospitals approved for internships in Massachusetts.

Of the thirty-five approved hospitals in the state, five may be designated general "teaching hospitals" in the literal sense, since their staffs are partially or completely composed of men who hold teaching positions in medical schools, and the patients are used for teaching purposes. Four of these five offer "straight" services varying in length between twelve and twenty-four months. Only one "teaching" hospital offers a rotating service, of twelve months' duration. There are twenty-eight general "non-teaching" hospitals, meaning hospitals in which no formal undergraduate instruction is carried on. In eighteen, the service is the rotating type, in the rest, "mixed." There are two hospitals for patients with chronic disease, in which a little undergraduate teaching is done, both offering rotating services of twelve months' duration. Of the twenty-eight non-teaching general hospitals only three offer services longer than twelve months, and in one the longer term is optional. There would seem to be little danger that the intern services are too long in Massachusetts. The only question to be considered is whether the rotating services are quite long enough.

There has in the past been much argument concerning the relative merits of the various types of internship, one group maintaining that the "straight" service gives a thorough training in one field of practice, and that no man can adequately carry on more than that while another maintains just as stoutly, and probably with equal right, that the rotating service gives a better knowledge of the interrelation of the various fields of medicine and that even to-day the majority of physicians cannot restrict their practice to a single field. It would seem obvious that for the man who intends to restrict his practice to internal medicine or general surgery the straight type of service offers the most complete training, while for the future "general practitioner" the rotating service offers more suitable experience, and for the "regional specialist" either a rotating or a mixed service which embraces at least medicine, surgery and pediatrics furnishes the best antidote for the narrowing influence that such restriction exerts. That a teaching hospital is as a rule more stimulating to the intern than one

in which no formal instruction is attempted may be accepted as generally true, since he is present at many of the teaching exercises, and absorbs much from them. Not all great teachers, however, are collected in the "teaching hospitals." The choice between "straight", "rotating" and "mixed" service would, therefore seem to rest preponderantly upon the type of practice to which the individual intern intends to devote himself. As regards the optimum length of internship, the limiting considerations would seem to be the pressure of necessity and the question of diminishing returns. The first consideration is always a personal one with each intern, the answer to the second depends somewhat upon the type of service, and somewhat upon the variety of material offered by the hospital in question. Obviously a mixed or rotating service might well be longer than the straight type, since even so the time spent in any one field would be much shorter in the former than in the latter. It is the opinion of the Council of the American Medical Association that twelve months is the minimum acceptable term of service, but no maximum term is mentioned in their report. It is conceivable that if twelve months is a satisfactory minimum, a term of more than eighteen months, especially in a straight service, might operate under the law of diminishing returns and might tend to "hospitalize" the intern, to his everlasting detriment as a practitioner.

Perhaps the most important question which can be partially answered in this survey is that concerning the optimum ratio of interns to beds and yearly admissions in any given hospital. These two factors determine the adequacy of material for study, and the amount of time available for other than barest routine duties, and this latter consideration is fully as important as the former in the proper training of an intern. Thorough study of a moderate amount of material is much more important at that stage of medical education than hasty examination of large numbers of patients, since the former develops a habit which lasts through the years that will supply material in increasing amount, while the latter tends to render one incapable of learning by experience.

A study of the ratio of interns to yearly admissions in the approved hospitals in Massachusetts brings to light a marked difference between the "teaching" and the non-teaching groups. In the former there were 354 yearly admissions per intern during the period studied, in the latter 980 yearly admissions per intern. In the two hospitals for patients with chronic disease, the ratio was 489 patients per intern yearly.

Many contradictory conclusions might be drawn from these figures but the true explanation of the differences probably lies in the greater amount of detailed study of each patient required for teaching and research purposes in the

"teaching" institutions. Such work is extremely time consuming, expensive, and yields only a small amount of information immediately applicable to the treatment of the patient upon whom it is carried out. It is, therefore, quite properly not required in non-teaching institutions, with the result that the intern can adequately study and care for a larger number of patients than is possible in a teaching hospital. Therefore, the ratio of three to one between the former and the latter seems proper, when the effort per patient is considered. The only question is whether the interns are overworked in both types of hospitals, and to this question no unbiased answer is available. While they are interns, every man believes they are, after ten years in practice, the same men are sure they were not. No one will deny that it is possible for an ambitious man to do his work adequately and at the same time learn a great deal under present conditions but the question is whether the return is adequate for the energy expended.

A partial answer to this question appears in the analysis of the ratios of interns to beds in the hospitals under consideration. In the entire number the ratio is thirty four beds per intern, or if the two hospitals for chronic patients are eliminated, twenty-eight beds per intern. In a properly regulated hospital, in which the interns' time is not wasted, this ratio is probably not excessive. Certain conditions not apparent in the figures, however, may make it so. Such conditions are most apt to be encountered in the mixed type of service in which the intern may be constantly interrupted in his work by the conflicting demands of his varied duties and of several members of the visiting staff who may demand his services simultaneously. Only great care and consideration on the part of the staff can prevent such occurrences becoming frequent and harassing and even they cannot defend the intern from the impossible demands which circumstances sometimes create. These potential interruptions constitute a serious objection to any service in which the intern serves in two or more fields simultaneously and should be considered carefully when contemplating this type of internship. A low ratio of beds to interns is the only apparent solution of the problem at present.

Returning to a consideration of the general problem of the ideal number of beds per intern, it appears that the average in the "teaching" group is just under nineteen beds per intern, while in the "non-teaching" hospitals it is just over fifty one per intern. The maximum ratio in the teaching group is twenty four to one, the minimum is nine to one. This minimum seems almost too small for proper intern training the object of which according to the Council's report, is "to round out the medical graduate's

training so as to enable him to enter into the general practice of medicine and not to equip him to enter directly on any specialty." One can hardly visualize the demands of nine patients which would be sufficient profitably to occupy along those lines an intern's entire time.

In the non-teaching group the maximum number of beds per intern is 108, an impossibly large number for one man except perhaps in a hospital for patients with chronic disease. There is no adequate reason for this high ratio of beds to interns. The latter usually receive no salaries and their number adds but little to a hospital's expense, and there would seem to be more than enough well-trained graduates to fill the demands for interns in Massachusetts. Service in a hospital with an impossibly high bed-intern ratio offers the intern no adequate return for his services, and tends to develop slipshod methods and the dangerous habit of making "snap" diagnoses. Any hospital with a ratio of over seventy-five beds per intern can hardly expect or intend to make adequate educational return for the services they render. It is perhaps significant that all the hospitals in our list having a bed intern ratio above that figure pay their interns salaries, a custom which obtains in few others in Massachusetts.

At the other end of the scale in the "non-teaching" group stands the bed-intern ratio of seventeen to one. This would seem to be almost too low for the intern's best interests, but if the visiting staff is mindful of its responsibilities, is probably adequate. Certainly that ratio is far more desirable than the maximum cited above.

Thus far the questions to which tentative answers have been suggested have concerned principally time and material in the form of patients available for study under different hospital systems. Equally important, however, is the development of a proper method of study, which only becomes possible if adequate laboratory facilities and systematic instruction in their application and value, are available to the intern. Herein lies the most glaring weakness of the "non-teaching" group of hospitals. Of seventeen hospitals in this group concerning which a definite statement is available, only three have a full time laboratory director, nine have part time directors, in two the direction is described as nominal, in one as "half time," and in two there is no director at all. In several the routine laboratory work is done by technicians, and the interns are required to do only emergency work.

Under any of the systems enumerated except that involving a full time director, the temptation to shirk laboratory work is almost overwhelming. The recent medical graduate is "fed up" on laboratory work and thirsts for patients and contact with them. Certainly there is little excitement to be found in the performance of

most routine laboratory tests, especially when they relate not to one's own patient but to an impersonal "case" that one has never seen and probably never will see. And if the visiting staff apparently succeeds in caring for their patients without recourse to somewhat tedious routine, any but the most conscientious intern soon learns to persuade himself that "a white count probably wouldn't tell us anything" or that there is no necessity for examining the urine. Once established, this habit becomes fixed to the detriment of future patients. The failure of many general practitioners to make the correct diagnosis in many cases lies not in their inability to interpret clinical signs correctly, but in their failure to do a few simple laboratory tests which would serve to direct their attention to possibilities which, without them, do not enter their minds. It is, therefore, of the utmost importance that every intern should acquire the ineradicable habit of checking his subjective impressions by the objective facts available through laboratory methods. This habit will be acquired only under the tutelage of one who has the conviction that laboratory work is essential to proper medical practice, and the time to inoculate lukewarm pupils with that conviction. With rare exceptions, such a combination is encountered only in laboratories to which the director gives his full time and enthusiasm, and every hospital employing interns should have such a director. If the clinical material is sufficient for the intern's needs, the laboratory material should be adequate for a full time director's

An analogous though less pressing situation exists in the departments of radiology in the hospitals concerning which definite information is at hand. In only five are there full time directors. Such instruction as the intern gets he must pick up as best he can, and it usually consists in reading a report of the x-ray findings, rather than study of the films and instruction in interpreting roentgenograms.

Radiology is a specialized procedure and is not essential to the diagnosis as often as are the more humble laboratory tests, but every intern should learn by experience rather than by word of mouth to know the circumstances in which its possibilities justify its expense to the patient or the hospital. He should also learn enough of the difficulties inherent in the interpretation of roentgenograms to give him a proper sense of their value when he is piecing together the evidence concerning an individual patient. To acquire even this minimum learning he must have the opportunity to see the roentgenograms of patients under his care and discuss with a qualified roentgenologist the correlation and discrepancies between the x-ray and clinical evidence.

Manifestly an intern will not get this type of instruction in a hospital in which the roentgenol-

ogist spends only time enough to read the films and dictate his opinions before hurrying to an other institution or back to his own office. While the roentgenological demands of some of the smaller hospitals may not require the entire time of a director of that service, any part time plan should insure that he give more than enough time to meet the minimum diagnostic requirements since only thus can proper instruction of interns be assured.

And finally, if an intern is to receive proper return for his labor the hospital in which he works must in some way provide him access to an adequate reference library. This does not mean an enormous collection of books, but it does mean that a reasonable number of recent standard works be available for reference work, and that the better medical periodicals also be available. In the majority of Massachusetts hospitals outside Greater Boston these conditions are not satisfied. The books on the shelves are outdated and the medical magazines few. Such conditions wean the intern from the valuable habit of keeping in touch with medical literature, so that after graduation his knowledge tends to fall farther and farther behind medical progress.

It is not the purpose of this paper simply to point out the existing defects in the instruction of interns in the hospitals of Massachusetts. Criticism of certain conditions has been offered as affording a basis for planning further improvement, for it must be stated in all fairness that in practically any approved hospital in the state a recent medical graduate can spend a year profitably if he is energetic and interested. What can be done to still further improve the value of the internship to both hospital and intern?

In order to answer this question, further data are necessary, the collection of which involves the cooperation of all who are vitally concerned in medical education: the medical schools supplying interns, the hospitals employing interns,

and last but not least recent interns themselves.

Medical schools should form a committee to advise prospective candidates for internship concerning the hospitals in which they are most certain of getting instruction and experience which will best fit their needs. In order to give such advice, the committee would have to be in possession of facts obtainable only through the cooperation of the hospitals and their recent interns. From the hospitals the committee should obtain information in regard to the various qualifications considered essential for approval by the Council of the American Medical Association. From each intern, on completion of his service, it should obtain opinion of the value of that service embodying specific suggestions for its improvement. Suggestions which the committee considered valuable could be forwarded to the superintendent or trustees of the hospital in question to be acted upon by them. After all, the interests involved are not conflicting but mutual.

There is at present no adequate organization for the solution of these problems and the need for such an organization is perhaps the most important fact which this study has served to emphasize. It also indicates what the composition and functions of such an organization should be. Manifestly, medical schools, hospitals and the Massachusetts Medical Society as well as the interns themselves, are concerned in improving the value of intern services in Massachusetts. Therefore, all of these bodies should participate, by representation in assembling and studying the necessary data which should include not only the usual statistics concerning beds, books, admissions and autopsies but also statements from all interns, on completion of their services, regarding the value of the service from their point of view and embodying suggestions for improvements. Such a study would benefit not only the interns but medical schools, hospitals, and the community as well.

## A BAFFLING CASE OF PULMONARY CARCINOMATOSIS\*

BY JOSEPH C. EDWARDS, M.D.†

SINCE pulmonary aspergillosis was first described in 1842<sup>1</sup> there has been much discussion as to whether the infection is primary or secondary to other lung conditions such as tuberculosis, abscess, bronchiectasis etc. In the

The Massachusetts Medical Society has provided for the award of a prize of fifty dollars each year to the best written and most comprehensive case report submitted by an intern holding a rotating internship in a Massachusetts Hospital which is approved for intern training by the American Medical Association.

This essay was awarded the prize for 1935. The illustrations were not a part of the material submitted for the award.

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literature there have been many reports of primary aspergillosis both in man and animal.<sup>2</sup> It is said to occur in pigeons as a primary pulmonary type. In man, some believe the condition to be primary even in the presence of tuberculosis and such writers reason that since the fungus is so universally present, if the aspergillosis infection be secondary, it should be found more frequently in association with tuberculosis. In the literature, only one instance was found associating aspergillosis with carcinoma of the lung.<sup>3</sup> As the authors reporting the case stated that no specific reference in the literature could

be found of aspergillosis infection secondary to pulmonary carcinoma, it therefore seems warranted that the following case should be reported

A report of this case may also serve to direct attention to the importance of a more careful consideration of possible primary conditions when obscured by predominating physical signs, clinical symptoms x-ray and laboratory findings

#### CASE REPORT

A thirty year old white married American housewife was admitted to Springfield Hospital Oct 28, 1934 with a complaint of cough, dyspnea and weakness over a period of three months. The onset had not been acute and there had been no chills or night sweats

The patient stated that she had not lost weight, but the physician in charge said that the patient's usual weight had been 125 pounds but in September had dropped to 107, a loss of 18 pounds in three months, which loss was attributed to restricted diet, prescribed for relief of vague gastrointestinal symptoms

Her history previous to admission to Springfield Hospital was briefly as follows

April, 1933 Roentgenogram of chest was negative

April, 1934 Complained of gastrointestinal symptoms of obscure nature. Gastrointestinal series interpreted as negative

Aug 30, 1934 Roentgenogram of patient's chest was reported as showing evidence of miliary tuberculosis, while another film taken at this time and interpreted by another radiologist was diagnosed as pulmonary tuberculosis, but not of the miliary type. Von Pirquet test was negative at this time and sputum failed to show acid fast bacilli

Sept 9, 1934 Sputum examination showed tubercle bacilli not found, mold present. Penicillium glaucum culture showed mixture of Staphylococcus and a spreader which made definite identification impossible

Sept 24, 1934 Sputum again negative to tuberculosis. Mold present aspergillus

Sept 27 1934 Tuberculosis not found. Mold present but too young to identify. It has the appearance however, of aspergillus. Curschmann's spirals were present. Blood examination at this time: red cells 5,460,000, Hg 75 per cent, white cells 17,000—small mononuclears 16 per cent—large mononuclears 15—transitionals 45—myelocytes 0—polys 75 per cent and eosinophiles 3 per cent with no normoblasts or megaloblasts

Sept. 30, 1934 Roentgenogram of chest reported as follows "From all appearances there seems to be slightly more involvement than there was in plate taken August 30th." A definite opinion was not given, but it was felt that malignancy could not be ruled out and that neither tuberculosis nor fungus infection could be disregarded

Oct. 7, 1934 The patient was becoming steadily worse. Coughing spells were numerous and exhausting

Oct 14, 1934 Examination by a consulting physician showed "nothing but chest signs" no nodules could be palpated in the breasts and examination of heart and abdomen was negative

Oct 23, 1934 Sputum was examined using 40 per cent potassium hydroxide, staining for 30 minutes, and aspergillus was found

Oct 28, 1934 Admitted to the Springfield Hospital, Springfield, Mass. The cough, general condition and particularly the dyspnea had become progressively worse, the relief of which necessitated almost continuous confinement to the oxygen tent

Physical examination revealed a very weak, cyanotic female, poorly nourished and looking very ill. There was great difficulty in raising a frothy white and occasionally blood streaked sputum, containing no yellow particles or pus. The pulse was regular. The heart was normal in size and its sounds normal. There was a slight impairment of resonance over the entire chest, while diminished breath sounds were evident throughout the chest, particularly at the bases which appeared equally involved. Rales were few in number, rather crepitant in quality. Because of the extreme distress from dyspnea on slightest exertion, the patient was too ill to attempt thorough examination. Palpation of the abdomen showed slight distress in the region of the liver and epigastrium but no masses were to be felt. The temperature was 100° F—pulse 110, with respirations 48 to the minute. There were frequent paroxysms of coughing accompanied by labored respirations and extreme dyspnea. Examination of urine showed S P T albumen, 2 to 4 white cells per high power field with occasional epithelial cells. The blood showed Red cells 3,950,000, Hg 70 per cent, W B C 22,400, Polys 81, Lymph 10, Myelos 5 and Eosinophiles 4. Platelets were distributed normally. Smear showed achromia. Sputum negative to aspergillus eight days before death. (Inhalations of ethyl iodide were administered before entry)

Nov 4, 1934 Roentgenogram—firm mottling scattered throughout entire lung fields. Mottling has increased in density since previous pictures

#### BRONCHOSCOPY

Nov 5, 1934 The mucous membranes throughout the pharynx and hypopharynx are dry, red and inflamed but thickening of these membranes is not apparent. The arytenoids are slightly thickened but show normal motility. The posterior commissure is normal and no granulations are present. The cords appear slightly thickened and quite red but are normally motile and approximate closely. The lateral walls of the larynx are slightly thickened and dark red, due to inflammatory reaction and to cyanosis. The tracheal rings are distinct but do not stand out as white as in the normal and the trachea throughout has a dark, dusky red appearance. The trachea is noticeably deviated, to the right at its middle third, but shows no evidence of compression

The carinal crest is but very little thickened and is quite normal in contour, excepting at its base where it is somewhat broadened. It shows no degree of fixation on inspiration or expiration. The right main bronchus appears dark red and quite cyanosed but its membrane appears but slightly thickened. The branch divisions of the lower lobes, right and left, are not thickened and although deeply red, appear quite normal in contour. Secretion is practically absent although several thick, gelatinous plaques were aspirated. The left main bronchial wall appears to be uniformly smeared with a thin translucent membrane which gave a definitely lighter appearance than that seen in the right bronchus. Because of the patient's serious condition, time was not spent

to examine the upper lobe orifices. As a therapeutic measure 6 cc of Iliadol was installed deeply into the right bronchial tree and 9 cc into the left. Oxygen was administered throughout the examination. Ten per cent cocaine was used in the hypopharynx and 20 per cent applied to carina and secondary branch divisions. Considering the patient's preoperative condition she reacted well to bronchoscopy.

Six days later the patient died in marked cyanosis with temperature of 97.6—pulse 130—respirations 60 a few hours before death.

The essential pathologic findings were as follows. The lungs appeared solid and shrunken throughout with a uniform surface appearance of mottled gray and white with uniformly distributed fine nodules over the entire lung surface. The lungs were not adherent to the chest wall. There were several ounces of free fluid in the thoracic cavity. The lung

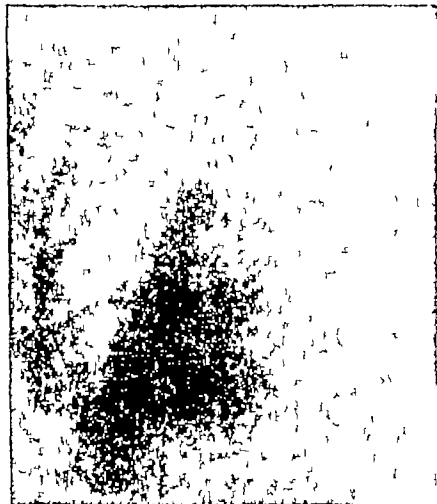


PLATE I. August 30, 1934

surface was hard and firm to palpation. Gross section revealed numerous areas varying from 1 cm to 3 cm in diameter of whitish color many of which showed necrotic centers. These areas were uniformly distributed throughout both lungs and in all lobes. The lung tissue seemed almost rubbery to the touch. The bronchi contained a creamy white fluid. There were no ulcerations present. No single large tumor mass was found.

The liver was enlarged its left lobe filling the greater part of the left upper quadrant. There were four well-circumscribed white necrotic masses in the liver occupying a depressed position in the surface of the organ the largest of which was two inches in diameter and about the same in depth. These masses were stellate in appearance at the liver surface. Cultures from these liver masses and from the lungs were negative for fungi but cultured secretions from the bronchi showed pneumococci, staphylococci and streptococci.

The heart was normal in appearance. The intestines, stomach, kidneys and adnexa were normal to gross appearance. One pathologist reported that from the microscopic appearance of the pulmonary

tissue the tumor could well be primary carcinoma of the lung while another thought the sections characteristic of metastatic carcinoma. The final diagnosis made by Dr. Frederick D. Jones of the Springfield Hospital was that of primary endobronchial carcinoma of the lung with liver metastasis.

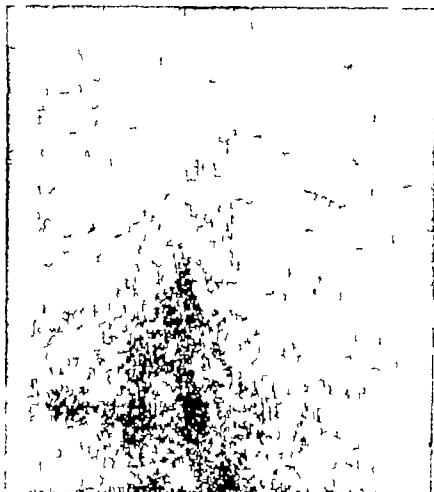
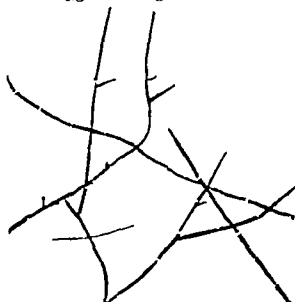


PLATE II. September 30, 1934

Hamman states that roentgenologically, pneumomycosis among other things may suggest new growth and that a lesion of the hilum and lower lobes suggests fungi. Aside from the cir



(Oil immersion.) Drawing of specimen of aspergillus from smear of sputum of patient. It is identical to the specimen obtained on culture which is more dense and has more branching mycelia with hyphae of short extent which terminate in single rounded ends not unlike conidia.

cumscribed appearance of many bronchiogenic carcinomas of the lung roentgenologically, Rabin and Neuhof say that "the non-circumscribed neoplasms of the smaller bronchi usually present the appearance seen in unresolved pneumonia (at relatively early stages of the growth). Later a lymphangitic carcinosis of both lungs often supervenes. The film then shows the lungs to be

occupied by fine streaks and nodules and the primary growth may not be recognizable. A carcinomatous involvement of the pleura with pleural effusion may occur early in the disease<sup>5</sup>."

Geschickter and Denison in a report of several cases of carcinoma of the lung divide them into two types, (1) the common bronchial or epidermoid carcinomas, or hilar cancer which is composed of epidermoid cells resembling the lining cells of the larger bronchi, and (2) the lobular or pneumonic cancer, which is a diffusely growing adenocarcinoma apparent in the roentgenogram as multiple nodules infiltrating one or

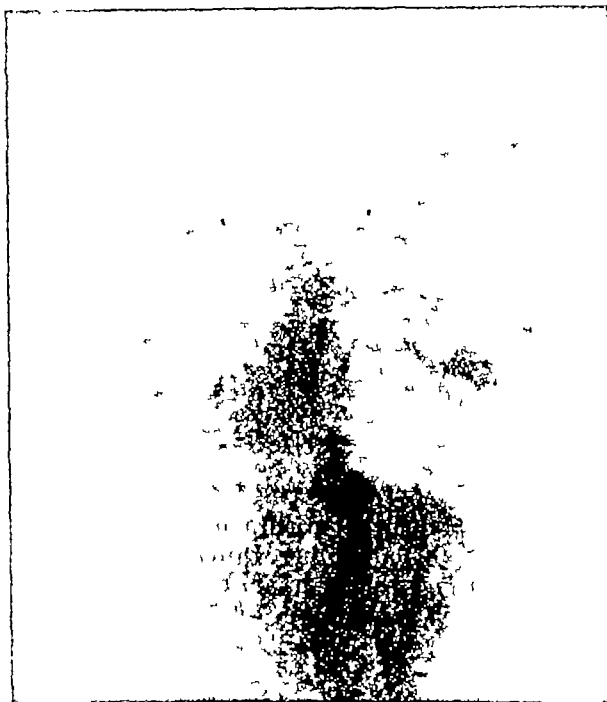


PLATE III November 4 1934

both lungs, usually toward the base<sup>6</sup>. In the latter diffuse type the authors state that adults under forty-five years of age are often afflicted. Microscopically the tumor has an adenomatous structure resembling the terminal ramifications of the bronchioles and sometimes containing a mucoid secretion. These authors believe that the so-called alveolar carcinoma is not an established form, and its existence has never been conclusively demonstrated.

The above-named authors reported several cases of pulmonary carcinoma the youngest being twenty-two years of age and the oldest sixty-five years. A roentgenogram of the twenty-two year old patient showed tumor diffusely infiltrating both lungs after the manner of miliary tuberculosis, with shadows more dense at the bases and in the region of the right lower bronchus. This young patient had had fever, cough, night sweats, and dyspnea of three weeks' duration, and had lost 11 pounds. The clinical impression of this case was miliary tuberculosis. A similar

case has been described by Hamman<sup>7</sup>. In the same article Geschickter and Denison reported another case in which the roentgenogram of an adenocuboidal cancer produced the picture of a miliary tuberculosis.

In cases of uncomplicated aspergillosis, Emerson states that roentgenograms of the lung show an absence of calcified lymph nodes at the hilum and the apices may be free from disease. At the hilum of one or both lungs a dense shadow radiates in coarse lines usually to one lobe, and radiates peripherally into a diffuse infiltration<sup>8</sup>. He further states that the infection may present a snowflake appearance, such as is seen in pneumoconiosis, the physical signs being those of bronchitis with later signs of infiltration, such as occurs in tuberculosis. The differential diagnosis of aspergillosis, tuberculosis and cancer of the lung may under certain circumstances be exceedingly difficult.

#### SUMMARY

A case of primary pulmonary carcinoma in association with sputum containing aspergillus is reported. It is believed that the fungus was pathogenic, was secondary to the carcinoma and that its effect on the patient, clinically at least, was deleterious. In differential diagnosis, aspergillosis, pulmonary carcinoma, and tuberculosis were considered, and during a period of several months, all these diagnoses were made with reservations by different physicians who had occasion to examine the patient. The absence of abdominal signs and symptoms, the persistent presence of aspergillus in the sputum and the absence of tubercle bacilli, together with roentgenological and bronchoscopic findings in the chest, suggested that the most reasonable diagnosis was that of pulmonary aspergillosis. Postmortem examination revealed as essential cause of the illness primary endobronchial carcinoma with liver metastases.

The author is indebted to Dr A. D. Rood for the illustrations and the report of the bronchoscopic findings.

#### REFERENCES

1. Osler William and McCrae Thomas. The Principles and Practice of Medicine. Eleventh Edition. Philadelphia W. B. Saunders Company. P. 237. 1931.
2. Jordan E. O. A Text Book of Bacteriology. Fourth Edition. Philadelphia W. B. Saunders Company. P. 462. 1915.
3. Norris G. W. and Landis H. M. R. Diseases of the Chest. Fourth Edition. Philadelphia W. B. Saunders Company. P. 457. 1929.
4. Kampmeier R. H. and Black H. A. Pulmonary aspergillosis in association with bronchial carcinoma. Am. Rev. Tuberc. 39: 315 (September) 1934.
5. Hamman Louis. The clinical manifestations of pneumomycosis. Am. Rev. Tuberc. 16: 575. 1927.
6. Rabin Coleman B. and Neuhoef H. A topographic classification of primary cancer of the lung. Its application to the operative indication and treatment. J. Thoracic Surg. 4: 147 (December) 1934.
7. Geschickter Charles F. and Denison Robert. Primary carcinoma of the lung. Am. J. Cancer 22: 864 (December) 1934.
8. Hamman Louis. The diagnosis of carcinoma of the lung. Am. Rev. Tuberc. 28: 711. 1923.
9. Emerson Charles P. Penicillium lung infection. Trans. Assoc. Am. Phys. 36: 18. 1921.
10. Schneider L. V. Primary aspergillosis of the lungs. Am. Rev. Tuberc. 22: 267. 1930.

# THE EFFECT OF ADMINISTRATION OF VITAMIN C ON THE RETICULOCYTES IN CERTAIN INFECTIOUS DISEASES\*

## A Preliminary Report

BY JAMES M. FAULKNER, M.D.†

**T**HE effect of administration of large daily doses of vitamin C has been studied in twenty-seven cases of rheumatic fever, eight

cases of bone tuberculosis and two cases of Still's disease. In each of the disease groups were included both active and inactive or recovered cases. None of the cases showed any clinical signs suggestive of scurvy. All the patients had been on a diet generally considered to be adequate in vitamin C. It had contained daily for all but three of the rheumatic fever patients either 120 cc of orange juice or canned tomato juice or some fresh fruit. In the bone tuberculosis and Still's disease group the diet had included at least one half of an orange daily. The thirty-seven patients varied in age from three to twenty-five years with an average age of 10.6 years. All these patients were given additional vitamin C in the form of 530 cc of orange juice per day by mouth, or in the pure crystalline form in daily doses of 200-300 mg by mouth and in two cases intravenously.

No specific therapeutic effect on the course of

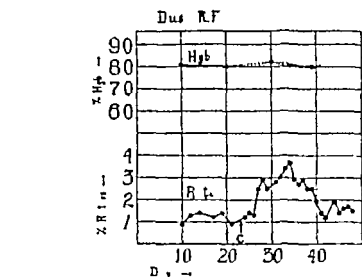


FIG. 1. A typical though small reticulocyte response in rheumatic fever. Beginning at the point marked C, 300 mg per day of ascorbic acid (Cebione-Merck) was given by mouth and continued throughout the rest of the experiment.

X—RETIC RESPONSE

○—

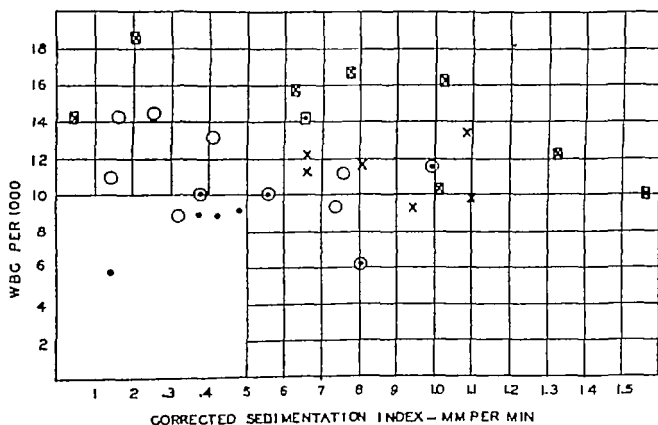
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□—FEVER

OVER 3%

BETWEEN 2 AND 3%

LESS THAN 2%



CORRELATION BETWEEN ACTIVITY OF DISEASE AND RETICULOCYTE RESPONSE

FIG. 2. Chart illustrating the correlation between the cardinal signs of infection and the reticulocyte response. It will be noted that the cases which showed a response of over 3 per cent all showed well-marked signs of infection; the majority of cases which showed no response lie in the normal zone and those which showed a response of between 2 and 3 per cent lie in an intermediate zone.

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the disease was observed during the period of increased vitamin C administration which lasted on the average for four weeks.

In the majority of these cases a response of the reticulocytes followed the large doses of



vitamin C analogous to the reaction which follows the administration of vitamin C to patients with the anemia of scurvy<sup>1</sup>. The responses were of small magnitude but the pattern of response, though variable, was orderly. Figure 1 illustrates a typical response of smaller than average magnitude in a case of rheumatic fever. The hemoglobin level was usually above 70 per cent so that the peak of the reticulocyte rise could not be expected to be very great. With lower hemoglobin values there was a slight tendency to higher reticulocyte rises and an increase in the hemoglobin level. Previous administration of large amounts of iron in the form of ferrous sulphate did not prevent the occurrence of the reticulocyte response.

An interesting feature of the reticulocyte response is the fact that it was roughly proportional to the severity of the infection. If the cases are divided into three groups, first, nineteen which showed a rise of 3 per cent or over (average 4.5 per cent), secondly, eleven which showed a rise of between 2 and 3 per cent, and, thirdly, eight which showed no response, it is found that all of those in the first group showed well-marked signs of active infection as measured by body temperature, leucocyte count and corrected sedimentation index of erythrocytes, those in the third group, as a rule, showed little or no signs of infection, and those in the second group showed an intermediate degree of activity. The relationship of the cardinal signs of infection to the reticulocyte response is illustrated in figure 2. The etiology of the infection

was not the controlling factor in conditioning the reticulocyte response.

The failure of large doses of vitamin C to influence the course of rheumatic fever is evidence against the hypothesis of Rinehart<sup>2</sup> that deficiency of this substance is a specific etiological factor in this disease although more numerous and more prolonged observations are required to reach a final conclusion.

The observation that infections predispose to scurvy is well established and has led to the suggestion that under these conditions the metabolic demands for vitamin C may be much increased<sup>3,4</sup>. Our results suggest that these demands are not met by diets heretofore considered adequate so that in infectious diseases relative vitamin C deficiency commonly develops and may constitute a secondary complication of some importance.

#### REFERENCES

- 1 Mettler S R, Minot G R. and Townsend W C. Scurvy in adults especially the effect of food rich in Vitamin C on blood formation. *J A M A* 95 1089 1930
- 2 Rinehart J F, Connor C L and Mettler S R. Further observations on pathologic similarities between experimental scurvy combined with infection and rheumatic fever. *J Exper Med* 59 97 1934
- 3 Meyer L F. Über Immunität und Ernährung in Kinde. *Klin Wchnschr* 4 1481 1926
- 4 Gabbe E. Bestimmung von Vitamin C in Blutserum. *Klin. Wchnschr* 13 1389 1934

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## MEDICAL PROGRESS

### PROGRESS IN PEDIATRICS\*

BY R. CANNON ELEY, M.D.†

#### ACUTE ANTERIOR POLIOMYELITIS

AS a result of the clinical evidence which has been presented<sup>1, 2, 3</sup> during the past two to three years, the enthusiasm for the administration of convalescent serum as a therapeutic measure in the treatment of the acute or pre-paralytic stage of anterior poliomyelitis has subsided, and attention is once more being directed toward prevention of the disease.

The development of a vaccine which might be successfully employed as a prophylactic measure in the treatment of poliomyelitis is not new as several attempts have been made in the past<sup>4, 5</sup>. However, with the recent knowledge that favorable results may be obtained with antigens inactivated by germicides in the prevention of

other virus diseases, a new impetus has been given to this phase of study. Maurice Brodie<sup>6</sup>, working with William H. Park, has developed a vaccine which at the present time seems to be efficacious in the prevention of this disease. By employing a vaccine in which the virus has been inactivated by the use of formaldehyde, Brodie has been able to immunize monkeys against poliomyelitis to direct intracerebral inoculation of the virus. Furthermore, the serum obtained from these monkeys possessed neutralizing substances against the virus of poliomyelitis. After having successfully performed these studies in monkeys, the vaccine was injected into members of the research group and these results were in accord with those obtained with the experimental animals.

In 1926 McKinley and Larson<sup>7</sup>, using a vaccine (with sodium ricinoleate as a preservative) that they had prepared from the spinal cords of monkeys killed during the acute phase of the disease injected four monkeys in an effort to

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establish immunity. Three of these animals failed to develop poliomyelitis when subsequently inoculated with the virus. The fourth monkey developed a slow or delayed form of the disease. All of the control animals died from acute poliomyelitis. The authors concluded that complete immunization had been obtained in three and partial immunization in the fourth monkey. At the same time they pointed out the fact that they had been unable to produce the disease in more than 70 to 75 per cent of the inoculations. However this work suggested the possibility that a suitable vaccine might be prepared as a prophylactic procedure in man. Kolmer<sup>2</sup> in 1934 successfully immunized a group of *Macacus rhesus* monkeys against acute anterior poliomyelitis by subcutaneous and intracutaneous injections of a vaccine prepared from the spinal cords of infected monkeys and treated with sodium ricinoleate. This preservative, in the amount employed, does not completely kill the virus, yet none of the vaccinated animals showed the slightest evidence of the disease either during or following the process of immunization which consisted of intracutaneous and intradermal injections of small amounts of the vaccine at definite intervals of time. In view of these observations Kolmer suggested that if three subcutaneous injections of this vaccine were given at intervals of five to seven days and in amounts of from 0.05 cc to 0.1 cc per kg of body weight, immunity to acute anterior poliomyelitis might be effectively established in man.

Recently Kolmer<sup>3</sup> has published the results of this form of prophylaxis in twenty-five patients whose ages ranged from eight months to fifteen years. In each instance the presence of protective antibodies in the blood was determined by serum neutralization tests prior to the injection of the vaccine. In order to determine the effectiveness of the vaccine on both immune and non-immune individuals this group of twenty-five children included fifteen whose blood failed to show any evidence of the presence of antibodies, and ten who did show the presence of antibodies. Each patient received from one to three subcutaneous injections of varying amounts of the vaccine at weekly intervals. None of the children vaccinated showed any evidence of infection, and in only one instance was there a moderately severe local reaction. Febrile reactions which were more commonly encountered after the first injection, were slight and usually subsided after twenty-four hours.

Serum neutralization tests were performed one week after the last injection of the vaccine and 75 per cent, i.e. eleven, of the fifteen children who prior to injection did not show any antibody formation now showed sufficient amounts to neutralize the virus. Similar tests

performed with the blood serum of the ten children who did show the presence of antibodies against poliomyelitis prior to the injection showed an increase in antibody. In view of the rapid antibody formation the suggestion is made that the vaccine cannot only be administered as a means of establishing immunity during normal periods, but that during epidemics it would be particularly valuable as an immunity is rapidly established. In the final conclusions contained in their summary the authors state, "It is believed that the vaccine is now ready for vaccination of human beings and especially children against poliomyelitis and particularly during epidemics."

Although the experimental and clinical evidence as to the value of this vaccine in establishing immunity to acute anterior poliomyelitis as presented by Kolmer and his co-workers is of a most encouraging nature, yet time, further investigations and corroboration of these observations are prerequisites to the acceptance of this procedure. As regrettable incidences<sup>10, 11</sup> have already occurred in the establishment of immunity against certain diseases we cannot be too cautious—utmost care must be exercised by those who continue this study. Experience has shown that there is an individual susceptibility to vaccines and that many as yet unknown factors may play important roles when a vaccine is injected into a human being. If the virus, even though attenuated, is still present in the vaccine five months after its preparation is it not possible that the preservative may lose some of its attenuating properties, thereby increasing the potency of the virus? (It is recognized that sodium ricinoleate when used as a detoxifying agent with scarlet fever and diphtheria toxin, will under certain conditions lose its detoxifying value.) Theoretically the antibody formation should be sufficient to exert a controlling influence over the presence of the virus in the body but what effect will other diseases have upon this antiviral antibody protection? Furthermore it is believed by many that certain conditions may activate a previously dormant neurotrophic virus. These questions and many others must be satisfactorily answered before the virus of acute anterior poliomyelitis, even though attenuated, should be administered to human beings unreservedly.

#### CHRONIC PYURIA

A few years ago Helmholtz noted that a specimen of urine obtained from an epileptic patient who was being treated by the ketogenic diet did not show the same tendency for bacterial growth as did specimens obtained from individuals who were receiving a regular diet. As a result of this observation bacteriological studies were instituted which showed that such urines not only inhibited the growth of the colon typhoid

group of organisms but that in many instances they actually possessed bactericidal properties. This effect, however, was less marked for the streptococcus and staphylococcus than for the colon bacillus. In view of these findings it seemed reasonable to apply this form of therapy, i.e., the ketogenic diet, in the treatment of individuals suffering from persistent pyuria, and particularly in that group in which the causative organism was recognized as the colon bacillus. The beneficial effect of this procedure was so marked that Clark<sup>12</sup> reported the successful treatment of two adults and Helmholz<sup>13</sup> reported similar results in two children who were suffering from an infection superimposed upon congenital anomalies of the urinary tract. During the following two years (1932-1933) the literature contained many case reports supporting the value of this form of therapy.

Further investigations have shown that the bactericidal power of the urine is not due to the presence of either acetone or diacetic acid but that it is directly proportional to the amount of beta-oxylbutyric acid<sup>14</sup> present in the specimen. Fuller<sup>14</sup> has also shown that the effectiveness of this acid depends on the acidity of the urine and that it is only effective at a pH of 5.5 or less.

During the past year the reports in the literature have been so encouraging that it would appear that the ketogenic diet is of unquestionable value not only in the treatment of chronic pyuria in children but also in adults. Clark<sup>12</sup>, Gamsborough<sup>17</sup>, Helmholz<sup>18</sup> and others have directed attention to its value in the treatment of adults while Rector and Wheeler<sup>19</sup>, and Summeifeldt and Brown<sup>20</sup> have reported equally as good results in the treatment of children. Rector and Wheeler instituted the ketogenic diet in fourteen patients who had failed to show any improvement when subjected to the usual forms of therapy, and of this group the urine became sterile in twelve cases. In two of the fourteen patients the authors were unable to produce a state of ketosis and it is interesting to note that both of the children showed anatomic deformities of the urinary tract. Summeifeldt and Brown studied forty children with persistent pyuria and reported successful results in those patients in whom no anatomic abnormality was present. This is rather an important point for it would appear that satisfactory treatment does not usually occur if there is some abnormality of the urinary tract. For this reason the authors stress the importance of a thorough examination including pnelograms, renal function tests, and in certain instances cystoscopic examinations before the institution of the dietary régime. The prerequisites for successful treatment depend upon (1) the selection of suitable patients, (2) the rapid production of ketosis, (3) a strongly acid urine (pH 5.5 or less) and strict adherence to the diet which, however, does not have to be maintained for a long period of time.

#### WHOOPIING COUGH VACCINE

The recent observations of Leslie and Gardner<sup>21</sup>, and Sauer<sup>22</sup> and his associates have not only reawakened interest in the prophylactic vaccination against whooping cough, but have also offered an explanation for the conflicting reports as to the value of vaccines in the treatment of this disease. This form of therapy is not new as it was first employed over twenty years ago<sup>23</sup> and since that time there has developed a rather voluminous amount of literature which is full of conflicting reports as to the value of the procedure in both prevention and treatment of the disease. Not infrequently the same observers have reported both success and failure in the prophylactic use of vaccines prepared in identical manner.

The aforementioned studies have confirmed the earlier observations of Bordet and Sleswyk<sup>24</sup>, i.e., that recently isolated strains of the *Bacillus Pertussis* differ serologically from old and stock cultures grown without blood in the medium. Furthermore, they have shown that hemolysis is more pronounced in recently isolated strains than in strains under prolonged artificial cultivation and, of probable significance, that the antigenic power of the organism appears to be high on first isolation but fails with prolonged repeated growth on artificial media, unless blood (and preferably human blood) is present in certain proportions. In fact Sauer<sup>25</sup> states that the recently isolated strains of Bordet-Gengou bacilli should be grown *only* on Bordet medium made with twenty per cent fresh, defibrinated human blood.

In view of these previously unrecognized facts an explanation for the failure of some vaccines and the success of other vaccines that have been employed in the past is offered. The vaccine employed by Bokay<sup>26</sup> was quite successful when used as a prophylactic measure in an institutional outbreak of the disease, but when confirmation of these studies was undertaken on a large scale the results were not so promising. Madsen<sup>27, 28, 29</sup>, who had the opportunity to study two epidemics of whooping cough in the Faeroe Islands, concluded after the 1923-1924 epidemic that "Vaccination had no effect once the disease had broken out, it should be used, however, to the widest possible extent as soon as the epidemic threatens. No absolutely sure prophylactic effect has been obtained, but the infection is lightened." In the second, or 1929 epidemic, 1832 individuals received the vaccine as soon as the epidemic threatened. The fatality rate was thirty times as great in the unvaccinated as in the vaccinated group of patients. Madsen was of the opinion that the explanation for this marked difference lay in the fact that the vaccine was prepared from fresh, young strains of the organism, and that large doses were given.

In 1933 Sauer<sup>22</sup> reported the results of pro

phylactic vaccine therapy in 394 selected non-immune individuals and offered evidence which strongly indicates that pertussis vaccine, when made from recently isolated, strongly hemolytic strains, grown on Bordet medium made with freshly defibrinated human blood, and given in adequate dosage at least four months before exposure, will produce effective immunization against the disease. To quote "In the course of five years the thirty-one control children in twenty-four of the families contracted unquestionable whooping cough. Twenty-nine of the injected children were exposed throughout the incubation, catarrhal, and paroxysmal stages but none contracted the disease. Not one of 162 injected children accidentally exposed has had a cough that in any way resembled pertussis. Active immunity is completed in four months and lasts for years." In a later publication Sauer<sup>20</sup> is careful to point that "no claims are made for it as a therapeutic agent nor when exposure has already occurred or threatens."

In view of this last statement it is of interest to call attention to a new type of pertussis vaccine that has been developed by Krueger<sup>21</sup> and his associates. This vaccine known as Hemophilus Pertussis Endoantigen is a filtrate of the crushed bacterial bodies of the pertussis organism and therefore a more rapid absorption and immunization might be expected by the injection of this bacterial free preparation. The rapid absorption of this vaccine not only offers the possibility of treating an individual who has recently been exposed to the disease, but also the possibility of instituting treatment during the catarrhal period of the infection. Frawley et al.<sup>22</sup> have presented clinical evidence which would indicate that the antigen is of both therapeutic and prophylactic value. Among one group of twenty-one children who were treated during the course of the disease 76 per cent had mild attacks in another group of 165 cases 86 of whom had the antigen within one week after the onset, 59 per cent had mild, 19 per cent moderate, and 12 per cent severe attacks. In a large group of 614 children who were vaccinated as a prophylactic measure 12 per cent of the vaccinated group and 10 per cent of an unvaccinated group developed whooping cough but 62 per cent of the vaccinated group had mild attacks in comparison with 12 per cent of the unvaccinated group who had mild attacks. Munns and Aldrich<sup>23</sup> have recently employed Krueger's endoantigen in the treatment of 122 cases and exposures during an epidemic in Winnetka, Illinois and from their observations have concluded "that the majority of children who receive the antigen will have mild attacks of pertussis. Although the prophylactic effect is more uncertain the antigen apparently has the definite effect of modifying and shortening a majority of pertussis infections. This fact is par-

ticularly true when the antigen is given early in the attack or before onset of the cough."

If one were to judge from the clinical data that have been accumulated, it would appear that the employment of pertussis vaccine as a prophylactic measure is probably justified. However when one considers the marked variability in the severity of whooping cough in individual cases the effectiveness of the administration of a vaccine as an active prophylactic measure is still open to question.

#### ENDOCRINE PSEUDOHYPERTROPHIC MUSCULAR DYSTROPHY

In view of the number of case reports in the literature concerning beneficial symptomatic treatment a brief review of this condition is of interest.

Although Duchenne<sup>24</sup> is usually considered as having published the first description of this disease in 1849, he was actually antedated by Semmola in 1834 and Costa and Gioga in 1836. During the following twenty years the primary myopathies were gradually differentiated from the atrophies of nervous origin. The former group has been further subdivided according to the anatomic distribution of involvement so that at the present time five types of this disease are recognized.

The etiology continues to be poorly understood, and, as one might expect, numerous factors have at one time or another been considered. Goldstein<sup>25</sup> has suggested that it might be the result of some endocrine disorder with particular reference to the pineal body. Barker<sup>27</sup> has demonstrated definite physical and metabolic evidences of endocrine dysfunction, Landé<sup>28</sup> has reported a case associated with dystrophia adiposogenitalis. Janney, Goodhart and Isaacson<sup>29</sup> have found changes indicative of general endocrinologic disturbances such as dry brittle hair, pigmentation of the skin, acromegalic features, trophic changes in the nails and unusual distribution of subcutaneous fat. Karé and Okunaka<sup>30</sup> have concluded that the disease is the result of an alteration in the autonomic innervation of the muscles and on the basis of their experimental work have devised their form of treatment. Syphilis, as well as other diseases of the central nervous system has been found associated with this disease but there is no evidence to support the view that the condition is the result of any of these disturbances. Heredity unquestionably plays an important part and it is not unusual to see two or more members of the same family affected. This is particularly true in regard to brothers. A study of a family in a secluded Swiss village where accurate records for three hundred years were available has shown that the hereditary features according to the mendelian theory are of the recessive mode.

Aring and Cobb<sup>41</sup> have recently published a careful study entitled "Muscular Atrophies and Allied Disorders." In this study efforts have been made to divide the various muscular disturbances into an idiopathic or "Primary" group where the etiology is unknown while those due to known etiological factors are classified as "Secondary." On this basis they have collected three groups of "Primary" atrophies, i.e., sporadic diseases, hereditary myopathies in which the lesions are practically entirely in the muscles themselves, and an hereditary group in which the pathology is largely in the spinal cord. The importance of such a classification and division of the myopathies becomes evident when one realizes that the form of therapy employed in the treatment of those disturbances which are secondary to metabolic dysfunctions are different from those instituted in the group in which the disturbances are secondary to pathology of the nervous system. A careful study of this publication is advocated for those who are interested in this subject.

More recently attention has been directed toward the creatine and glycogen disturbances in these diseases, as abnormalities in the metabolism of both of these substances have been repeatedly demonstrated. McCrudden and Sargent<sup>42</sup> pointed out the low blood sugar content present in their patient and attempted to explain the muscular weakness by the low glycogen content of the muscles. Milhorat, Techner and Thomas<sup>43</sup> have shown that these patients have a creatinuria even on a creatine-free diet and excrete creatine almost quantitatively. This is a complete reversal from that which occurs in the normal individual. Similar observations have been made by Magee<sup>44</sup> and by Levene and Kristeller<sup>45</sup>.

Treatment in the past has been both discouraging and futile. Recently, however, encouraging reports have appeared in the literature and at the present time two methods of therapy have been offered.

Based on their experimental evidence Kuré and Okanaka<sup>46</sup> in 1930 suggested that these patients should be treated with pilocarpine and adrenalin. The authors treated twelve patients in this manner and were able to obtain improvement in six, "functionally" complete cure in two, but no improvement in the others which, however, were far advanced cases. Hough<sup>47</sup> in 1931, treated sixteen patients with this method and obtained improvement in every case although several of them were quite advanced. Of this group eight showed slight improvement, four moderate improvement, and four showed marked improvement, in one case that was comparatively early "a symptomatic and functional recovery" was obtained. Both authors are care-

ful to point out that this form of therapy is *not* a cure, that relief is only temporary, and that the treatments have to be repeated at regular intervals. In a second communication in 1933 Hough<sup>48</sup> states that the procedure "is of sufficient value to justify its continued use in this disease."

The second therapeutic procedure was offered by Milhorat, Techner and Thomas<sup>43</sup> in 1932 and is based on the effect of glycine administration upon creatine metabolism. These authors treated three patients suffering from progressive pseudohypertrophic muscular dystrophy by the oral administration of 5 Gm of glycine daily for eight periods of three months each with an interval of three weeks between each period of treatment. Chemical studies showed that the creatinuria was definitely increased and that after a period of a few weeks this gradually decreased until it had reached its former level, although the glycine had not been discontinued. Clinically there was a slow disappearance of fatigue which was accompanied by increased activity and an improvement in motor acts that were formerly executed in a very poor and awkward manner. Chanutin, Butt, and Royster<sup>49</sup> treated five patients in this manner with improvement in three, the other two showed improvement at first but soon became worse. Mettel and Slocum<sup>50</sup> treated three patients with marked improvement in two and slight improvement in the other one. Beneficial therapeutic results have also been reported by Kostakow and Slauck<sup>51</sup>. Beard and Tripoli<sup>52</sup> obtained improvement in their patients by the oral administration of either glycine or glutamic acid and also observed a creatinuria, which after two or three weeks gradually disappeared. Thus, they considered, indicated a retention of muscle creatine in the body. Harris and Brand<sup>53</sup> were unable to detect any striking improvement as reported by Thomas, Milhorat and Techner<sup>43</sup>. In an attempt to evaluate the efficacy of the two procedures, i.e., the use of adrenalin and pilocarpine and the use of glycine or glutamic acid, Voshell<sup>54</sup> treated fourteen patients and concluded that the patients who received adrenalin and pilocarpine responded more favorably. Cuthbertson and MacLachlan<sup>55</sup> have recently reported the results of prolonged glycine administration in nine cases of muscular dystrophy. Five of the nine cases were of the pseudohypertrophic type and except for one case there was definite improvement as evidenced by gain in weight, and gain in strength. In view of the consistent chemical abnormalities that have been repeatedly demonstrated by different observers in this type of muscular dystrophy it would appear that the best therapeutic results should be expected from that form of therapy which is directed toward the underlying metabolic disturbance. At the present time the administration of amino acetic acid

offers the patient greater hope than any form of treatment heretofore employed

As the term "Glycine" is gradually replacing the synonym "Glycocol" in chemical nomenclature it is advisable to point out that there is now available on the market a toxic substance used by photographers in developing films which is dispensed under the term "Glycin." On account of the similarity of the two names unfortuna te mistakes have been made and unpleasant accidents have occurred. For this reason the Council on Pharmacy and Chemistry of the American Medical Association has adopted the term "Aminoacetic Acid" as a means of protecting the public against accidental poisoning. It is strongly urged that physicians prescribing this substance will conform with the requests of the Council

## REFERENCES

1. Park, W. H. J. A. M. A. 99:1985 1932
2. Kramer, S. D., Aycock, W. L., Solomon, C. I. and Thenebe, C. L.: New Eng. J. Med. 66:12 1932
3. Neal, J. B. Polymyositis. Baltimore: Williams & Wilkins Co. P. 40 1932
4. Flexner, S., and Lewis, P. A.: J. A. M. A. 54:1780 1930
5. Abramson, H. L., and Gerber, H. J. Immunol. 2:435 1934
6. Abt, Isaac H., and Abt, Arthur F.: Year Book of Pediatrics, 1934
7. McKinley, J. C., and Larson, W. P.: Soc. Exper. Biol. Proc. 24: 97 1926 '7
8. Kolmer John A.: Am. J. M. Sc. 133:510 1934
9. Kolmer John A., Kligb, G. F., and Rula, A. F. J. A. M. A. 104:1456 1935
10. Kelle, W. Deutsche med. Wchnsch. 58: 304 1932.
11. Petroff, S. A.: New Eng. J. Med. 66 426 1932
12. Clark, A. L.: Proc. Staff Meet. Mayo Clin. 6 605 1931
13. Helmholz, H. F.: Proc. Staff Meet. Mayo Clin. 6 609 1931.
14. Fuller, A. T.: Lancet 1:1555 1932
15. Clark, A. L.: Practitioner 12: 234 (Jan.) 1934.
16. Clark, A. L.: J. Urol 31 192 1934

## FIRE RESPONSIBLE FOR LOSS OF LIFE AND PROPERTY

It has been reported that, since the founding of the Republic, the losses of life and property due to fires have exceeded the losses in all of the wars carried on by the United States.

Every minute, on the average a building fire occurs somewhere in this country and every day about twenty people die because of fire. Burns with out deaths cause an unknown addition to the losses by fire.

The total economic loss is more than one billion dollars a year. Most of the fires are due to carelessness and are preventable. A film on fire prevention which can be used as an educational measure may be obtained on application to the Aetna Life Insurance Company of Hartford Connecticut.

## TUBERCULOSIS VIEW OF DUBLIN DISPUTED

Controverting Dr Louis I. Dublin, who in a recent speech predicted complete control and eradication of tuberculosis in a half century the National Tuberculosis Association went on record as finding the disease the principal cause of death between the ages of 15 and 40 and the directors in a resolution called for an increased fight against the plague

17. Olinaborough Hugh Practitioner 122 46 (Jan.) 1934
18. Helmholz, H. F. J. Urol 31:172 1934
19. Hector John M. and Wheeler Warren E. New Eng. J. Med. 211:142 1934
20. Sturmfeld, Pearl, and Brown Alan J. Pediat. 5:7 7 1934
21. Leslie P. H. and Gardner A. D. J. Hyg. 31:4-3 1931.
22. Sauer L. W.: J. Pediat. 3:740 1933 J. A. M. A. 105 239 1933 J. A. M. A. 101:1449 1933
23. Nicolle C. and Conner A. Compt. rend. Acad. d. sc. 1945 1932
24. Dordet, J. and Slesawsky: Ann. Inst. Pasteur 4:470 1919
25. Sauer L. W.: J. A. M. A. 10 1471 1934
26. Bokay Z. Jahrb. f. Kinderh. 104 301 1924
27. Madsen T.: Boston M. and S. J. 19 159 1925
28. Madsen, T. Rec. franc. de Pediat. 5 148 19 9
29. Madsen, T.: J. A. M. A. 101 147 1933
30. Sauer L. W. Am. J. Dis. Child. 49:189 1935
31. Krueger A. P., Nichols, V. C., and Frawley J. M.: Proc. Soc. Exper. Biol. & Med. 30:1597 1933
32. Frawley J. M., Stallings M., and Nichols, V. C.: J. Pediat. 4:175 1934
33. Frawley J. M.: J. Pediat. 4 184 1934
34. Munroe G. F. and Aldrich, C. A.: J. Pediat. 5 590 1934
35. Duchenne: L'Union Medicale VII 51. Oct. 1852.
36. Goldstein, H. Arch. Pediat. 47 377 1930
37. Barker L. F.: M. Clin. North America 14 109 1930 31
38. Lande L.: Zischr. f. Kinderh. 42 356 19 6
39. Jannet N. W.: Goodhart S. P., and Isaacson, V. I. Trans. Sect. Nerv. and Ment. Dis. A. M. A. P. 259 19 9
40. Kure K., and Okinaka, S. Klin. Wchnsch. 9 1163 1930
41. Aring, C. D., and Cobb, S. Medicine 14 77 1925
42. McCruden, R. H. and Sargent C. S.: Arch. Int. Med. 37:465 1914
43. Milhorat A. T.: Tschner, F. and Thomas K. Proc. Soc. Exper. Biol. & Med. 8 609 1932
44. Mager, M. C. Am. J. Dis. Child. 42:19 1932
45. Mager, M. C. Am. J. Dis. Child. 42:3 2 1932.
46. Lorenz, P. A., and Kristell, R. L. Am. J. Physiol. 4 45 1909
47. Hough G. de N. Jr.: J. Bone & Joint Surg. 13 8 6 1931.
48. Hough G. de N., Jr.: J. A. M. A. 101: 113 1932
49. Chanulian, A., Butt H. R. and Royster L. T.: J. Biol. Chem. 100:xxvi, 1932
50. Mettel H. B. and Blooom, Y. K.: J. Pediat. 3 355 1933
51. Kowitzow, S., and Blauack A. Deutsche Arch. f. Klin. Med. 178 25 1933
52. Beard, H. and Tripoli, C. J. New Orleans M. & S. J. 66 205 1932
53. Harris, M. M. and Brand, E. J. A. M. A. 101 1047 1932
54. Thomas, K. Milhorat, A. T. and Tschner F. Ztschr. f. Physiol. Chem. 85 82 1932
55. Voobell, A. F.: South M. J. 46:156 1932
56. Outhbertson, D. P. and MacLachlan T. K. Quart. J. Med. 3 411 1934

Although the resolution in no way named the insurance statistician it was viewed by many physicians as significant because it so closely followed Dr Dublin's talk on control of the disease.

The resolution adopted was as follows

Resolved that in view of the fact that tuberculosis is still the leading cause of death between the ages of 15 and 40 and is also the most important cause because controllable added stress should be laid on the continued importance of a vigorous campaign against tuberculosis.—New York Times June 26

## MANY VOLUNTARY HOSPITALS HAVE HAD TO CLOSE

It is reported that, for the six years following 1928, nearly 600 voluntary hospitals in the United States have had to close their doors and at the present time several hundred others are in a precarious condition

In 1934 these voluntary hospitals admitted nearly five million people. The cause of this situation is the decreasing support which has been supplied by generously disposed persons. Such hospitals have been drawing on invested funds and have been ambitious to continue service to the people up to the limit of their resources

## CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FORWARDED BY RICHARD C. CABOT, M.D.

TRACEY B. MALLORY, M.D., *Editor*

### CASE 21271

#### PRESENTATION OF CASE

A sixty one year old German night watchman entered complaining of hoarseness and general pains of four months' duration.

Approximately two years before admission while in Munich he had a chill. This was followed by an increase in frequency and nocturia which he had had for a few years. A month later, after he had returned to this country, a cystoscopy and an intraurethral operation were performed under spinal anesthesia at a local hospital. No report was given to him but he felt much relieved, although he still had nocturia about two or three times. About a year later, approximately nine months before admission, his frequency increased somewhat and he also had slight incontinence. Five months before admission he had another operation at this same local hospital following which he was started on a series of bladder irrigations. In spite of all treatment frequency returned and one month later he had a third operation which consisted of a transurethral prostatic resection. A note from his local hospital revealed that his first operation consisted of a right vesiculo-ureterotomy for a ureterocele. Phenolsulphonephthalein test at that time showed a 15 per cent excretion from the right kidney and 35 per cent from the left kidney in nine minutes. The appearance time was five minutes on both sides. The second cystoscopy done at that hospital showed a kink in the right ureter. This ureter was dilated and the renal pelvis lavaged with 1 per cent silver nitrate. Pyelograms showed the kidneys normal in size, shape and position. Shortly after this operation he developed hoarseness which did not improve and which he believed had become slightly worse. At the same time he began to have pains in his legs, hips, back and shoulders. These pains were fleeting but very severe and occurred at practically any time although they were brought on very often and made much worse by climbing stairs. He had continued work until about one month before admission at which time he entered a hospital for massage and baking. While in the hospital laryngoscopic examination showed fixation of the left vocal cord due to paralysis of the left recurrent laryngeal nerve.

The patient was born in Germany but had been in the United States for the past forty-three years. He had the ordinary childhood diseases including a questionable attack of rheumatic fever. Very often he had sore throat. Forty years before admission he had a severe attack of gonorrhea and a few years later had a flare-up. For the past thirty years he had rheumatism which affected various joints, particularly the arms, shoulders and back. About fifteen years before entry he had a penile lesion but it disappeared in a few weeks. He had had two others like it since then.

His father died at the age of seventy-two of strangulated hernia. His mother died at seventy-five of cardiac failure. Two brothers died at the ages of thirty-four and fifty-eight of rheumatism. Another brother died at home of tuberculosis at the age of twenty-six. He had one sister seventy years old who was living and well except for rheumatic pains. Another sister died in an asylum.

He had been married for thirty-four years. His wife died four years ago of hypertensive heart disease. She had had one miscarriage, no children.

Physical examination showed a well-developed man lying in bed, not acutely ill. He had an acetone breath and showed evidence of recent loss of weight. There was moderate pallor of the skin. His voice was hoarse and upon expiration was soft and rasping. The heart was moderately enlarged on both sides. There was a soft systolic murmur heard over the precordium and frequent extrasystoles every four to ten beats. The heart sounds were distinct. The blood pressure was 120/83. There was an external non-bleeding hemorrhoid. The right lobe of the prostate was firm and hypertrophied, the left lobe indurated but not clearly nodular. The right knee joint showed slight impairment in extension and was larger than the left. The increased size appeared to be due to hypertrophic changes of the joint bones or cartilage.

The temperature was 97°, the pulse 98. The respirations were 22.

Examination of the urine on admission showed a specific gravity of 1.010, a large trace of albumin and large numbers of white blood cells and clumps of granular casts. The blood showed a red cell count of 3,300,000, with a hemoglobin of 60 per cent. The white cell count was 4,400, with a differential of 52 per cent polymorphonuclears, 45 per cent lymphocytes, one large mononuclear, one eosinophil and one basophil. Examination of the stools was negative. A Hinton test was negative. The nonprotein nitrogen was 46 milligrams per 100 cubic centimeters, the uric acid 3.36 milligrams. A complement fixation test for gonococcus was negative. An electrocardiogram showed auricular fibrillation, rate 150 with ectopic ventricular contractions and





point in the whole story It cannot be laughed off

### X-RAY INTERPRETATION

DR. GEORGE W. HOLMES This is the chest film He has a high diaphragm on the left side with gas below it which I would interpret as being intestinal gas The left border of the heart is obscured It is not enlarged to any extent He has a slight increase in the supracardiac shadow This is the ascending and thus the descending aorta It is not possible to measure the accurate diameter of the aorta from the film But I think it is within normal limits The diameter of the aorta varies considerably There is nothing abnormal in the lung fields In view of the story of laryngeal paralysis one might suspect the esophagus There is no obstruction and no indication of tumor

This second film is an oblique view to show more completely the aorta, here the arch, ascending and descending portions are quite distinct, certainly nothing there to suggest aneurysm or any gross dilatation The pelvis shows a small group of calcified shadows in the region of the prostate gland I think that calcification is more likely to occur in an inflammatory process than in malignant disease The bones of the spine and pelvis are normal There is nothing to suggest a bone lesion Here is a group of dense shadows in the soft tissue They may be glands or an old hematoma and are of no particular importance The joint spaces show very little change

In the skull we have a rather prominent grouping of the blood vessel markings but no definite evidence of disease.

### DIFFERENTIAL DIAGNOSIS CONTINUED

DR. ALBRIGHT It seems to me fairly clear that, with a big heart, with a nonprotein nitrogen of 46, and with the delayed appearance of the dye he certainly had some renal insufficiency I think the terminal event is renal insufficiency and uremia He had twitching and went out like a person who had uremia The question is what was the cause of the kidney lesion The first thought is some type of kidney associated with Bence-Jones protein The urine examination is perfectly typical of a kidney lesion in myeloma with Bence-Jones protein He had a large trace of albumin, clumps of granular casts and white blood cells What was more important, he did not have any edema, which would be surprising if he had those same urinary findings in ordinary chronic nephritis It is also of some significance that he had a serum protein of 6.6 This is a normal value, the fact that it is not low suggests some factor tending to elevate it such as myeloma We are not told how much there was in his urine

The kidney gets into trouble apparently in Bence-Jones proteinuria due to plugging of the tubules with the Bence-Jones protein

The next question that comes up is the cause of the Bence-Jones proteinuria in this case I think one is apt to believe that it is always due to multiple myeloma and in 99 per cent of the cases it probably is I looked up this question this afternoon It is known to occur with leukemia and Dr. Minot told me he is sure he has seen it in metastatic malignancy I have seen it in one case with proved hyperparathyroidism

In favor of myeloma is this perfectly characteristic onset of bone pain The slightly elevated calcium and slightly elevated phosphorus in the blood are in favor of myeloma You usually think of a myeloma skull as one with a whole lot of sharply defined defects in it, but we have cases that have not shown that I remember a case with uniform decalcification and nothing to suggest localized areas So I see no reason why we cannot make the diagnosis of multiple myeloma with secondary renal involvement There is a second possibility, metastatic malignancy We turn our minds to the prostate He had this trouble starting originally in the prostate with incontinence, then this laryngeal paralysis right after manipulation of the prostate, as though something might have gone from the prostate perhaps into the brain It is hard to believe that he would have got such a localized area with metastases to the brain but it is possible so we have to consider cancer of the prostate It is also true that it is unusual to get metastases to bone without seeing lesions by x-ray Prostatic cancer can do that because of its osteoplastic tendency when it forms bone rather than destroys it and may cause uniform density with no changes in the x-ray We do not have to consider hyperparathyroidism Leukemia is pretty well ruled out The spleen was not enlarged The third possible diagnosis would be chronic nephritis with uremia, on the theory that the Bence-Jones protein had nothing to do with it He had, however, no hypertension and no eye ground changes Amyloid disease, in view of the chronic sepsis and the large amount of albumin in the urine, is a possibility If he had that, he should have had a low serum protein and edema

The final possibility is that all this did start with cystitis and pyelitis and that he did die in uremia as the result of a pyelonephritis I would like to know what the temperature was and if he did die of sepsis I think that is unlikely because the white count was low

My final diagnosis, however, is that he had multiple myeloma with myeloma kidneys and death due to uremia, a chronic infectious arthritis that probably started with a gonococcus urethritis and chronic prostatitis, arteriosclerotic heart disease with chronic fibrillation

## CLINICAL DISCUSSION

DR. ARLIE V. ROCK This has been a very illuminating discussion by Dr Albright from my point of view. When the patient arrived on the ward my impression was that he had malignant disease. There are at least two types of response in people who have malignant disease, one having a quite normal appearance, even though you know certainly that malignancy is present. The second type have a facies that is quite characteristic of malignant disease. This patient fell in the latter group. In looking him over pretty thoroughly we excluded the prostate among other possible causes of malignancy. The suggestion of myeloma occurred to us and the Bence-Jones protein was found by Dr Jacobson. We were surprised by the relatively huge amount present in the urine. Then we were a bit disappointed in not being able to get any confirmatory evidence of myeloma on the basis of the x ray findings all of which seemed to be negative from that point of view. He did have evidence of chronic nephritis. He died in a state of uremia and while we felt that there was little doubt of his having myeloma, we discharged him with a question of myeloma instead of making a positive diagnosis because we know that other cases of malignant disease may have Bence-Jones protein in the urine.

## CLINICAL DIAGNOSES

Chronic nephritis  
Uremia  
Hypertrophic arthritis  
Myeloma?

## DR. FULLER ALBRIGHT'S DIAGNOSES

Multiple myeloma  
Myeloma kidney  
Uremia  
Infectious arthritis  
Chronic prostatitis  
Arteriosclerotic heart disease

## ANATOMIC DIAGNOSES

Plasma cell myeloma, diffuse.  
"Myeloma kidney"  
Septicemia, streptococcus non hemolyticus  
Hyperplasia of retroperitoneal glands  
Hydrothorax, left.  
Diverticulosis of the sigmoid and descending colon  
Pleuritis, chronic fibrous.  
Pericarditis, chronic fibrous, localized

## PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY The autopsy on this man was at first very disturbing. We could not find anything until we got down to his kidneys, which were somewhat smaller than normal, 225 grams, the normal would be nearly 350 grams. When the capsules were stripped the

surfaces were very pale gray. It was quite obvious that there was something wrong with them.

The remnants of his prostate were somewhat hypertrophied and contained some calcification. The heart was perfectly normal. The coronaries were negative, the aorta negative. There was a little emphysema. Naturally in view of the story of the finding of Bence Jones protein we examined a number of bones and they all looked perfectly normal. The cortex was not thin, the trabeculae were present in normal numbers. The marrow seemed a little grayer than normal but there were no tumor foci, so that until the microscopic sections came through we really had no idea what the situation was.

This first slide is a total cross section of a vertebra. You can see the layers of cortical bone on either side and between them an approximately normal distribution of marrow cells and fat cells. When we come down with the higher power, however, we find that between the fat cells the vast majority of the cells are of one type, with dark staining, basophilic cytoplasm and a perfectly round eccentric nucleus. They are typical plasma cells and comprise at least two-thirds of all the marrow cells present.

The lymph nodes were at first thought to be normal but more careful examination showed numerous plasma cells scattered through the pulp. The spleen and liver, however, escaped the infiltration.

The kidneys present the typical picture seen in cases of multiple myeloma. The convoluted tubules are free from casts but the straight tubules—both Henle's loops and the collecting tubules—contain very numerous exceptionally dense hyaline casts. The glomeruli and tubules show only slight arteriosclerotic changes. This type of kidney lesion is characteristically limited to the myeloma cases which show Bence-Jones proteinuria.

DR. BERNARD M. JACOBSON There are a number of interesting features of this case. I should like to say in passing that while the patient was alive Dr. Hunter found a few plasma cells in the smear, a finding that is certainly abnormal and which might be interpreted as evidence of plasma cell type myeloma.

The masses described in the x ray report in the region of the shoulder and on the left side of the pelvis might possibly be amyloid deposits, a condition described in myeloma which we have not seen at this hospital. They unfortunately were not examined at the necropsy.

## CASE 21272

## PRESENTATION OF CASE

A five and a half year old girl entered through the Emergency Ward complaining of vomiting of two days' duration.

Two days before entry she awoke very early in the morning and began to vomit. She continued to vomit all that day. The vomitus was described by her grandmother as "phlegmy" fluid which became greenish toward the end of the day. The child ate nothing during that day and had no bowel movement. She was unable to keep food or fluids down. That evening her mother gave her some Ex-lax, following which the patient complained of right-sided abdominal pain which she said had been present all that day. A physician found tenderness in the right lower quadrant and advised admission to the hospital. She had had no pain on micturition.

Her mother, father and one brother were living and well. There was no history of diabetes, carcinoma or tuberculosis.

At the age of nine months she had lobar pneumonia followed two weeks later by measles. During the past six months she had had severe sore throat associated with enlarged cervical glands. She had always had a poor appetite and was quite finicky about her food. Her bowel habits were very irregular. She had been given all sorts of laxatives.

Physical examination showed a very sick child whose skin was hot and flushed. There was herpes on the lips. Both tonsils were enlarged, inflamed and contained on their surfaces patches of yellowish exudate. The chest was clear, the heart negative. The abdomen was soft but no peristalsis could be heard. No masses were felt. There was slight costovertebral tenderness but no spasm on the right side. A rectal examination showed no tenderness.

The temperature was  $104^{\circ}$ , the pulse 130. The respirations were 24.

Examination of the urine showed a very slight trace of albumin and a green to orange test for sugar. The sediment contained a few white blood cells and occasional red blood cells. There were no casts. The stools were negative. Examination of the blood showed a red cell count of 37 000, 88 per cent polymorphonuclears.

Her condition remained unchanged on the second day except for a slightly lower temperature and pulse. On the fourth day the patient was more alert but very irritable. She cried out whenever touched. Her abdomen was resistant throughout to deep palpation. Both costovertebral angles were tender but this seemed to be fairly superficial. That evening a fine punctate rash appeared. The throat was not acutely inflamed. The temperature was  $104^{\circ}$ , the pulse 120, the respiration 25. She still was very irritable and resisted examination. Her abdomen was kept rigid voluntarily but could be softened when desired. She had one bowel movement that evening following an enema. On the fifth day the child's neck became stiff and Kernig's sign was positive. A lumbar puncture showed clear fluid with an initial pressure of 220 milli-

meteers which rose to 350 upon jugular compression and promptly fell following release. There were four cells, all lymphocytes. A Pandy test for globulin was negative. The sugar was slightly increased. An ear consultant found no definite abnormality. Two days later the child appeared in fairly good spirits and showed only slight spasm in the right upper quadrant anteriorly but extreme costovertebral tenderness. Her temperature was  $104.4^{\circ}$ . Examination of an uncentrifuged specimen of urine showed 4 to 12 white blood cells per high power field and an occasional red blood cell. A centrifuged specimen was loaded with both red blood cells and white blood cells and showed a positive guaiac test. The white blood cell count was 21,000. An intravenous pyelogram showed the kidney outlines on both sides. The right appeared considerably larger than the left, but both were smooth in outline and normal in shape. The dye appeared promptly on both sides. On the right the pelvis was imperfectly filled and there was no filling of the upper major and minor calices. The bladder was not remarkable. On the ninth day operation was performed.

#### DIFFERENTIAL DIAGNOSIS

DR EDWARD L. YOUNG JR. Any child of this age who starts to vomit is at once under suspicion of beginning one of the exanthemata or one of most any of the acute infections and it is the starting point of so many things in a youngster that it really means very little. The fact that it came on several hours before any abdominal pain is the reverse order in which appendicitis generally appears and is, I think, worth paying attention to. Of course, the other side of that picture is the fact that at five and a half appendicitis is often very atypical and, of course, must always be considered.

On examination the only lead we are given is that of probable sepsis somewhere because of temperature and a possible source of sepsis in the tonsils. The white count is very high and the polymorphonuclear percentage likewise. This backs up our feeling that we have got to find the source of infection. The abdominal examination would seem to rule out a focus of trouble there sufficient to cause this temperature. The lack of peristalsis does not fit into the picture as it appears at this stage of the game. The continued tenderness in the costovertebral angles may be of importance but there has to be more to go with it before it will lead us anywhere. Of course, a urinary infection in a child will make them just as sick as this child apparently was. I do not see any record of urinary culture, however, which might have helped. It is not unusual, in fact according to some urologists, it is a very common thing to have the throat the starting point of acute pyelitis or pyelonephritis.

On the fifth day the child showed evidence of meningeal irritation but the lumbar puncture would seem to rule out any definite meningitis. The ear consultant was called in on the basis that at this age the ears are one source of unexplained temperature. He did not help out, however.

The one thing that seems to continue is the costovertebral tenderness, apparently increasing with particular attention directed toward the right side. The urine also seems to point toward trouble in this neighborhood and it seems to me that a perinephric abscess has to be considered a very definite possibility. We know that a certain number of perinephric abscesses start from small cortical abscesses which rupture into the perinephric tissue. In those cases the urine will show the organism on culture and there will be microscopic blood and pus in the sediment. In other cases, probably about half of them, a perinephric abscess is a definite metastatic process in the perinephric tissue itself. The perinephric fat is a definite entity with its own blood supply and early in the process the infection is localized and can cause a great deal of pain. It is an interesting fact coming from some clinics that the delay in diagnosis, apparently unavoidable, is considerable. I believe that at the Mayo Clinic it is reported as over thirty days. The study of the kidneys suggests that there is some trouble in the right side and it seems to me in the face of the evidence we have that an exploratory operation directed toward a perinephric abscess is definitely indicated.

#### PRE OPERATIVE DIAGNOSIS

Abscess of right kidney

DR. EDWARD L. YOUNG'S DIAGNOSES

Perinephric abscess

Abscess of the kidney

#### OPERATIVE NOTE

"Oblique incision in right loin. In exposing the kidney it was found that the perirenal fat was edematous and adherent. In freeing the upper pole of the kidney an abscess cavity was broken into with the escape of considerable

thick, odorless pus. The kidney was densely adherent throughout, showing evidence of long standing infection. The kidney was removed without difficulty. Two wicks were placed one to the site of the upper pole of the kidney and one to the pedicle, and the wound was closed in layers."

#### FURTHER DISCUSSION

DR. YOUNG. There is very little more to say. The condition is undoubtedly cortical abscesses rupturing into the perinephric tissue. In these border line cases it is always questionable whether to drain the abscess and leave the kidney intact or to do a nephrectomy. We know that in doubtful cases it is probably safer to err on the side of nephrectomy as a secondary operation is more difficult. Here they felt that the only safe thing to do was to remove the kidney.

The prognosis is of course excellent although later in life if this person becomes pregnant she must be under close observation to be sure that her only remaining kidney does not make trouble.

#### PATHOLOGIC DIAGNOSES

Pyonephritis

(Carbuncle of kidney)

#### PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY. The kidney which was removed at operation turned out to be a typical example of a so-called carbuncle of the kidney. The upper pole was swollen to nearly twice the size of the lower pole by a large number of practically contiguous abscesses, varying from two to ten millimeters in diameter. Some of these abscesses were immediately subcortical and a few of them had obviously ruptured into the perinephric tissues thereby giving rise to the perinephric abscess. Others were immediately beneath the pelvic epithelium and here again a few had broken through and served to account for the pus in the urine. The probable source of this type of infection is hematogenous.

Seven years later the family moved to Arlington. His premedical education was acquired at the Worcester (Mass.) Academy and his medical degree was conferred by Boston University School of Medicine in 1897. Later he studied at the Harvard Medical School.

He was a Fellow of the Massachusetts Medical Society and the American Medical Association. In 1914 he became Superintendent of the Ring Sanatorium and Hospital, and President of the Corporation.

During the war he was Chief of the Neuropsychiatric Service at the Army Hospital at Fort Sheridan. He retired with the rank of Major. He had been Assistant Professor of Neurology at the Boston University School of Medicine for many years. He was prominent in Masonic bodies, and many civic and social organizations.

Dr. Ring is survived by his widow, Dr. Barbara Ring, who is Treasurer of Ring Sanatorium, a son, Hallam T. Ring, business administrator of the Sanatorium, a brother, Harold E. Ring, a sister, Mrs. Willard F. Gay, and a grandson, John Hallam Ring, all of Arlington.

**POLLANO**—WALTER A. POLLANO, M.D., of 238 Haverrhill Street, Lawrence, died from a heart attack, after a brief illness, June 25, 1935. He was born in Sessa Aurunca, Italy, in 1879. His early education was acquired at the University of his native city and at the University of Naples. After coming to America he became a registered pharmacist and later graduated from the Middlesex College of Medicine and Surgery, and served an internship at the Lying In Hospital in New York City.

He was a Fellow of the Massachusetts Medical Society and the American Medical Association.

He is survived by his widow, Mrs. Dora Pollano, a daughter, a son, four brothers, and a sister.

**SWAN**—WILLIAM DONALD SWAN, M.D., of 167 Brattle Street, Cambridge, died June 25, 1935, at his summer home in Annisquam.

Dr. Swan was born in Kennebunk, Maine, the son of Joshua and Sarah (Hodges) Swan, in 1859. His premedical education was acquired at Harvard College where he received his A.B. with the class of 1881. He graduated from the Harvard Medical School in 1885. He served as intern at the Massachusetts General Hospital and the Boston Lying In Hospital and then pursued postgraduate studies at Vienna. On his return he engaged in practice in Cambridge.

He was a Fellow of the Massachusetts Medical Society and the American Medical Association and had served as medical examiner of the first Middlesex District for over thirty years. He was honorary president of the Cambridge Hospital, having previously served as President and Trustee. He was a member of the Harvard Club, the Union Club of Boston and the Laurentia Club of Canada.

Dr. Swan is survived by a son, William D. Swan

and a daughter, Mrs. J. Frank Brown, and a sister, Mrs. J. Beirtram Williams.

**WITHEE**—FREDERICK ELMARIAN WITHEE, M.D., of 9 Forest Street, Newton Highlands, died June 30, 1935. He was born in Vassalboro, Maine, in 1864, and graduated from the College of Physicians and Surgeons of Baltimore in 1892.

He joined the Massachusetts Medical Society in 1897 and retired in 1931. He was also a Fellow of the American Medical Association. He maintained practice until within a day of his death. He was a member of the Staff of the Newton Hospital for seventeen years, and on his retirement was made an honorary member. He served as physician to Newton schools for twenty-nine years and during the World War served as captain in the Medical Corps at Camp Devens. He was a member of the American Legion.

His widow, Mrs. Addie L. (Brown) Withee, survives him.

## OBITUARIES

### DR. DUNCAN CAMPBELL SMYTH

Dr. Duncan Campbell Smyth was born on May 8, 1885, at Port Hood, Nova Scotia. He was the son of Christopher Smyth and Ellen Somers and grandson of the Hon. Peter Smyth. He died June 11, 1935.

He received his early education at the Port Hood Academy and later at the University of St. Francis Xavier's College in Antigonish, Nova Scotia. From this college he received the degree of Bachelor of Arts in 1904. Following the footsteps of his brother, the late Dr. P. Somers Smyth, prominent eye specialist of Boston, who died in 1929, he entered the Harvard Medical School and graduated therefrom in 1909. He interned at the Massachusetts Eye and Ear Infirmary subsequently engaging in practice in Boston.

On January 1, 1914, he married Alice G. Rice and by this marriage he leaves two children, a daughter, Pauline, aged seventeen years, and a son, Duncan, aged twenty years.

Dr. John E. Somers, who practiced his profession in North Cambridge for many years, was an uncle of the deceased.

Dr. Smyth was a Senior Surgeon in the Department of Otolaryngology at the Massachusetts Eye and Ear Infirmary. He was a finished operator. He made a distinguished name for himself in bronchoscopy and esophagoscopy. He invented two bronchoscopic instruments and one operation bears his name. His record in removing foreign bodies from the bronchi is exceptionally brilliant. He was distinguished for his good judgment and his dislike of fads and shams. He was one of the first to recognize the value of the formation of the Thoracic Clinic at the Massachusetts General Hospital and was the strongest representative of the Infirmary on this service. His opinions were highly valued by the members of this group. In the American Bronchoscopic Society, of which he was Vice Presi-

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## A SYMPOSIUM ON MEDICAL EDUCATION IN MASSACHUSETTS

In this issue, for the first time, the Massachusetts Medical Society through its Committee on Medical Education and Hospitals has attempted to draw attention to certain phases of medical education which are of particular local interest.

The manner in which physicians are registered in our Commonwealth can be improved. In order to bring about most wisely a reform of this character it is essential, as a starting point, that doctors be familiar with the history and nature of our present licensure law. The Editor of the *Journal* has described this clearly and succinctly.

Books play an important part in any process of medical education. The article by Dr. Lincoln Davis, President of the Boston Medical Library gives some idea of what a well-run library may accomplish as a center of postgraduate instruction and describes how the Library in Bos-

ton is eager to lend a helping hand to all physicians in the community who are interested in availing themselves of this unique collection.

Hospitals form a necessary link in any chain of medical progress. Dr. J. H. Pratt and Dr. C. H. Lawience have discussed hospitals and their relation to education from different viewpoints, Dr. Pratt pointing out how the community hospital can be made into a vitally important center of postgraduate education, and Dr. Lawience reminding the staff members of hospitals approved for intern training that they are obligated to teach their interns carefully and systematically and, therefore, assume teaching responsibilities as definite as those undertaken by members of the faculty of any medical school.

Finally, the case report by Dr. Joseph C. Edwards illustrates the quality of work that Massachusetts interns are capable of performing. This paper received the prize offered this year by the Massachusetts Medical Society for the best case report written by an intern in a Massachusetts hospital approved for intern training and offering a rotating internship.

The opportunities for postgraduate education in Massachusetts are varied and open to many, and in the future they can be developed to even greater advantage than they have been in the past. One cannot have attended the recent meeting of the Society without realizing how widespread throughout our ranks is the earnest, sincere desire to know more and to do better work. The more intelligently the opportunities at hand are used, the more rapid will be the growth of general medical knowledge.

## INFANTILE PARALYSIS CONVALESCENT THERAPEUTIC SERUM

ON page 36 of this issue, Dr. Chadwick sounds a timely word of warning as to the therapeutic value of infantile paralysis convalescent serum. As the next few months will inevitably witness a normal seasonal increase in the incidence of the disease, and may even see the unfolding of an epidemic that no one today can foresee, it is well that the medical profession should realize the limitations of a serum, the use of which is too often based on emotional rather than scientific grounds.

With the attention given to infantile paralysis during and after the 1916 epidemic, it was devoutly to be hoped that some specific therapeutic agent might be found. For some years, the studies carried on in this State under the auspices of the Harvard Infantile Paralysis Commission offered encouragement to the belief that the serum, if used in the preparalytic stages, might be of some therapeutic value in minimizing the subsequent paralysis. Even through the 1931 epidemic individual instances were numerous in which favorable effects followed, and might

therefore be due to the serum. Even these, however, were subject to the criticism provoked by a lack of control cases for it was manifestly impossible to make certain that the treated cases had not been of milder type than those already paralyzed and therefore not treated. Studies in other states, where serum was not so readily available and where more skepticism existed as to its value showed beyond dispute that when the value of serum was measured by comparison with a control group of alternate cases, no scientific evidence could be brought forward to support the belief in its efficacy.

Thus were shattered our hopes that convalescent serum might serve as a specific therapeutic agent. It is safe to say that in its continued use today the physician is merely hoping against fact that his particular case will in some way show some improvement that may be attributed to the serum. In the absence of any other specific therapy, and keeping in mind the popular hysteria with respect to the disease, the use of the serum is not greatly dissimilar to the drowning man's frantic grasp at a passing straw. The most that can be said for the serum is that its use may to a certain degree allay popular panic and give to the victim's parents a measure of comfort in the thought that something tangible is being done. Beyond this it is apparently of little value. It is to be hoped that the medical profession in its proper eagerness to afford to its patients every possible aid to recovery, will not lose sight of the real facts as to the value of convalescent serum.

### HONORIS CAUSA

It has been rare indeed in the last decade and a half, to have material of any importance spread upon the pages of the *Journal* without its first coming under the scrutiny of the managing editor. Special occasions, however, justify unusual methods and his associates on the staff of the *Journal* take this means of congratulating *Doctor Walter Prentice Bowers* on their own behalf and on that of the Massachusetts Medical Society on the honor which Harvard University has done itself in conferring upon him the degree of Master of Arts, *honoris causa*.

This degree has been conferred upon our friend, not as the editor of the *Journal*, not as a former president of the Massachusetts Medical Society, not on account of his arduous labors on the committee investigating the costs of medical care, not as a former secretary of the Board of Registration in Medicine, but on account of the years which he has given to his community as a skilled and devoted practitioner of the art of medicine.

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

BOWERS, WALTER P. M.D. Harvard University Medical School 1879. F.A.C.S. Managing Editor, *New England Journal of Medicine*. Member, Massachusetts Board of Registration in Medicine, 1894-1921. His subject is "The Massachusetts Board of Registration in Medicine." Page 1. Address: 8 Fenway, Boston, Massachusetts.

DAVIS, LINCOLN A.B., M.D. Harvard University Medical School 1898. F.A.C.S. President, Boston Medical Library. His subject is "The Value of the Medical Library in Medical Education." Page 5. Address: 279 Beacon Street, Boston, Massachusetts.

PRATT, JOSEPH H. Ph.B., A.M., M.D. Johns Hopkins University School of Medicine 1898. Physician in Chief, New England Medical Center. Professor of Clinical Medicine, Tufts College Medical School. His subject is "The Community Hospital as a Center of Postgraduate Education." Page 7. Address: 270 Commonwealth Avenue, Boston, Massachusetts.

STOREY, W. EDWARD. M.D. Emory University School of Medicine, Atlanta, Georgia 1930. His subject is "Notes on the Small Hospital as a Center of Postgraduate Education." Page 11. Address: Columbus, Georgia.

LAWRENCE, CHARLES H. A.B., M.D. Harvard University Medical School 1908. Physician, Boston Dispensary. Instructor in Medicine, Tufts College Medical School. His subject is "Internships in Massachusetts Hospitals." Page 11. Address: 520 Commonwealth Avenue, Boston, Massachusetts.

EDWARDS, JOSEPH C. A.B., M.D. Harvard University Medical School 1934. Intern, Springfield Hospital, Springfield, Mass. His subject is "A Baffling Case of Pulmonary Carcinomatosis." Page 15. Address: Springfield Hospital, Springfield, Massachusetts.

FAULKNER, JAMES M. A.B., M.D. Harvard University Medical School 1924. Visiting Physician, House of the Good Samaritan. Research Fellow, Thorndike Memorial Laboratory and Junior Visiting Physician, Boston City Hospital. Assistant in Medicine, Harvard Medical School. His subject is "The Effect of Administration of Vitamin C on the Reticulo-epithelium in Certain Infectious Diseases." Page 19. Address: 264 Beacon Street, Boston, Massachusetts.

ELEY, R. CANNON. M.D. Medical Department, University of Virginia 1925. Instructor in



Pediatrics and Communicable Diseases, Harvard Medical School and School of Public Health Associate Visiting Physician, Children's Hospital, Boston, Massachusetts His subject is "Progress in Pediatrics" Page 20 Address Children's Hospital, Boston, Massachusetts

## MASSACHUSETTS LEGISLATIVE NOTES

House No 2245

Reported on House No 1894

Referred to Ways and Means, House

RESOLVE providing for an investigation and study by the commissioner of public health of the laws relative to public health and to the establishment and administration of a system of health insurance

RESOLVED That the commissioner of public health is hereby authorized and directed to make an investigation and study of so much of the Governor's address (printed as Senate No 1) as relates to a study and revision of the laws relating to public health, and of the subject matter of current house document numbered fourteen hundred, relative to the establishment and administration of a system of health insurance Said commissioner shall report to the general court the results of his investigation and study, and his recommendations, if any, together with drafts of legislation necessary to carry such recommendations into effect, by filing the same with the clerk of the house of representatives on or before the first Wednesday in December of the current year For the purposes of this resolve said commissioner may expend, subject to the approval of the governor and council, such sums, not exceeding, in the aggregate, one thousand dollars, as may hereafter be appropriated therefor

### EDITORIAL NOTE

This resolution deals with very important matters relating to the practice of medicine That part which provides for a revision of public health laws should be given careful study by doctors, because there should be no antagonism between practitioners and health authorities

That relating to health insurance is one of the unsolved controversial subjects before the State and Nation in which the medical profession must assist in a solution, fair to all interests if possible, with the fundamental requirement that the people of this country must have adequate medical care

The Commissioner of Public Health has a difficult task before him in this assignment, and will need the assistance of fair minded persons who can submit facts and arguments which will be of assistance in the preparation of his report

House No 1157

The bill designated to permit the licensing of chiropractors was defeated in the House June 26 by a standing vote of ninety two to twenty nine,

after an adverse report by the House Committee on Ways and Means

Representative Olson of Ashland served notice that he would move reconsideration

The attempt to have a reconsideration of the vote the next day was defeated This apparently disposes of the attempt for this year

## MISCELLANY

### THE NOMINATION OF DR. WILLIAM L HARRIS OF MILFORD

Governor Curley has presented the name of Dr William L Harris of Milford to the Council to fill the position of medical examiner of the sixth Worcester District to succeed Dr George Curley, deceased

### ADMISSION TO THE PRENDERGAST PREVENTORIUM

The Prendergast Preventorium conducted by the Boston Tuberculosis Association accepted 110 children for the opening day June 29 Dr Eli Friedman will be medical supervisor for this season

### DR RICHARD P STRONG DELIVERS THE MAIBEN LECTURE

Dr Richard P Strong, Professor of Tropical Medicine at Harvard University, delivered the Maiben Lecture in Medicine, at the meeting of the American Association for the Advancement of Science, Minneapolis, June 25, 1935 The subject of the lecture was "The Importance of Ecology in Relation to Disease"

### THE APPOINTMENT OF MR FRANK PRESTARA

The Council has endorsed the Governor's nomination of Mr Frank Prestara as a member of the Industrial Accident Board by a vote of five to three Mr Prestara took the oath of office June 26

He succeeds Mr N Fusaro of Worcester

### THE ELECTION OF DR E W GOODPASTURE

Dr E W Goodpasture, Professor of Pathology of Vanderbilt University School of Medicine, Nashville, Tennessee, has been elected a Director of the American Society for the Control of Cancer, to fill the vacancy on the Board caused by the death of Dr George H Bigelow

### THE APPOINTMENT OF DR R M ASH

Mayor T S Burgin of Quincy, Massachusetts, has appointed Dr Richard M Ash of 66 Greenleaf Street, Health Commissioner of that city

### BOSTON UNIVERSITY SCHOOL OF MEDICINE ALUMNI ASSOCIATION

The Boston University School of Medicine Alumni Association recently elected the following officers President Helmuth Ulrich, M D first vice-president,

David L. Belding MD second vice-president  
C. Wesley Sewall MD treasurer Harold W. Rip-  
ley MD secretary Rudolph Jacoby MD auditor  
Cecil W. Clark MD advisory committee Wesley  
T. Lee MD Harold L. Babcock MD Frank Bar-  
ton MD Milo C. Green MD Winfred Overhol-  
ser MD Samuel N. Vose MD

Boston University Medical School needs a \$500,000 endowment, \$200,000 of which would be used to on large its buildings and equipment, and the remainder for a fund to carry on its work. Dr. Alexander S. Begg, dean of the school, said at the annual reunion of the alumni association:

He suggested that the alumni appoint a fund-raising committee.

The school, which was established in 1874 with fifty-eight students, has reached a point where it is now teaching in excess of 250 students and has had 1700 graduates. Boston University Medical School was the first degree-granting institution in New England to offer women an opportunity to study medicine.

There were about 500 men and women doctors present. Dr. Harold L. Babcock, 10, retiring president of the alumni, presided, and Dr. Edward S. Calderwood was toastmaster.

Four old grads rose and bowed when they were called upon. They were Drs. John P. Sutherland and George Perry, '79; George Hunt, '84; and John B. Rice, '86. Dr. Perry Wilde represented the class of '25. Members of the graduating class of the school of medicine attended: Dr. Daniel L. Marsh and Charles L. Sullivan, Jr., of Jamaica Plain, Mass., president of the 1935 senior class, were guests of honor.

#### THE 121ST ANNUAL REPORT OF THE TRUSTEES OF THE MASSACHUSETTS GENERAL HOSPITAL

The 121st Annual Report of the Trustees of the Massachusetts General Hospital is a testimonial to the intellectual vigor as well as to the physical health of this institution. The principal points enumerated in the Report may be placed in three groups—Scientific, Economic and Physical.

The outstanding achievement of the year 1934 was the establishment of a psychiatric service under the direction of Dr. Stanley Cobb. This service, which was made possible by a grant from the Rockefeller Foundation, has at its disposal twelve beds on the third floor of the Baker Memorial. On the same floor are the beds of Dr. Ayer's Neurological Service and Dr. W. J. Mixter's neurosurgical assignment, thus concentrating on one floor all patients with diseases of the nervous system. As the Report points out, the significance of this development lies in the close affiliation thus brought about between a psychiatric unit and the life of the General Hospital.

In the Out Patient Department, special clinics

have been formed for the study of osteomyelitis and of headaches of obscure etiology. In the laboratories intensive study is being carried on as to the nature of renal calculi. This work links up closely with the studies which have been made with such important results on the various aspects of hyperparathyroidism, studies in pernicious anemia in endocrinology and in the field of the sympathetic nervous system. A Wolf Schindler gastroscope was purchased in April 1933; its value has been demonstrated in the differentiation of gastritis and gastric ulcer. Over 200 examinations have been made.

This list does not by any means include all of the investigations being carried on in the various departments of the hospital, but it gives one an idea of the scope of the researches under way.

In the field of economic development we find listed an investigation of the financial status of outpatients. During the period from January 1 to May 30, 1934, all outpatients who had been admitted two or more years previously were interviewed as to their financial condition. Seven thousand five hundred and twelve patients were investigated, and of this number only forty-eight were found to be ineligible for hospital treatment.

The Trustees have gone on record as favoring a plan of Group Insurance, but they are awaiting the cooperation of the other hospitals in the Greater Boston group.

An eight-hour day for nurses has been instituted; data are being collected as to the reactions of patients, nurses and staff to this innovation.

As to changes in the physical aspect of the hospital, it is to be noted that the land on the corner of North Grove and Fruit Streets, formerly owned by the city, has been purchased by the hospital. Some of the buildings thereon are being remodeled to serve as dormitories for male employees. A great need exists for housing facilities for graduate nurses, male nurses and resident doctors. Seventy-one physicians live in the hospital; the facilities of the hospital for supplying rooms to the resident staff are severely taxed.

More beds in the Baker Memorial have been made available for patients for the demand for beds has steadily risen. Two hundred and twenty-six of the possible 300 beds are now in commission.

The hospital has sustained great losses in the death of Dr. George Bigelow and of Mr. Robert Homans and Mrs. Nathaniel Thayer. Mr. Homans and Mrs. Thayer had served for many years on the Board of Trustees, their services to the hospital were outstanding.

The Staff has lost through resignations the services of Dr. Tracy Putnam, Dr. Philip Wilson and Dr. Frederick Lord. The first two go to other fields of activity, and, as the report suggests, they will add their contribution to that of the large number of Massachusetts General Hospital graduates who in every field of medicine and in many places are putting into daily practice the lessons and the ideals taught them by the Massachusetts General Hospital.

Seven years later the family moved to Arlington. His premedical education was acquired at the Worcester (Mass.) Academy and his medical degree was conferred by Boston University School of Medicine in 1897. Later he studied at the Harvard Medical School.

He was a Fellow of the Massachusetts Medical Society and the American Medical Association. In 1914 he became Superintendent of the Ring Sanatorium and Hospital, and President of the Corporation.

During the war he was Chief of the Neuropsychiatric Service at the Army Hospital at Fort Sheridan. He retired with the rank of Major. He had been Assistant Professor of Neurology at the Boston University School of Medicine for many years. He was prominent in Masonic bodies, and many civic and social organizations.

Dr. Ring is survived by his widow, Dr. Barbara Ring, who is Treasurer of Ring Sanatorium; a son, Hallam T. Ring, business administrator of the Sanatorium; a brother, Harold E. Ring, a sister, Mrs. Willard F. Gay, and a grandson, John Hallam Ring, all of Arlington.

**POLLANO**—WALTER A. POLLANO, M.D., of 238 Havenshill Street, Lawrence, died from a heart attack, after a brief illness, June 25, 1935. He was born in Sessa Aurunca, Italy, in 1879. His early education was acquired at the University of his native city and at the University of Naples. After coming to America he became a registered pharmacist and later graduated from the Middlesex College of Medicine and Surgery, and served an internship at the Living In Hospital in New York City.

He was a Fellow of the Massachusetts Medical Society and the American Medical Association.

He is survived by his widow, Mrs. Dora Pollano, a daughter, a son, four brothers, and a sister.

**SWAN**—WILLIAM DONNISON SWAN, M.D., of 167 Blattle Street, Cambridge, died June 25, 1935, at his summer home in Annisquam.

Dr. Swan was born in Kennebunk, Maine, the son of Joshua and Sarah (Hodges) Swan, in 1859. His premedical education was acquired at Harvard College where he received his A.B. with the class of 1881. He graduated from the Harvard Medical School in 1885. He served as intern at the Massachusetts General Hospital and the Boston Lying In Hospital and then pursued postgraduate studies at Vienna. On his return he engaged in practice in Cambridge.

He was a Fellow of the Massachusetts Medical Society and the American Medical Association and had served as medical examiner of the first Middlesex District for over thirty years. He was honorary president of the Cambridge Hospital, having previously served as President and Trustee. He was a member of the Harvard Club, the Union Club of Boston and the Laurentia Club of Canada.

Dr. Swan is survived by a son, William D. Swan,

a daughter, Mrs. J. Frank Brown, and a sister, Mrs. J. Bertram Williams.

**WITHEE**—FREDERICK ELMARIAN WITHEE, M.D., of 9 Forest Street, Newton Highlands, died June 30, 1935. He was born in Vassalboro, Maine, in 1864, and graduated from the College of Physicians and Surgeons of Baltimore in 1892.

He joined the Massachusetts Medical Society in 1897 and retired in 1931. He was also a Fellow of the American Medical Association. He maintained practice until within a day of his death. He was a member of the Staff of the Newton Hospital for seventeen years, and on his retirement was made an honorary member. He served as physician to Newton schools for twenty-nine years and during the World War served as captain in the Medical Corps at Camp Devens. He was a member of the American Legion.

His widow, Mrs. Addie L. (Brown) Withee, survives him.

## OBITUARIES

### DR. DUNCAN CAMPBELL SMYTH

Dr. Duncan Campbell Smyth was born on May 8, 1885, at Port Hood, Nova Scotia. He was the son of Christopher Smyth and Ellen Somers and grandson of the Hon. Peter Smyth. He died June 11, 1935.

He received his early education at the Port Hood Academy and later at the University of St. Francis Xavier's College in Antigonish, Nova Scotia. From this college he received the degree of Bachelor of Arts in 1904. Following the footsteps of his brother, the late Dr. P. Somers Smyth, prominent eye specialist of Boston, who died in 1929, he entered the Harvard Medical School and graduated therefrom in 1909. He interned at the Massachusetts Eye and Ear Infirmary subsequently engaging in practice in Boston.

On January 1, 1914, he married Alice G. Rice and by this marriage he leaves two children, a daughter, Pauline, aged seventeen years, and a son, Duncan, aged twenty years.

Dr. John E. Somers, who practiced his profession in North Cambridge for many years, was an uncle of the deceased.

Dr. Smyth was a Senior Surgeon in the Department of Otolaryngology, at the Massachusetts Eye and Ear Infirmary. He was a finished operator. He made a distinguished name for himself in bronchoscopy and esophagoscopy. He invented two bronchoscopic instruments and one operation bears his name. His record in removing foreign bodies from the bronchi is exceptionally brilliant. He was distinguished for his good judgment and his dislike of fads and shams. He was one of the first to recognize the value of the formation of the Thoracic Clinic at the Massachusetts General Hospital and was the strongest representative of the Infirmary on this service. His opinions were highly valued by the members of this group. In the American Bronchoscopic Society, of which he was Vice Presi-

dent a year or two ago his opinion was equally valued

Dr Smyth was not given to ready speaking. He usually spoke last, and had the gift of hitting the nail on the head. He had a dry wit which brightened any discussion. When necessary he could hit hard. In the Wednesday Clinical Meetings every one felt that the meeting would be a success if he were there and generally he was. He made the hospital his first interest. He did not wait until his time of service came around to appear. Nearly every morning he would show up ready to tease somebody and to help everybody. He was a bit old fashioned in some ways especially in his loyalty and respect for his superiors. He played a good game of cards. He was a splendid companion and thoroughly a man's man.

Dr Smyth was at the height of his powers at the time of his death. He was next in line for senior positions in medical societies.

A little over a year ago he had warning that he was to share the fate of his brother who died of cerebral hemorrhage five years ago. He had a slight hemorrhage and on June 11 a fatal one.

A few years ago Dr Smyth bought for summer use a house at Marshfield, Mass. which Daniel Webster built for one of his sons and in which at various times Webster himself had lived. Dr Smyth had long been an admirer of Webster and he began to collect Webster items. In the Webster room of Dr Smyth's house a number of valuable Websterian relics were found and transferred to the town authorities. In his pursuit of this material he made a regular and systematic round of the second hand book shops. Dr Smyth was interested in civic affairs and was a member of the Board of Trade of Marshfield.

He was a lover of birds and dogs. He took great interest in the many birds about his Marshfield home. Working his black and white setter Beverly gave him great relaxation from his medical work. When she was ready to give birth to her first litter of puppies a month or so ago her welfare caused him more concern almost than his hospital duties.

He was a member of the American Laryngological Association, the American Otological Society, the American Rhinological, Laryngological and Otological Society, the American Academy of Ophthalmology and Otolaryngology and the Massachusetts Medical Society. For many years he was instructor in Laryngology at the Harvard Medical School.

He was a member of the Harvard Club of Boston and until recently a member of the Boston Art Club.

H P M

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DR. WILLIAM HERMAN  
1891-1935

The sudden death of Dr. William Herman on January 25, 1935 brings a poignant realization of the unique position which he had come to occupy in this

community. He was born in 1891 in Nashville, Tennessee and graduated from Yale University in 1912. He then entered business for three years but found that it offered no adequate expression for the humane and esthetic aspirations which made up so large a share of his life. He hesitated for a time between the study of architecture and that of medicine but finally chose the latter and entered the Harvard Medical School in 1916. The extraordinary gift for forming friendships which was his most outstanding trait began at once to make itself felt, among his fellow students, the members of the faculty and diverse artistic and social circles of the city. Professionally it soon became evident that the psychological and sociological aspects of medicine were far more to his taste than the physiological ones. On graduation he completed a medical internship at the Massachusetts General Hospital, then a psychiatric internship at the Phipps Clinic in Baltimore, became attached to the Boston Psychopathic Hospital and worked for a year in Amsterdam under Professor Brouwer and Professor Kappers on a problem in neuroanatomy.

As his psychiatric training progressed it became more and more obvious that he must inevitably ally himself with the analytic school of psychology. His unequaled gift of intuition combined with an uncompromising candor and faculty for self-criticism made no other course possible. His proposal to practice psychoanalysis engendered considerable criticism and even ridicule but he calmly held to his plans and convictions without a trace of the truculent attitude which too often mars the discussion between schools of psychology. He received analytical training from Dr. van der Hoop of Amsterdam, Dr. Jung of Zürich, Dr. Franz Alexander and finally Dr. Hans Sachs.

From the first his psychiatric practice was an unqualified success. His gift for obtaining confidence, his keen insight into the depths of complicated situations and his faculty of summing up problems in a vivid and convincing form contained a large creative element which entirely transcended the mere application of technique. He inspired trust and affection in his patients rather than dependence. Perhaps his most spectacular professional success was obtained in the treatment of a group of patients with convulsions which he was preparing to report after several years' observation. He played a large part in the reorganization of the Boston Psychoanalytic Society and it is largely to his wise counsel and breadth of view that the society owes its reputation for liberalism combined with high professional standards which makes it respected throughout the country. He was associated with Dr. Stanley Cobb's department since 1926 and gave every year an elective seminar in psychiatry which has deeply affected the outlook of many students. Plans were maturing to allot him a much larger share of the teaching.

Dr. Herman married Susan Evans Hale of Windsor, Vermont in 1925 and a daughter and a son were born to them.

engorged and pulsating jugular vein a paradoxical pulse and a moderately enlarged heart which was fibrillating. The pleura was markedly thickened, as was the pericardium. At operation an area of pericardium which was partially calcified was removed, but postoperative improvement was slow, so that in 1933 Doctor Churchill again operated and removed a larger amount of calcified pericardium without any further help. A liver biopsy showed slight fibrosis and an omentopexy was done. At the present time he is improving on a restricted salt and fluid intake.

There have been three fatal cases. Two had severe active tubercular pericarditis and died very soon after operation. The other fatal case showed extensive cirrhosis in a fifty-two year old person. Two other patients were slightly benefited and lived about a year after operation.

In summary, Doctor White said that the first symptom is usually dyspnea, abdominal ascites, or both. There is no palpitation. The two most important physical signs are an enlarged liver and engorged jugular veins. There is frequently no pulsation at the right border of the heart by fluoroscope. Many cases have thickened pleura and increased hilus markings. The electrocardiogram usually shows a low voltage with inverted or flattened T waves. The serum protein is frequently low and the liver function is usually normal.

Doctor Churchill spoke briefly of the surgical aspects of Pick's disease. He pointed out that a very sick patient can stand a severe operation if it will relieve him of an overwhelming burden. The patients operated on for Pick's disease frequently are in better condition at the end of the operation than they were at the beginning. If the patient has acute tuberculous pericarditis, he will die as the heart is small and feeble and the tamponade cannot be relieved. Therefore, these latter cases should be avoided surgically.

An excellent motion picture showed the details of the operation. Ether is used for the anesthetic, and the oxygen tent is employed routinely postoperatively. The anesthetic is administered intratracheally to maintain a positive pressure in case the pleural cavities are accidentally opened. There is some danger of opening the heart. The wound is closed tightly with silk sutures.

### SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

#### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, JULY 8, 1935

Wednesday, July 10—

112 M Clinico-Pathological Conference Children's Hospital

Thursday, July 11—

\*12 M Clinico-Pathological Conference Massachusetts General Hospital

Saturday, July 13—

\*10-12 Staff rounds at the Peter Bent Brigham Hospital. Open to practicing physicians

\*Open to the medical profession

†Open to Fellows of the Massachusetts Medical Society

August 29 - September 5—Latin American Congress of Physical Therapy, X-Ray and Radium. For information address Dr. Madge C. L. McGuinness, 1211 Madison Avenue, New York City

October 7-10—American Public Health Association will meet in Milwaukee, Wisconsin. For information address the American Public Health Association, 50 West 50th Street, New York City

October 21 - November 2—1935 Graduate Fortnight of the New York Academy of Medicine. See page 898, issue of May 9

October 28 - November 1—The Twenty-Fifth Clinical Congress of the American College of Surgeons. See page 1065, issue of May 30

### BOOKS RECEIVED FOR REVIEW

The Kidney in Health and Disease. Edited by Hilding Berglund, Grace Medes and others. 754 pp. Philadelphia: Lea & Febiger. \$10.00

Ten Years of Rural Health Work, Rutherford County, Tennessee, 1924-1933. W. Frank Walker. 82 pp. New York: The Commonwealth Fund

Epidemics and Crowd-Diseases. Major Greenwood. 409 pp. New York: The Macmillan Company. \$5.50

The Biochemistry of Medicine. A. T. Cameron and C. R. Gilmour. Second Edition. 518 pp. Baltimore: William Wood & Company. \$6.00

Aids to Surgery. Cecil A. Joll and Reginald C. B. Ledlie. Sixth Edition. 612 pp. Baltimore: William Wood & Company. \$2.75

Handbook of Anaesthetics. J. Stuart Ross and H. P. Fairlie. Fourth Edition. 299 pp. Baltimore: William Wood & Company. \$4.00

The Principles and Practice of Urology. Frank Hinman. 1111 pp. Philadelphia and London: W. B. Saunders Company. \$10.00

A Textbook of Biochemistry. Edited by Benjamin Harrow and Carl P. Sherwin. 797 pp. Philadelphia and London: W. B. Saunders Company. \$6.00

Economic Problems of Medicine. A. C. Christie. 242 pp. New York: The Macmillan Company. \$2.00

Sedgwick's Principles of Sanitary Science and Public Health. Rewritten and enlarged by Samuel C. Prescott and Murray P. Horwood. 654 pp. New York: The Macmillan Company. \$4.25

Emotions and Bodily Changes. A survey of literature on psychosomatic interrelationships 1910-1933. H. Flanders Dunbar. 595 pp. New York: Columbia University Press. \$5.00

International Clinics. Volume II. Forty-Fifth Series, 1935. Edited by Louis Hamman. 327 pp. Philadelphia, Montreal and London: J. B. Lippincott Company

Aids to Ophthalmology. N. Bishop Harman. Eighth Edition. 242 pp. Baltimore: William Wood & Company. \$1.25

### BOOK REVIEW

The Newcastle Upon Tyne School of Medicine, 1834-1934. G. Gray Turner, assisted by W. D. Arnison. Andrew Reid & Co., Ltd., Strawberry House, Newcastle upon Tyne, 1934. xii + 221 pages

The history of a medical school is always of interest to the medical profession. This book, written by a well known British surgeon, who has many friends in this country, is an attractive account of the Newcastle School, which recently celebrated its one hundredth anniversary. The book is well illustrated and attractively published.

# The New England Journal of Medicine

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## NEW ENGLAND BRANCH, AMERICAN UROLOGICAL ASSOCIATION

### HEMORRHAGIC CYSTITIS AND TUBERCULOSIS OF THE PROSTATE\*

#### Case Report

BY O. DRAPER, CHIEF, M.D.†

A man of forty-eight a wire worker entered the hospital complaining of hematuria which had existed since the day previous.

Family and past history were essentially negative.

Five months ago he noticed some pain along the urethra, a frequency and discomfort when voiding particularly in the erect position.

His blood pressure was 130/100. Heart normal. Blood picture normal. Bleeding and clotting time normal. Prostate not enlarged. Bleeding was persistent and excessive. He was cystoscoped with unsatisfactory results on account of the free bleeding. He was drained by catheter and there was no let up in his bleeding.

On admission red count was 4,300,000, white count was 16,000. Hemoglobin 70 per cent.

The man was operated upon with the expectation of finding a tumor of the bladder. The operation was done under spinal anesthesia. The bladder was full of clots, no tumor, calculus or areas of definite ulceration were found. The bladder wall seemed to ooze blood from nearly every portion especially where touched by sponge or instrument. The bladder was closed around a large Freyer tube.

At the time of operation his red count was 2,380,000, white count was 10,750 and hemoglobin 50 per cent.

Postoperative diagnosis was hemorrhagic cystitis. His aftertreatment consisted of intravenous saline glucose and a transfusion together with a nutritious diet. His convalescence was slow but gradual.

On his discharge the red count was 5,700,000 and hemoglobin 70 per cent.

In the London *Lancet*, Fullerton, in reviewing 605 cases of hematuria, found the bladder as the source in 470 and of these cystitis and tumor were the most common causes. Bladder injuries and calculi were next in importance.

Podvinec and Pollak in a German periodical mention a vesical purpura as the source of bleeding and Lichtenstein in another article from German literature mentions varicosity as a cause.

The other case is that of a man fifty-eight who entered the hospital on account of a pain in his

back and difficulty in locomotion. He was admitted to the Medical Service.

He was examined carefully. There was noted a slight irregularity in the prostate, a nodule in the left lobe. There were no urinary symptoms. No residual Cystoscopy was negative and the stains and guinea pig examination of bladder and both kidney urines were negative.

The spine showed a destructive lesion involving the upper half of second lumbar. Impression was that of tumor probably malignant.

The diagnosis was probable malignancy of prostate.

This man was operated upon for confirmation of diagnosis.

Suprapubic cystotomy was done under ether anesthesia. A portion of the left lobe of the prostate was removed and examined by our pathologist. Dr. Raymond Goodale by frozen section and no malignancy was found. The wound was closed with drainage. The recovery was uneventful.

On staining and further examination of the portion of prostate removed our pathologist reported the finding of tuberculosis. The slides were reviewed and confirmed by Dr. Shields Warren and others at a Cancer Clinic which met at our hospital at that time.

We feel that this case may be another one of tuberculous of the prostate gland.

Before leaving the hospital an Albee fusion was done to immobilize the diseased vertebrae.

There are comparatively few cases which are considered definitely as tuberculous lesion of the prostate. Usually a primary focus is located in some part of the body. We found no primary focus in this case.

Patch and Foulds in the *British Journal of Urology* in 1931, reported tuberculosis of the prostate in the absence of tuberculosis elsewhere in the genito-urinary tract as extremely rare.

Lowsley and Duff in *Annals of Surgery* in 1930, considered tuberculosis of the prostate as usually secondary.

Barney in 1923 reported a case of tuberculosis of the prostate. The total number of such cases is not large.

Both the patients here reported have obtained a satisfactory restoration to their usual health. The tuberculous prostate case is working and it is a year since his operation. The hemorrhagic cystitis case is working and it is about six months since his operation.

Read at the meeting of the New England Branch of the American Urological Association, Boston, February 14, 1935.

†The late O. Draper—Cystoscopist, Memorial Hospital, Worcester. For record and address of author see "The Week I Live" page 76.

## VESICOINTESTINAL FISTULA\*

BY HAROLD L. LELAND, M.D.†

**T**HE chief interest in the case I have to present tonight lies in the chronological development of events, and I will endeavor to present it from that viewpoint

On August 4 of last summer, Mrs. A. was admitted to the Ward Genito-Urinary Service of the Lowell General Hospital. Her chief complaint was dysuria and great frequency, of three months' duration, with hematuria for the past three days. The only fact of interest in her past history was her story of so-called "bilious attacks" with "much gas", beginning four years ago and recurring at intervals to date, until overshadowed by the urinary symptoms. These attacks were accompanied by slight nausea but never by vomiting. She was constipated and had required a laxative for several years.

Physical examination on admission showed a small emaciated woman, appearing much older than her fifty-one years. The only abnormality to be found was a slight tenderness in the left iliac region, no masses could be palpated.

The laboratory reported a normal blood count, a blood urea of 20 mgm., and an alkaline urine of a very foul odor, having a specific gravity of 1.022, a trace of albumen, and a very heavy sediment filled with pus and some blood.

Cystoscopic examination on the day of admission revealed a bladder with a very offensive urine, so turbid that repeated washing would not permit identification of any landmarks. There was a large, gray, ovoid shadow lying in the base of the bladder, coinciding with the x-ray picture.

A suprapubic cystotomy was performed under novocain infiltration anesthesia. The stone was removed and the bladder closed with a double layer of sutures, being drained with an indwelling urethral catheter.

Her postoperative recovery was excellent. Her temperature never rose above 99°F. She had no discomfort, although her urine remained very foul.

Her wound appeared to be healing by first intention until the ninth day, when it suddenly broke open and discharged a large amount of semi-formed feces and urine.

My immediate thought was that, in closing the bladder under the somewhat restricted field of local anesthesia a stitch had caught a coil of gut and had finally sloughed through into the bladder. I labored under this disquieting illusion for a week, when the intern came to me and said "Doctor, I have just talked with Mrs. A's husband. He tells me that she was passing fecal matter through her urethra for a month before she entered the hospital, but was too embarrassed to tell us about it."

My morale immediately rose 100 per cent.

In addition he said "Here are two stones which she passed last month." One, measuring about two cm. in length contained as a nucleus a small piece of wood, resembling a piece of broken toothpick, the other, a small piece of string.

I accused Mrs. A. of inserting the toothpick into her urethra. This she indignantly, and I think truthfully, denied. We then theorized that the toothpick had entered the bladder from the intestine, causing the fistulous tract.

Her further convalescence was uneventful but slow.

Cystoscopy on the twenty-first postoperative day was unsuccessful inasmuch as the bladder could not be cleared of its fecal content. She refused a gas roentgen examination and was discharged on the twenty-fourth postoperative day with the suprapubic sinus well healed, but the bladder still contaminated with feces.

## SECOND ADMISSION

Mrs. A. returned September 1 as an outpatient. Cystoscopic examination was again unsatisfactory because of the fecal content of the bladder. A cystogram at this time showed a practically normal bladder contour.

## THIRD ADMISSION

On September 15, Mrs. A. again returned as an outpatient.

This time cystoscopy showed a marked improvement. The mucosa revealed a chronic cystitis with a small area low down on the posterior wall which was depressed, irregular and seemed to be the site of the fistula. It did not appear malignant. Attempts to pass catheters and filiforms into this tract were unsuccessful. Both ureters showed a cloudy urinary efflux. They were catheterized in spite of the infected condition of the bladder. Specimens from both kidneys showed pus, bacteria, and a positive culture for colon bacillus. The phthalein test was normal.

Bilateral pyelograms with sodium iodide 125 per cent showed very slight changes which we interpret as being due to infection.

## FOURTH ADMISSION

October 4, two months after her original entry, Mrs. A. was again admitted to the hospital. This time she complained primarily of obstinate constipation, with colicky abdominal pains, distention and vomiting. This condition had been developing gradually during the past month.

Physical examination showed a horseshoe-shaped abdominal distention, suggestive of a distended colon from obstruction in the sigmoid. No masses could be felt.

She was relieved by repeated high enemata and pitressin.

During this stay in the hospital a quart of dilute methylene blue was given as a high rectal injection. Her bladder was then viewed through the cystoscope for three quarters of an hour without any color being seen. A bladder injection of methylene blue appeared in the feces the next day.

At this time we felt that she was suffering from a partial intestinal obstruction. We were undecided as to whether this obstruction was caused by a new growth, or by adhesions about the fistulous tract, which apparently was high in the colon, the semi-formed feces excluding the small gut.

She again refused a gastrointestinal x-ray examination, signed a release and left the hospital against advice on the fifth day.

## FIFTH ADMISSION

December 3, four months from the date of her first admission, Mrs. A. again entered the hospital. This time she was admitted to the General Surgical

\*Read at the meeting of the New England Branch of the American Urological Association, Boston, February 14, 1935.

†Leland, Harold L.—Assistant Professor Genito-Urinary Surgery, Boston University School of Medicine. For record and address of author see This Week's Issue, page 75.

Ward Service with a recurrence of her intestinal obstruction.

Physically she had lost some weight and her general condition was not nearly so good.

The urine still contained a small amount of fecal matter.

Cystoscopic examination again failed to permit the introduction of a catheter or siliiform into the fistulous tract. There was nothing in the bladder suggesting malignancy.

A gastrointestinal x-ray now accepted for the first time, showed a filling defect in the sigmoid which could not be filled by a barium enema.

On the tenth day an exploratory operation was attempted under spinal anesthesia with the hope of doing a colectomy.

The abdominal cavity contained a small amount of serous fluid. In the pelvis was a hard mass the size of one's fist. The transverse colon dropped down and was adherent in this mass. The sigmoid and a coil of small gut were likewise involved. The bladder was adherent low down on its posterior wall to the transverse colon.

The bladder was easily separated. A small adhesion no larger than a lead pencil contained the communicating tract with the transverse colon. This was severed and the bladder and colon closed in double layers.

Attempts were then made to bring the sigmoid up for a colectomy. This was impossible because of the adhesions and the great fragility of the tissues which tore and spilled feces into the abdominal cavity.

Finally the peritoneum was brought down to the sigmoid low in the pelvis. The abdominal wall was partially closed with profuse drainage.

The patient did not rally. She died the next day undoubtedly of surgical shock.

Autopsy could not be obtained but a pathological examination of tissue removed from the sigmoid at operation showed a frankly malignant adenocarcinoma grade II.

To summarize. We had a simple vesical calculus with an incomplete and therefore misleading history, a fistulous tract between the transverse colon and bladder with subsequent intestinal obstruction from an adenocarcinoma of the sigmoid.

The unsettled question is the relation of the toothpick in the first calculus to the conditions found. Did it cause the fistula, or was degeneration of the carcinoma the cause of the false passage, with the toothpick a mere incident thereto?

## DISCUSSION

Dr. F. H. COLBY. I enjoyed Dr. Leland's case very much indeed and congratulate him on his presentation. These cases of fistula formation between the bowel and bladder are sometimes extremely difficult to diagnose when the patient is first seen. It is usually a question as to whether the cause of the fistula is in the first place an inflammatory disease affecting usually the sigmoid diverticulitis or whether it is carcinoma. These two conditions account for practically all fistulae except the occasional congenital one between bladder and bowel. While I was at the Brigham Hospital there were two of these cases of fistulous formation between the bladder and the bowel. One patient complained of pneumaturia and the diagnosis was easy of course. The other patient had a persistent cystitis much as in Dr. Leland's case. This patient was gone over very care-

fully both on the general surgical and on the urological services being on the urological service first. Cultures of the urine from kidneys and bladder and complete urological examination resulted in the diagnosis of chronic pyelitis for some time. Then the patient was given a barium enema and one of the nurses reported that barium had appeared in the urine. It is unusual to be able to find the fistula between the bowel and bladder diagnosed at cystoscopic examination unless the fistula is large. It is not frequently made in this manner following a barium enema the barium appearing in the urine.

Carcinoma and diverticulitis apparently cause fistula formation in about the same number of incidences. Both of these patients had diverticulitis.

Divergence of the fecal stream by either a preliminary colectomy or cecostomy and following that, a repair of the damaged bowel either by resection or by a plastic operation are usually the procedures that are followed and likely to be most successful in one of these patients the diseased mass could be removed by a plastic operation on the bowel and a Heineke-Mikulicz procedure done to restore the normal lumen of the bowel. In the other patient, following the colectomy and prolonged drainage of the bowel resection was successfully performed the fistula closed and the bowel eventually closed by a subsequent operation.

These cases are always interesting and should be always borne in mind by us as urologists where a persistent cystitis without any evident cause is present.

Dr. EDWARD J. O'BRIEN. There is a very close relation frequency of urination and these diverticula especially when they become inflamed. I have seen several cases in the past four or five years where all the symptoms were those of the urinary bladder when the actual pathology was in the lower sigmoid or rectum. One individual about four years ago first came to me with some frequency of urination. I cystoscoped him but could not find a thing except four or five leucocytes per high power field in the urine. From time to time he complained of pain extending down the left cord into the scrotum. I had him x-rayed and the K. U. B. plates were absolutely negative. Bismuth enema was then done and a diagnosis of diverticulitis of the sigmoid was made. The man went along for about a year and a half without much trouble except for an occasional attack of pain and soreness along the cord extending into the left testicle. Two years ago last January he began to pass some gas through his urethra and that was followed by feces. I sent him to the hospital cystoscoped him and found that he had an opening in the upper left side of the fundus of his bladder. On opening the abdomen there was a large inflamed mass that filled almost the entire pelvis. It was deemed inadvisable to do much exploration in this region so I did a cecostomy thus diverting the fecal stream. This was kept open for about three months with the large bowel irrigated daily with salt solution. The urine became clear and apparently the inflammation of the diverticula subsided. I then closed this cecostomy and the man has been very well since. The urine is clear and is negative except for an occasional leucocyte.

I also saw a case which was sent to me for obstruction of the prostate. There was no residual urine. I cystoscoped him and his bladder looked quite normal. A few weeks later he passed considerable blood by rectum. He was explored and found to have a massive carcinoma of the rectosigmoid.

I mention these facts to show that where we see a lot of patients with frequency and bladder findings are negative we ought to be suspicious of some disease in the sigmoid or the pelvis.



DR E G CRABTREE I want to call attention to the possibility of demonstrating the sinus if you take an oblique cystogram. Most often these are connected with the rectum in the region of the sigmoid, either carcinomatous or inflammatory in origin, and in the right oblique view, when a dense solution is used, you nearly always see the sinus.

DR. CLYDE L. DEMING There are no real papers on this subject and I am delighted that Dr Leland presented this subject. The last paper on this subject was written by Hume about thirty years ago. With the advances of our diagnostic procedures it seems to me it would be well for the urologists to bring this subject up to date, because cer-

tainly a great deal has happened in the last thirty years in regard to this subject.

DR LELAND These things usually run in threes. I had my second case last month. This patient had an admission diagnosis of indirect inguinal hernia, with a large mass low down in the abdomen. He, also, passed fecal material by urethra. He was in *extremis* at the time and no operative investigation could be made. At autopsy he showed a large diverticulum of the sigmoid which had, apparently, eroded through and had communicated with the bladder so that communication between the bladder and intestinal tract is more common than the textbooks would show.

## A CASE OF CONGENITAL HYPERTROPHY OF THE VERUMONTANUM\*

BY ROBERT R. BALDRIDGE, M D †

CONGENITAL hypertrophy of the verumontanum as a cause of urinary obstruction was first described by Bugbee and Wollstein in 1923<sup>1</sup>. The patient was a child three and one half years old. In 1924 the same authors<sup>2</sup> reported eight cases of posterior urethral obstruction from 4903 autopsy records of the Babies' Hospital in New York City. Seven of these eight cases were demonstrated to have been due to hypertrophy of the verumontanum. They were all under one and one half years of age.

In 1927 Robinson<sup>3</sup> described the case of a male, seventeen years of age who was brought to the hospital in uremic coma and who died shortly after admission. Autopsy showed posterior urethral obstruction due to an hypertrophied verumontanum.

Dodson and Lorraine<sup>4</sup>, in 1931, reported another case in a 19 year old male, in whom the verumontanum produced almost complete obstruction of the posterior urethra. Appropriate treatment produced marked improvement. I have been unable to find reports of any other cases in the American or British Journals.

In 1934 Lowsley and Kirwin published a paper entitled "A Clinical and Pathological Study of Congenital Obstruction of the Urethra"<sup>5</sup>. They confined their discussion entirely to valves of the posterior urethra, and did not mention hypertrophy of the verumontanum as a cause of obstruction. Their bibliography is extensive, and includes the work of Bugbee and Wollstein, and of Dodson and Lorraine.

Bugbee and Wollstein and Robinson, studied the pathology of congenital hypertrophy of the verumontanum. In all cases examined the structure was identical with the normal, except for hypertrophy.

The symptoms and pathological findings in

these cases are those of posterior urethral obstruction from any cause.

Symptoms developed early or late, depending on the degree of obstruction and on the degree of compensatory hypertrophy of the musculature above the point of obstruction.

Pathological findings, clinically or at autopsy, are essentially the same in the babies reported by Bugbee and Wollstein, and in the older patients of Robinson, and of Dodson and Lorraine. There is dilatation of the posterior urethra and bladder, and extensive bilateral hydro-ureter and hydronephrosis. The ureteral valves are incompetent.

Symptoms depend, naturally, on the stage of the disease, and on the presence or absence of infection. Those depending on the mechanics of the condition are difficulty in urination, dribbling, frequency, dysuria, but most important of all, intermittent lower abdominal distention and paradoxical incontinence.

The secondary group of symptoms, due to kidney failure, are those of uremia from any cause.

I wish to report the case of an eleven year old boy who was admitted to the Rhode Island Hospital on December 4, 1932. His chief complaints were hematuria and pain over the lower abdomen and also in both lumbar regions. Until two years before admission and, except for measles, chickenpox and whooping cough, his past history had been that of a healthy boy.

Two years before admission the patient first noticed that in the morning his lower abdomen appeared to be distended. This distention disappeared after voiding.

About one year before admission he ran and fell, belly down, on a sled. There was blood in the urine for twenty-four hours. He was seen by a physician, but no treatment was given. From the time of this accident until admission the patient developed progressive symptoms of difficulty in starting the urinary stream, perhaps followed in a few minutes by extreme urgency and incontinence. At times he was totally unable to void. He also noticed an intermittent enlargement of the lower abdomen, with pain in the bladder and in both flanks. The tumor, and likewise the pain would disappear if he

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were able to void. On these occasions he passed an unusually large amount of urine. Paradoxical incontinence was a feature of the history and bed wetting became a frequent occurrence. During this period the patient often stayed at home from school because of abdominal distention and pain. His appetite was poor.

Several hours before admission he had been wrestling with another boy who threw him and fell on top of him. There was immediate severe pain in the lower abdomen and in both kidney regions. Shortly afterward he passed bloody urine and was brought to the hospital.

Physical examination showed a well-developed and nourished boy lying flat in bed and in no severe distress. Pulse was 100 beats per minute, respirations 24, temperature 98.6 F and blood pressure 110 systolic and 70 diastolic.

Examination was essentially normal except for the abdomen which showed extreme tenderness and muscle spasm in the region of the bladder and of both kidneys. There was a midline abdominal tumor which extended from the symphysis pubis to above the umbilicus.

A soft rubber catheter (F 16) was passed without difficulty and the distended bladder gradually decompressed. The urine was grossly bloody for two weeks. There was a large trace of albumin but no pus or casts. Culture was sterile.

Cystoscopy done on the second day after admission was not very satisfactory. The cystoscope (F 18) met no resistance. The bladder wall lay in great folds which obscured vision and when fully distended was so large that the cystoscopic lens would not focus. We have had the same difficulty in vision when attempting to see objects on the other side of a large dark room by the light of a match.

In spite of the extreme degree of pathology demonstrated by cystoscopy and the intravenous urograms which were subsequently made it is remarkable that on the fourth of December two days after admission examination of our patient's blood gave the following results:

Blood urea nitrogen—17 mgm per 100 cc of blood  
creatinine—1.4  
Red blood count—5,000,000 cells per cu mm  
Hemoglobin—80%  
White blood count—9,240 cells per cu mm  
Differential count  
Polymorphonuclear 65%  
Lymphocytes 29%  
Transitionals 6%

One week after admission an intravenous renal function test (phenolsulphonethylphthalein) showed the following:

Output of dye 1st half hour—	0%
“ 2nd —	20%
“ 3rd —	15%
“ 4th —	5%
Total output in two hours	40%

Two weeks after admission during which time the patient had been on permanent catheter drainage and his urine had become clear of blood a second cystoscopy was done. The bladder wall was very thin and not trabeculated. It was generally congested. No diverticula tumors or foreign bodies were seen. Both ureteral orifices were large and gaping. The bladder neck and prostatic urethra were dilated. The verumontanum was enormously enlarged filling the entire undilated portion of the posterior urethra. It protruded into the bladder neck and could be pushed from side to side. There were no demonstrable valves. The tumor mass did not

bleed easily. It was destroyed as completely as possible by electrocoagulation and the patient continued on permanent catheter drainage.

During the next two weeks the catheter was removed several times and much to our dismay the patient was unable to void. In the meantime he had developed a rise of temperature and a severe urolithiasis. Four weeks after admission therefore we performed a suprapubic cystostomy for more safe and adequate drainage. We found the bladder wall to be unusually thin, the bladder capacity very great and to our satisfaction no evidence of the tumor we had fulgurated or any other urethral obstruction. We interpret the patient's inability to void as having been due to bladder atony and urethral infection.

After several weeks of suprapubic drainage the sinus was allowed to heal and the patient was discharged voiding normally except for very slight incontinence with a staphylococcus infection of his urine.

He has been seen repeatedly during the last two years and many intravenous urograms have been made. As you see from the reproductions there has been only a slow progress in the regaining of muscle tone of ureters and kidney pelvis.



December—1933 Before treatment. Ureters difficult to visualize. Very large.

Nevertheless the last group of X-rays taken two years after original treatment (retrograde pyelograms) demonstrate that although the kidneys and ureters have a capacity of fifteen cubic centimeters on each side the emptying time is normal.

Renal function (intravenous phenolsulphonethylphthalein) done December 15 1934 two years after treatment and repeated for verification gives the following:

Appearance time of dye (in bladder)—	
3 minutes	
Output 1st half hour—	38%
2nd —	33%
3rd —	11%
4th —	4%

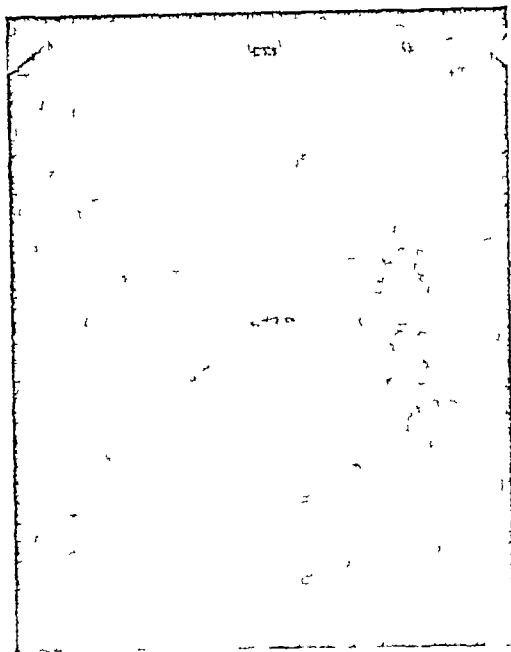
Total output in two hours 86%

Blood urea nitrogen (December 15 1934)  
13 mgm per 100 cc blood

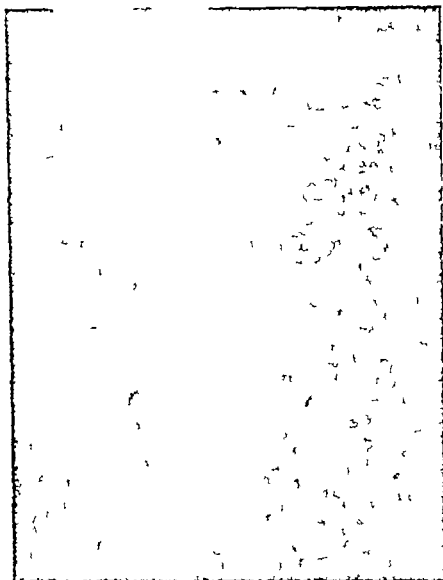
Urine cultures (December 15 1934)

Right kidney—sterile

Left kidney—staphylococcus albus



December—1932 Before treatment Bladder at body of 4th lumbar vertebra

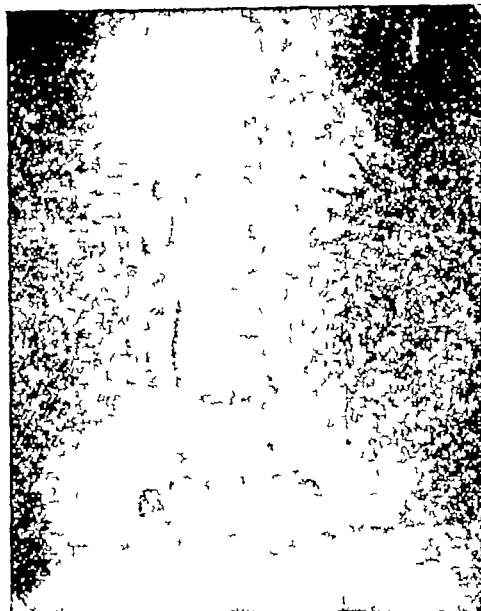


June—1933 Note size of left ureter and large bladder capacity

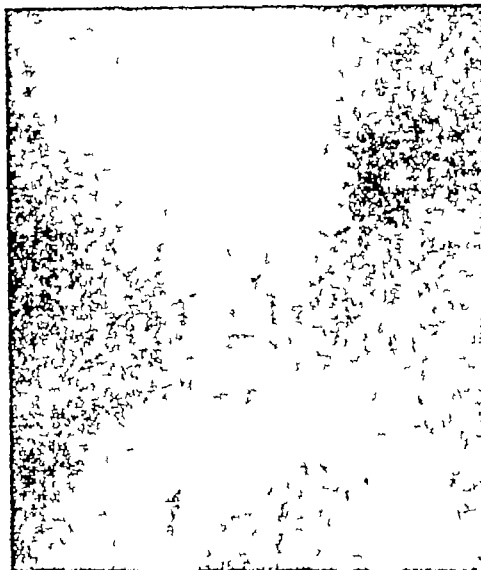
#### Urine examination (December 15, 1934)

Albumin—slight trace  
Specific gravity—1016  
Sugar—none  
Microscopic—20 to 40 pus cells, with clumping, per high power field

At the present time the patient is in excellent general health, and his infection is rapidly clearing up. There is no residual urine. Neither are there any symptoms referable to the genito-urinary system except a slight tendency toward incontinence in cold weather.



June—1934 1 1/2 years after treatment



December—1934 2 years after treatment

#### REFERENCES

1. Bugbee H G and Wollstein M. Retention of urine due to congenital hypertrophy of the verumontanum. *J Urol* 10 477 1923
2. Bugbee H. G. and Wollstein M. Surgical pathology of the urinary tract of infants. *J A M A* 83 1887 1924
3. Robinson W. W. Congenital hypertrophy of the verumontanum as a cause of urinary retention. *J Urol* 17 381 1927
4. Dodson A. I. and Lorraine H. Congenital obstruction of the posterior urethra. *Virginia Med. Monthly* 58 102 1931
5. Lowmley O. S. and Kirwin T. J. A clinical and pathological study of congenital obstruction of the urethra. report of four cases. *J Urol* 31 497, 1934

#### DISCUSSION

DR F H COLBY This is a very interesting case. Would the ketogenic diet be worth a trial?

DR. CLYDE L. DEMING I should like to ask what the pathology of the verumontanum was?

DR ERIC STONE I was fortunate enough to see this picture. The tissue was destroyed by fulguration and it was impossible to get microscopical pic

tures of the specimens. The appearance however of the tissue was in no way remarkable. It looked like a normal verumontanum except that it was out of all proportion to the usual structure. The mucous membranes were normal in appearance over it and its general contour was what you would expect of the usual. The only abnormal feature was the tremendous enlargement of the tissue.

## HYDRONEPHROSIS—REPORT OF A CASE\*

BY EARL S. MERRILL, M.D.†

**U**RETERAL structure is commonly bilateral and there is no very constant relation between the attacks of pain, the degree of hydronephrosis and the ability of the kidney to function as measured by phthalein excretion.

The following case report shows some interesting variations and illustrates the occasional necessity of ureteral dilatation before operation is attempted.

**Present Illness.** The patient a man thirty-eight years of age first consulted me September 30, 1933. He complained of repeated attacks of pain in the right kidney region. The pain radiated through to the front but not down along the ureter.

These attacks some mild and some severe had been recurring with gradually increasing frequency for about fifteen years. They were accompanied at times by nausea and vomiting. There had been no symptoms of urinary infection.

During the preceding year he had several times had a little pain in the left flank. This pain was intermittent, sharp but not severe and did not radiate.

**Past History.** Outside of the usual childhood diseases his health had been good.

**Physical examination** was essentially negative except that he was rather pale and thin.

**Cystoscopic examination** showed a normal bladder mucous membrane.

The ureteral orifices were normal and the ureters were catheterized easily. Sterile specimens of urine were normal on culture and routine examination.

The pyelogram of the right kidney showed very markedly dilated kidney pelvis and calyces.

On the left the injection was not very satisfactory but the kidney appeared to be essentially normal.

A phthalein test was done. The appearance time, following intravenous injection was two minutes on the left. No phthalein appeared from the right. The left kidney secreted 15 per cent in one half hour.

Because of the low function test he was advised to have the left ureter dilated. A definite hang was found with a No. 10 bulb at about the junction of the upper and middle thirds of the ureter.

The ureter was dilated to a No. 10 Fr. four times before a No. 12 Fr. bulb could be passed. On November 6, 1933 about a month after dilatations were begun the phthalein test was repeated. The left kidney secreted 20 per cent and the right kidney secreted 0.5 per cent in one half hour. Dilatations were continued and after six more treatments a No. 13 Fr. bulb was passed with some difficulty. On Feb-

Dr. BALDRIDGE. I believe that Dr. Colby's suggestion regarding the ketogenic diet is a good one although staphylococcus infections do not respond to this form of treatment so frequently as do the bacillary types. I have nothing further to add to Dr. Stone's discussion.

So far as I have been able to find this is the eleventh reported case of congenital hypertrophy of the verumontanum in the English literature.

February 9, 1934 another phthalein test was done. The left kidney secreted 30 per cent in one half hour and the right kidney secreted just a trace. The patient at this time stated that he was feeling very much better although he had had several attacks of pain in the right kidney. He also reported that he had gained seven pounds in weight.

I continued dilating the ureter with a No. 13 bulb at about two week intervals.

April 17, 1934 six and one half months after beginning the dilatations the phthalein test was repeated again. The left kidney secreted 35 per cent in one half hour and the right kidney just a trace.

May 19, 1934 the right kidney was removed. The patient stood the operation very well and convalescence was uneventful.

Since operation the left ureter has been dilated at intervals of about once every two months. The patient has gained about ten pounds in weight.

## DISCUSSION

Dr. E. G. CRABTREE. I have nothing in particular to say in discussion of Dr. Merrill's paper except to emphasize the fact that one cannot estimate what reserve the kidney has until it is put to the test. This patient of Dr. Merrill shows return to function that is perfectly surprising.

Perhaps this meeting would be a proper place to put on record a similar story concerning a patient who has been under observation for a long period of time.

As resident at the Massachusetts General Hospital I operated on this woman for two large stones in a hydronephrotic kidney which showed wide dilatation of the pelvis thinning of the cortex and no function with phenolphthalein. Apparently the stones were the cause of the hydronephrosis. They were easily removed and the kidney was allowed to remain.

Then came the Great War at which time many physicians and surgeons were doing urology often with little time spent on complete study. The surgeon who saw this patient with a cortical infection, due to staphylococcus affecting her remaining kidney asked her if the opposite kidney had been removed at my operation. When she replied that it had not been removed he proceeded to do a nephrectomy on the previously normal kidney. After operation there were two or three years of very stormy renal difficulties. Eventually she returned to good health married and has had three pregnancies typhoid fever and pneumonia and was still living and seen at the Boston Lying In Hospital last year.

Dr. CLYDE L. DEXING. Dr. Merrill's case is an extremely interesting one. I am going to report briefly a case of a young woman with one child who came to us with extreme pain on one side due to a large hydronephrosis with very little function. On the other side we found an uninfected hypoplastic kidney with only a trace of phthalein function so

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†Merrill, Earl S.—Chief Surgeon Urological Service Eastern Maine General Hospital. For record and address of author see "This Week's Literature" page 75.

that we found ourselves practically in the same position as did Dr Merrill. One kidney seemed to do most of the work and the opposite one was practically of no value. Necessity demanded that we save that kidney in some way. We were obliged to do a plastic on the hydronephrosis and she recovered very well. Others of you have probably

had somewhat similar experiences, finding yourself in the position that we have, when necessity demands that we save the kidney one way or another. I am sure we are forced to use conservative means under these conditions. Dr Merrill is to be congratulated on the conservative way in which he handled his case.

## TRANSURETHRAL RESECTION OF THE INTERNAL SPHINCTER IN A CERTAIN TYPE OF CORD BLADDER\*

By EDWARD L. PEIRSON, JR., M.D.

THE classical cord bladder shows a marked loss of tone and sensation of the bladder wall with relaxation and funneling of the bladder neck. There is, however, another type of neuro-pathic bladder which is seen in the presence of a minimal cord lesion. In this type, the tone and sensation of the bladder wall are maintained and the sphincters are spastic instead of relaxed. In such a case, one finds retention of urine due not so much to failure of the bladder musculature to contract and expel the urine as to failure of the sphincters to open properly during the act of voiding. The continued effort of the bladder to force out the urine through an uncooperative sphincter produces in the end, exactly the same state of affairs as would be produced by a bladder trying to force out the urine through an obstructing prostate or a contracted bladder neck.

My experience with this type of cord lesion has been limited to six proved cases in two of which I had an opportunity to examine the bladder at autopsy. An operation was performed on each of the six cases, the three advanced cases being treated by suprapubic cystotomy and three favorable ones by transurethral resection of the internal sphincter. The actual neurological diagnosis fortunately is not of great importance as we are interested in the functioning of the bladder and not in the cause of this dysfunction. It appears, however, that if the cord damage is extensive a different type of bladder lesion with loss of bladder tone will develop. The neurological diagnosis was central nervous system syphilis four cases, spina bifida one case and poliomyelitis one case.

The outstanding symptom, which brought all these cases to the hospital, was either acute or chronic retention of urine. The outstanding finding upon examination was a bladder which appeared characteristic of obstruction at the bladder neck without any visual evidence of organic obstruction. If the condition had been present for a long time as it had in the majority of the cases a coarsely trabeculated bladder was found. In the three cases in which I had a chance to examine the bladder wall I found it very much thickened and identical with the type of blad-

der seen in long-standing prostatic obstruction. This is very different from the thin atonic bladder wall classically described as associated with cord lesions. The cystoscopic picture differed from organic obstruction in certain ways. Usually the interureteric ridge did not seem to share in the general hypertrophy. There was at least slight dilatation of the posterior urethra and as one looked inwards from the region of the verumontanum the internal vesical orifice appeared at least as wide open as normal. Five of the six cases showed definite dilatation of the upper urinary tract from back pressure and one case had a moderate-sized diverticulum.

There is obviously great danger in confusing this condition with actual organic obstruction such as median bar or contraction of the bladder neck. In fact I am inclined to believe that many cases which have been considered contracted bladder necks were in reality spastic internal sphincters. In certain cases, at least, it is impossible to make the differential diagnosis unless the internal sphincter can be directly examined with the finger, either under general anesthesia or at autopsy, as upon opening the bladder under local anesthesia the spastic internal sphincter may feel identical with a contracted bladder neck due to a chronic inflammatory condition. Likewise, as the nerve injury to the spinal cord is usually not extensive, the condition may not be obvious. Furthermore, there is some evidence to show that it may be possible to have retention of urine due to spasm of the internal sphincter without any cord lesion at all. Certainly, a very similar, although a transitory condition is frequently seen following a simple abdominal operation. In other cases, however, I have found it possible to demonstrate, without opening the bladder, that the retention of urine was due to sphincter spasm (or perhaps more accurately, to failure of the internal sphincter to open properly), and not to organic obstruction.

In spite of the fact that some bladder disturbance is found in the majority of cases suffering from disease of the spinal cord, the investigation of the urinary tract in these cases has frequently been overlooked. Often, the physician in charge of the case has failed to realize that the bladder symptoms may be the first and only sign of spinal cord disease, and that the management of the retention of urine may be the

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solution and taking the picture while the patient was voiding. For this purpose, I devised an emulsion of mineral oil acacia and sodium iodide which was very satisfactory and much more economical than Ipiodol. Plate 2 is a normal urethrogram taken by injecting the solution backwards from the meatus in the usual way. I wish you would compare it with plate 3, which is a urethrogram of the same normal individual taken during the act of voiding.



PLATE 3 Urethrogram of the same normal individual (Plate 2) taken while the patient was actually voiding. If one compares this with the previous plate one observes the changes which normally occur at the bladder neck during the act of micturition.

You will notice that in plate 3 the bladder neck has opened widely to form a funnel, and that this has apparently been accomplished by a pulling downwards of the bladder neck so that the area of constriction in the internal sphincter and also the bladder floor is considerably lower than before. Presumably, this has been accomplished by



PLATE 4 Urethrogram of the case described in this paper taken during the act of voiding. One observes that the spastic internal sphincter obstructs the bladder neck. See text.

the action of the muscles which run from the trigone down the urethra. This demonstrates the importance of the fact, that the opening of the internal sphincter is an active and not a passive phenomenon and explains the retention of urine in these cases. It also explains why the retention is relieved by resection of the sphincter even if the sphincter is somewhat dilated before operation. In this plate both sphincters are well relaxed and there is a large stream passing through the urethra.

The third urethrogram (plate 4) is of the patient under discussion taken during the act of voiding. In spite of this, one observes that the internal sphincter has not relaxed. The bladder neck has not been pulled down and funnelled out. The posterior urethra appears dilated and the external sphincter, in spite of the fact that the patient is voiding, is not relaxed.

I think one can see from this how easily one might confuse the spastic internal sphincter with a median bar on cystoscopic examination. In fact, the failure of the internal sphincter to open actively has produced a condition nearly identical with actual obstruction at the bladder neck. The marked dilation of the posterior urethra and the lack of opening and depression of the bladder neck, seem to me, to be very striking and to prove conclusively that the retention of urine is due to spasm of the sphincter muscles and not to an obstructive lesion. Unfortunately, this plate is not very good, as the marked deformity of the pelvis made it difficult to get the patient squarely centered on the table.

The last plate (plate 5) is a urethrogram on this



PLATE 5 Urethrogram of the same patient obtained six days after operation. It shows the artificial funneling of the bladder neck which has been produced by resection of the internal sphincter.

same patient taken six days after transurethral resection of the internal sphincter. One observes here that action of the internal sphincter has been destroyed and the posterior urethra has become continuous with the bladder. This artificial funneling of the bladder neck has produced a condition not very different from a normal state of affairs during micturition as shown in the previous plate, the main difference being that the bladder base has not been pulled down. The external sphincter is still somewhat spastic but the greater force of the urinary stream has caused it to open more widely than before operation.

Following the taking of these urethrograms, the patient was taken off catheter drainage and observed for a week. For two days he was able to void well. Then he began to have marked frequency and difficulty in voiding. The stream became smaller and he passed only a small amount at a time. The residual urine increased daily until at the end of the week it amounted to six ounces. On November 6, I resected his internal sphincter with a McCarthy resectoscope removing three large pieces from the posterior and posterior lateral aspects. The pathological examination showed numerous muscle bundles so arranged as to suggest sphincter muscles. Immediately beneath the mucosa there were large clumps of lymphocytes and plasma cells.

Twenty-four hours after resection the patient was able to void easily and passed a large and more forceful stream than he had ever done in his life. He has continued to date to void easily and freely without residual urine. He has no incontinence. He gets up once at night and passes his urine about four times a day. A check-up cystoscopic examination shows the same funneling of the bladder neck as is seen in the postoperative urethrogram. The posterior urethra and bladder appear continuous.

The two other cases in which I have carried out this operation have been quite similar to the one reported. In both cases the neurological diagnosis was *tuberculous paresis*. Both cases came to the hospital with a large residual urine and were preoperatively treated by catheter drainage with as is common in these cases marked improvement in the bladder decompensation. It was not sufficient however to

leaving the hospital he gained twenty pounds in two months and was able to return to work which I think shows the great improvement which can be obtained with adequate bladder drainage in these cases.

As regards the operation it is extremely simple and very much more efficient in this type of case than any operation on the sympathetic nervous system. Such a small amount of tissue needs to be removed that it is truly a minor procedure. If the tone of the external sphincter is maintained (which can easily be determined by urethrograms or by observation) there is no danger of incontinence.

There is however, the theoretical possibility that there may be sufficient spasm of the external sphincter to prevent voiding even after resection of the internal sphincter. It is my experience however that if the internal sphincter is not markedly relaxed and the bladder tone has been sufficiently maintained, the operation will be successful. If however study of the case shows marked loss of tone of the musculature of the bladder wall or marked relaxation of either sphincter this operation is contraindicated. As regards the permanency of the result, I know nothing as these cases have been followed only a short time. It seems reasonable to suppose that if the progress of the disease in the spinal cord cannot be checked they may develop further urinary complications. On the other hand if no further damage to the nerves of the bladder occurs I believe the results will be permanent and even if this is not the case, the improvement in these patients to date has been sufficient to justify the procedure. This type of patient must have adequate bladder drainage if his health is to be preserved. This can be obtained either by resection of the internal sphincter or by permanent suprapubic cystostomy. It seems logical to save the latter procedure for those cases which cannot be handled by resection of the internal sphincter.

#### DISCUSSION

DR. RICHARD CHUTE: I would like to compliment Dr. Peirson on his very real and ingenious contribution to this subject. I have been interested in this for some years and I do not think there is anything more puzzling than one of these neurological bladders.

allow them to empty their bladders even temporarily. The first case was operated on seven months ago. He came to the Salem Hospital with acute retention and a greatly distended bladder. He had had frequency and difficulty of urination for three years. The urinary stream was small and he was known to have had some residual urine for several years. The findings were very similar to the case just reported. Following resection of the internal sphincter he has been able to void normally and has had no residual. He has slight frequency and urgency but no incontinence. The third case was operated on four months ago. He came to the Salem Hospital with twenty-four ounces of extremely foul residual urine and a bilateral pyonephrosis which was caused by the back pressure. There was more loss of bladder tone and more dilatation of the posterior urethra and internal sphincter in this case than in the other two. He was uremic and was running a septic temperature. After a period of catheter drainage a transurethral resection of the internal sphincter was carried out. His urinary stream has never been so forceful as in the other cases because of loss of bladder tone but he has been able to empty his bladder. In spite of the fact that he did not carry out the antilutetic treatment after

He spoke of one thing that I think is a conception which a lot of people have not yet acquired that is this business of decompensation and recompensation of the bladder. You take a bladder that has decompensated due to some sort of obstruction either neurogenic or prostatic and as in Dr. Peirson's case which had forty ounces of residual you rest it with catheter drainage and allow it to recompensate and on recompensation it will only hold two ounces. If we bear that conception in mind it will often straighten out some of our bladder difficulties. Dr. Peirson's third case where the patient apparently did not have much pain in his bladder I should

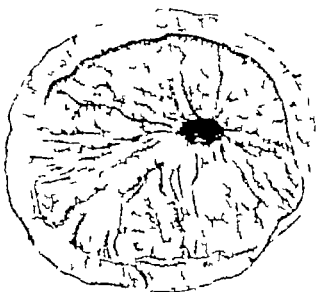


PLATE 4. Drawing of the bladder neck from an autopsy specimen of a patient with central nervous system syphilis.

The history and cystoscopic findings were similar to that reported in this paper. When the bladder neck was examined at the time of suprapubic cystotomy under local anesthesia it was found to be tightly closed and felt to the examining finger like a contracted bladder neck. This autopsy specimen shows however that the contraction of the bladder neck was neurogenic and not organic in origin. At autopsy the bladder wall was greatly thickened, there was marked dilatation of the upper urinary tract and a diverticulum was present.



think, if he started running a residual it might be a good thing to do a sympathectomy in combination with this, but, as Dr Peirson shows this is so much simpler and easier, I should think it would be a good thing to try

I was wondering about the rectal sphincter Was that also spastic?

DR F H COLBY This communication of Dr Peirson's is excellent It sounds a little too good to be true, that is all These cases have always been difficult problems

I wish to ask Dr Peirson if during the course of his endoscopic examination, viewing the internal sphincter, he asked these patients to try to void voluntarily, and then stop voiding, whether he saw any movement of the internal sphincter, whether they could relax it or whether they could contract it to any extent

DR C J E KICKHAM Relative to the paper of Dr Peirson and the question of infection in his group of cases, I would like to ask whether the intractable chronic infection so frequently encountered in the urinary tract of the cord bladder individual affected the postoperative course in his cases Sepsis is the most common complication of transurethral resection and also the most important contraindication In view of this, it seems to me that this procedure might be quite hazardous in this type of case

DR G G SMITH I have been tremendously interested in this paper of Dr Peirson's There is one point I wish he would comment on in discussion In the cases of tubes that I have cystoscoped, I have always seen the bladder neck wide open so that even with an observation cystoscope you could look around the posterior urethra In other words, this funnel shaped bladder neck seems to have already developed I would like to have him put me right about this and tell me whether they were more advanced cases or why I found that appearance to exist

DR CLYDE L DEMING There is one point which I do not quite comprehend and that is, why can one look through the internal sphincter of the bladder from the posterior urethra in these cases? I do not doubt that this is true but if it is true why should not the patient void? His urograms are convincing that there is something wrong

DR E L PEIRSON As regards Dr Colby's statement I should say that I tried seeing whether they could relax the bladder neck when I looked in with the endoscope I also tried it in one or two who were normal, and I was not convinced that I could tell one way or the other I think, as Dr Colby pointed out these results are much too good to last and I think I brought out the point that I do not know whether they will last We do know, however, with this type of cord bladder with increased bladder pressure that the patient will go on and die from sepsis and back pressure on the upper urinary tract if that pressure is not adequately relieved Something has to be done for them It seems to me it is entirely justifiable to do this operation for if it fails they can still have

the suprapubic cystotomy, but I think that treatment by pty and occasional catheterization is not justifiable

As regards infection as a complication, I think it is very important Because of the severe infection I did a suprapubic cystotomy in three of these cases In the one case which I resected which had a pretty bad infection, the infection had been fairly well cleared by catheter drainage before the operation was undertaken Such a small amount of tissue needs to be removed in this operation that infection does not play such a serious part as it does in resecting an adenoma of the prostate

As regards Dr Smith's question about the dilated bladder neck, I think when you consider the extreme complexity, the neurophysiology of the bladder and in addition, consider the diffuse and scattered nature of the lesions of the spinal cord that it is quite easy to conceive that by placing your lesions in the spinal cord at the proper place you can produce almost any type of lesion of the bladder You can have relaxation of the sphincter or spasm, you can have increased or reduced tone of the bladder wall At the present time, I have in the Salem hospital a case exactly like the one Dr Smith speaks of, with acute retention, a large residual urine, infection and marked funnelling of the bladder neck, with spasm of the external sphincter so that he is unable to void That shows up nicely in the urethrograms when we fill up the bladder and he tries to hold it, the urine comes down to the external sphincter In other words, the whole posterior urethra is tremendously dilated That type of case is obviously unsuited for this form of treatment.

Perhaps the confusion is that I was speaking of looking back from the verumontanum using the McCarthy panendoscope with the fore-oblique vision You look back from the verumontanum into the bladder neck just as you can with the resectoscope Of course the prostatic urethra in these cases is very short and you can see the bladder quite clearly with the panendoscope The reason they can void after you have resected the internal sphincter, although the internal sphincter was open before you resected it, is, I think, quite clearly shown in the third urethrogram which I showed In this urethrogram the internal sphincter stood out quite clearly as a definite band at the bladder neck which would cause obstruction to the outflow of urine just as a chronically inflamed, hard, and rigid bladder neck causes obstruction In either case, the opening of the bladder neck may be of sufficient calibre to allow the outflow of urine, yet retention may exist because of the bar of tissue posterior to the internal meatus which fails to relax at the time of micturition

The surprising thing was, it seems to me, that the other neurological findings were very slight In some cases the rectal sphincter was relaxed In some we found a few other neurological signs such as absent or hyperactive knee jerks, absent corneal reflexes in two cases, and fixed pupils in two cases But by and large the neurological signs were quite striking by their absence, although the findings in the spinal fluid were very definite in all the syphilitic cases

## THE RECURRENCE OF BENIGN OBSTRUCTING PROSTATES YEARS AFTER PROSTATECTOMY\*

BY RICHARD CHUTE, M.D.†

A SUCCESSFUL prostatectomy on a benign hypertrophied obstructing prostate has always been carried with it the thought of a permanent cure and urological surgeons are wont to say to their patients, "Well, old man, it's all out now and it'll never bother you any more." They are right in more than 99 per cent of the cases, but not in 100 per cent, for on rare occasions regrowth of the benign hyperplastic prostatic tissue will take place to the extent of causing typical prostatic obstruction again. I would like to report two such patients from whom I have removed good sized, benign, obstructing, "regrown" prostates in the last few months, patients on whom my father had performed successful prostatectomies ten years and eighteen years before respectively.

The first patient was fifty-nine years old when my father operated on him in 1924. At that time he gave a five months history of difficult urination with frequent desire etc. and he had six ounces of infected residual. By rectum his prostate felt perfectly benign and was not markedly enlarged. A one-stage suprapubic prostatectomy was done and three small masses largely intraurethral were enucleated in the usual manner without any difficulty. The microscopic report was benign hypertrophy. The patient made a satisfactory recovery and had been without urinary symptoms for ten years until a few months before I was called to see him last August after two episodes of acute retention. His prostate by rectum felt somewhat larger than normal and absolutely benign. Cystoscopy showed a marked anterior cleft and more or less encroachment of the prostate in the median region, also marked trabeculation. Eye reflexes and knee jerks were normal. After the usual preparation, I did a one-stage suprapubic prostatectomy easily enucleating a moderate-sized benign prostate in one piece consisting of both lateral lobes. The pathological report on this was benign hypertrophy. The patient made a satisfactory convalescence and I have seen him recently. He voids with perfect control and has practically no residual urine.

The second patient was only forty-seven years old when my father operated on him in 1916. Father saw him in his second episode of acute retention with his bladder up to his umbilicus and withdrew thirty-one ounces of turbid urine. The patient gave a history of painful difficult urination for about a year. His stream was very slow and painful to start, and he passed only a little urine at one time. His prostate by rectum felt slightly enlarged and benign. Cystoscopy showed the prostate jutting in on all sides especially on the right, with some trabeculation and also a small diverticulum of the bladder. Knee jerks and eye reflexes were normal. Father did a one-stage prostatectomy shelling out a somewhat enlarged prostate in the usual manner

and not touching the small diverticulum. The patient made a satisfactory convalescence and ended by voiding with perfect control with only one-half ounce of residual urine. After the operation the patient was fine for nearly fifteen years but in the last three years had had mild symptoms of recurrent prostatism. A few ounces of residual urine had begun to accumulate and rectal examination revealed considerable benign regrowth of his prostate. Last October I was called to see him in acute retention and withdrew twenty-six ounces of residual. His prostate by rectum was considerably enlarged and it was necessary to depress the cystoscope markedly in order to pass it over the raised bladder outlet and cystoscopy showed considerable prostatic tissue jutting in the median and lateral regions. Knee jerks and eye reflexes were normal. I did a two-stage suprapubic prostatectomy on him easily enucleating in one piece a good sized prostate which weighed fifty grams. The pathological report was benign hypertrophy. He made a satisfactory recovery and I have seen him within a month. He voids with perfect control and empties his bladder practically completely.

These two cases meet the requirements for genuine benign recurrence so well expressed by Victor Blum of Vienna<sup>2</sup> who feels that only those cases should be classed as genuine recurrences in which after a properly and carefully performed perineal or suprapubic prostatectomy and after an interval of several years during which there is normal urination the symptoms of prostatic obstruction reappear, and a recurrent prostatic hypertrophy is definitely present by rectal examination and cystoscopic inspection or through the opened bladder and in which there is not the slightest suspicion of malignancy.

I have looked through a good deal of the world literature on this subject and have found less than fifty cases which fulfill the above requirements for genuine recurrence of benign obstruction. A good many cases have been reported in which considerable regrowth of the prostate some time after prostatectomy has been evident on rectal palpation or on postmortem examination, but there have been very few of these cases reported which gave urinary obstruction again during life. We have not the time to consider the various theories as to the place of origin, and mechanism of growth of benign prostatic hypertrophy but according to the best opinions at the present time the hyperplastic growth probably starts in the submucous periurethral groups of prostatic glands situated in the region of the neck of the bladder. As these centrally placed glands of the prostate undergo hypertrophy and grow, they form an expanding adenomatous mass which presses on the outer layer of prostatic glands which gradually atrophy and become flattened and form the so

\*Read at the meeting of the New England Branch of the American Urological Association, Boston, February 11, 1935.

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called "surgical capsule" of the prostate. The ordinary enucleation of the prostate is not really a complete prostatectomy, it is merely the separation of one part of the prostate from another part of the prostate along an easy plane of cleavage. It is the shelling-out of a tumor mass composed of the hyperplastic central glands of the prostate from the so-called "capsule," which is composed of the flattened and atrophic outer prostatic glands and is left behind. This is a well-known fact of long standing. As to the theories as to the cause of regrowth, one is that the flattened atrophic outer glands of the prostate which formed the capsule may, in the course of time, take on new life, proliferate and occasionally undergo enough hyperplasia to form another obstructing growth after the removal of the adenoma of the central glands which had been making pressure on them. It has also been shown by various men<sup>2,3,4</sup> that after prostatectomy very small nodules of hyperplastic tissue often only recognizable under the microscope, can frequently be found in the surgical capsule and it is thought by some that these hyperplastic nodules continue their growth and eventually may produce a recurrent obstructing mass.

The average age of the patients in my series was sixty years at the time of their first operation. This is more than five years younger than the age of the average prostatic operated upon in the Massachusetts General<sup>5</sup> and Johns Hopkins<sup>6</sup> hospitals and it may be that it signifies that these patients have prostatic cells which have greater vitality and tendency to proliferate than the average so that they get their masters into trouble five years earlier than the average prostatic and then are hard to eradicate, and stubbornly regrow again after operation like hardy perennials. It seems likely that there may be some endocrine gland factor, not understood at present. The clinical recurrences in my series appeared on an average of seven and a half years after the first operation.

#### SUMMARY

The paucity of reports of true recurrent benign prostatic obstruction is very hard to explain considering the thousands of prostatectomies that have been performed since the turn of the century, but I do wish to call your attention to the fact that genuine benign recurrences following prostatectomy occasionally occur and to report two personal cases that recurred ten years and eighteen years respectively after their original operations.

#### REFERENCES

- 1 Blum Victor. Rezidive nach der Prostataktomie. *Ztschr f Urol. Chir* 5:77 1920
- 2 Gregori Hanns V. Zur Frage der Rezidivbildung nach Prostataktomie. *Ztschr f Urol* 22:929 1928
- 3 Honegger R. Ein Beitrag zur Histogenese der Prostatahypertrophie und des Rezidivs nach Prostataktomie. *Ztschr f Urol* 16:425 1922

- 4 Hedinger. Zwei Präparate von Prostata nach Prostataktomie. *Corr.-Bl f Schweiz. Ärzte* 36:289 1906
- 5 Swan C S and Mintz E R. A review of the prostatectomies for benign prostatic hypertrophy at the Massachusetts General Hospital in the years 1926-1930. *Inclusive J Urol* 6:67 1931
- 6 Young H H. *Practice of Urology*. Philadelphia and London W B Saunders Company P 496 1926

#### DISCUSSION

DR E L MERRITT. I recall that several years ago at a clinic given by Dr Squier in New York, he called attention to the necessity of removing all of the small spheroidal bodies, as he called them, at the time one did a prostatectomy and in the particular case he was operating upon at that time he removed a fairly large, adenomatous prostate and then he reached down into the prostatic fossa and removed quite a long chain of these hyperplastic nodules, as Dr Chute called them. Several times since then, in doing prostatectomies, I have reached down into that fossa following the removal of the gland, finding quite a long chain of these small nodules and I have recalled that Dr Squier brought out the fact that if they were left he felt quite confident that they would cause recurrence. I wonder how the other men feel about that.

DR HAROLD S BACKUS. I was especially interested in this paper because when I first took up the study of Urology there was a very prominent surgeon who did a secondary prostatectomy ten years after the first prostatectomy, for which he got \$5000. That interested me, thinking I might be able to make a living doing Urology. Also, about fifteen years ago before Prof Hugh Cabot went west urologically, one of the first things I heard him say, in one of his lectures, was, "We do not remove the prostate, we just remove the adenomatous growths and there is no reason why they cannot grow again." For that reason I was interested to know that they do grow again.

I find, in doing prostatectomies, that there is quite often considerable prostatic tissue left after the growths have been enucleated. I do not try to get it out, if it causes no obstruction. However, I believe this tissue may hypertrophy and cause trouble in a few cases.

DR CLYDE L DEXING. In New Haven we have been studying prostatic hypertrophy for a couple of years and we have a hunch as to why these recur. We feel that prostatic hypertrophy arises from the glands of the posterior urethra, that it arises from the lateral lobes of the true prostatic gland and that it arises from the glands between the verumontanum and neck of the bladder deep in the prostate. It is reasonable to expect that a greater number of these hypertrophies arise from the glands of the posterior urethra. If these are removed primarily we do not in any way interfere with the other multiple foci for prostatic development deep in the prostatic gland.

DR CHUTE. As to Dr Merritt's remarks, I think it is a very good point about the spheroidal bodies which you occasionally see and I, for one, from now on am going to try to do more one-stage suprapubic prostatectomies because when you reach down through the typical sinus in the second stage operation while you can do a pretty good job, you don't have the flexibility that you do with a one-stage prostatectomy when you have things wide open and can view and explore the prostatic bed pretty thoroughly, and I think on the basis of this, I shall try to do more one-stage operations.

DR BACKUS speaks of the matter of the big fee. Of course, there is the possibility that a very mean patient who had a recurrence after a few years

might sue you especially if he had paid a good fee in the first place. He might claim that the operation had been badly done and it is conceivable it might cost you quite a bit and also a loss of reputation if it got into the newspapers.

As for Dr Deming's remarks that discussion is so involved that I won't try to go into it. I was

merely stating things as I saw them but I know that Thompson Walker in London and others would agree with you on that. But the big wonder of it all to me is the fact that there must have been 100,000 prostatectomies done since 1900 and I can only find fifty reports of genuine recurrences in the literature.

## CYSTS OF THE TESTICLE\*

BY RALPH H. JENKINS, M.D.† AND CLYDE L. DEMING, M.D.†

**C**YSTS of the testicle are classified into cysts of the tunica albuginea and cysts of the testicle. They are exceedingly rare. In reviewing the literature it is difficult to separate simple cysts of the testicle from cystic neoplasms. Sir Astley Cooper<sup>1</sup> in 1845, described the gross anatomy of teratoma of the testicle under the term of hydatid disease. This article was elaborately illustrated and four cases of simple cysts were described. Curling<sup>2</sup> in 1853 divided the growths into cystic, relatively benign, and solid malignant tumors. He described two such cases as simple cysts. Ewing<sup>3</sup> in studying the reports of Cooper and Curling felt that their cysts were of neoplastic origin. Succeeding accounts were less accurate in differentiating cyst of the testicle and cystic neoplasms. Cases were described, however, by Hochenegg<sup>4</sup>, 1885 and Walliman<sup>5</sup>, 1911. Albert<sup>6</sup> 1893, mentions three cysts of the testicle in 6000 autopsies.

C. K. Smith<sup>7</sup>, in 1919 reported a large cyst of the testicle which he believed followed gonorrhea. He suggested that the etiology was an occlusion of the vas deferens and epididymis following epididymitis resulting in a cystic condition of the epididymis and secondarily involving the testicle.

Barach<sup>8</sup>, in 1919, reports a very interesting case of cyst of the testicle in a dog. He considered trauma as the etiological factor as this dog was run over by an automobile four or five years previous to his operation.

K. Frater<sup>9</sup>, in 1929 reported and illustrated a case of cyst of the tunica albuginea. The cyst measuring 1 cm. in diameter contained clear fluid and was located in the anterior surface of the left testicle near the upper pole. The walls of the cavity appeared to be complete. The rest of the testicle showed little change. The epididymis was normal. The inner surface of the wall was lined in some parts by a single layer of cells and in others two or more. The nuclei of these cells were slightly ovoid. There was no history of gonorrhea, injury or abnormality

of the testicle. The urine contained four pus cells to the high power field. The Wassermann reaction on the blood was negative. The patient died from pernicious anemia.

Simple cysts of the testicle should not be confused with an encysted hydrocele of the body of the testicle. The latter is a small collection of serous fluid beneath the visceral portion of the tunica vaginalis which according to Rose and Carless<sup>10</sup>, is probably due to the dilatation of the lymphatic spaces and has no clinical significance.

The case reported here is a cyst of the testicle.

A man twenty-eight years of age was referred by his family physician to Dr. Clyde Deming for impotency. He had indulged in an active sexual life which consisted of intercourse five times daily since his marriage four years ago. During the past two months he was only able to have intercourse about once in five days due to the lack of erections. There were no premature ejaculations and no other symptoms other than that he complained of being weak and tired following intercourse. There was no history of gonorrhea, injury or abnormality of the testicles.

Our examination was entirely negative except that a hard painless somewhat irregular mass measuring 2 x 3 cm. was found involving the lower lobe of the right testicle. This mass did not transmit light. The right epididymis and vas deferens were normal in size and consistency. The left scrotal contents were normal. The urine was normal. The prostatic and vesicular fluids were normal. The Wassermann reaction on the blood was negative.

The patient was seen a few weeks later and the mass in the testicle had apparently increased in size. Our diagnosis was tumor of the testicle. An orchidectomy was performed under local anesthesia and the patient made an uneventful recovery.

Our surgical pathologist, Dr. Béla Halpert, gave the following pathological report:

"Gross. The specimen consists of the right testicle epididymis and a part of the spermatic cord enclosed in the tunica vaginalis communis. The cavity of the tunica vaginalis contains no excessive fluid and its surfaces are smooth and shiny. The testicle and epididymis are of normal size and shape and measure 5.5 x 3 x 3 cm. In the lower pole of the testicle there is a firm area beneath the capsule. The cut surfaces present the usual pattern except in the lower third where an amorphous laminated structure occupies an oval area 2.4 x 1.6 mm. The area is well circumscribed, appears to have a capsule and is soft in the center and quite firm in the periphery. It is grey and translucent while the rest of the surface is light orange-yellow.

*Microscopic.* The seminiferous tubules are

From the Department of Surgery Yale University and the New Haven Hospital, New Haven, Connecticut.  
Read at the meeting of the New England Branch of the American Urological Association, Boston, February 14, 1935.  
Jenkins, Ralph H.—Assistant Clinical Professor of Urology Yale University School of Medicine. Deming, Clyde L.—Clinical Professor of Urology Yale University School of Medicine. For records and addresses of authors see "This Week's Issue" page 75.

## EDWIN KLEBS\*

## A Centennial Note

BY LEONA BAUMGARTNER, M D †

## I. LIFE

EDWIN Klebs, whose hundredth birthday fell on February 6 1934, was one of the pioneers of bacteriology and he also made distinguished contributions in other fields of medicine. It therefore seems appropriate, at this time, to recall some of his achievements. The name of Klebs is irrevocably attached to the bacillus he first described in 1883 as found in the throats of patients with the then undifferentiated group of conditions called "croup"<sup>26</sup>. Less well known are many other contributions of almost equal significance. Thus he described acromegaly<sup>6</sup> before Pierre Marie, fifteen years before Metchnikoff he inoculated primates with the virus of syphilis<sup>11 22 23</sup>, he<sup>15</sup> described the isolation of colonies of bacteria on solid media before Koch, he was the first to produce tuberculosis experimentally in animals by the injection of milk from infected cows, thereby establishing the bovine origin of the disease<sup>7</sup>, and he described typhoid bacilli and attributed a causal relation between the organisms and the disease before Eberth, who is generally accredited with their discovery. The establishment of priority *per se*, however can seldom be a matter of as great concern as the estimation of the influence exerted by a man upon the history of a given subject, and it is from this point of view that we propose to take up the work of Edwin Klebs.

Theodore Albrecht Edwin Klebs was born February 6 1834 in the decade of the nineteenth century which saw the birth of Johannes Müller's "Physiologie", Cruveilhier's school of pathological anatomy, and the cell theory of Schleiden and Schwann. It is perhaps not surprising, therefore that as he grew to manhood and finished school in his native Königsberg he turned to medicine instead of to the law to which the fortunes and traditions of his family had long been bound. Rathke, Helmholtz, Burdach, and Werther were his first teachers during five semesters in Königsberg. At twenty-one years of age he enrolled for further study at Würzburg under the then popular and stimulating medical faculty composed of Virchow, Kolliker, Scherer, Bamberger, Levdig and Scanzoni. In later years Klebs often spoke of these days in glowing terms. Virchow impressed him so deeply that at the first opportunity he followed him to Berlin as an assistant. This was in 1861, three years after the "Cellulopathologie" had appeared and after Klebs had completed his doc-

torate. A brilliant group was then gathered in the laboratories of Virchow's newly erected Pathological Institute. Edwin Klebs, Oskar Liebreich, Julius Cohnheim, Friedrich von Recklinghausen, Willy Kuhne, and Ernst Leyden, men who were unconsciously fitting themselves to occupy in later years the chief academic posts in the German-speaking medical world, and who already had commenced the researches which were to give to the school the credit of formulating the theories which dominated pathology for the next half century.

After these preparatory years Klebs went first to Berne (1866), then as Recklinghausen's successor to Würzburg (1872), and the following year to Prague at Heering's request, returning to Zurich, Switzerland, in 1882. The six years at Berne he described as the happiest of his life but the nine at Prague were the most fruitful scientifically. He not only did original work of first importance in bacteriology, but in addition he taught many young men, and developed three important medical journals. Among his pupils in these academic years were numbered Ernst Ziegler, Zahn, Hanau, Szarka, Koster, Fischl, von Jaksch, Eppinger, and Lubarsch. It was the day of the founding of the great German scientific journals, journals so intimately bound up with their individualistic founders as to bear their names (Virchow's, Ziegler's, Pflugler's, etc.). The three journals which Klebs himself inaugurated were named in a style more approved by a modern scientific world which does not so readily countenance great individualism. *Die Prager medizinische Wochenschrift* began in 1876, the *Correspondenz-Blatt für Schweizer Aerzte* appearing in 1871, and the *Archiv für experimentelle Pathologie und Pharmakologie* founded with Naunyn and Schmiedeberg in 1873. All have withstood the rigors of passing fashions in scientific publishing and have served a useful purpose for their respective readers.

Upon leaving Zurich, where he had worked for eleven years, Klebs went in 1893 to Karlsruhe for a year, then came to America, settling (1895-96) in the laboratory of a private tuberculosis sanatorium in Asheville, North Carolina, and in August of 1896 moving to Chicago as professor of pathology in Rush Medical College. But in 1900 he returned to Europe to live successively in Hanover (where the *Kausale Therapie*, the fourth and only short-lived medical journal edited by Klebs, was started), Berlin, Lausanne, and Berne. The many vicissitudes of his life, so often rendered poignant and even dramatic by the changeable temperament of the man, have been adequately commented upon by his

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Portrait of D. Edwin Klebs, painted in Rome 1879 signed H. Treussart s. l.  
Prof. Klebs, Rom. 78 reproduced through the courtesy of Dr. Arnold C. Klebs.

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Theodore Albrecht Edwin Klebs was born February 6 1834 in the decade of the nineteenth century which saw the birth of Johannes Müller's "Physiologie", Cruveilhier's school of pathological anatomy, and the cell theory of Schleiden and Schwann. It is perhaps not surprising, therefore, that as he grew to manhood and finished school in his native Königsberg, he turned to medicine instead of to the law to which the fortunes and traditions of his family had long been bound. Rathke, Helmholtz, Burdach, and Werther were his first teachers during five semesters in Königsberg. At twenty-one years of age he enrolled for further study at Würzburg under the then popular and stimulating medical faculty composed of Virchow, Kolliker, Scheerer, Bamberger, Leydig and Scanzoni. In later years Klebs often spoke of these days in glowing terms. Virchow impressed him so deeply that at the first opportunity he followed him to Berlin as an assistant. This was in 1861 three years after the "Cellulärpathologie" had appeared and after Klebs had completed his doc-

torate. A brilliant group was then gathered in the laboratories of Virchow's newly erected Pathological Institute. Edwin Klebs, Oskar Liebreich, Julius Cohnheim, Friedrich von Recklinghausen, Willy Kühne, and Ernst Leyden, men who were unconsciously fitting themselves to occupy in later years the chief academic posts in the German-speaking medical world, and who already had commenced the researches which were to give to the school the credit of formulating the theories which dominated pathology for the next half century.

After these preparatory years Klebs went first to Berne (1866), then as Recklinghausen's successor to Würzburg (1872), and the following year to Prague at Heering's request, returning to Zurich, Switzerland, in 1882. The six years at Berne he described as the happiest of his life, but the nine at Prague were the most fruitful scientifically. He not only did original work of first importance in bacteriology, but in addition he taught many young men, and developed three important medical journals. Among his pupils in these academic years were numbered Ernst Ziegler, Zahn, Hanau, Sazka, Koster, Fischl, von Jaksch, Eppinger, and Lubarsch. It was the day of the founding of the great German scientific journals, journals so intimately bound up with their individualistic founders as to bear their names (Virchow's, Ziegler's, Pflugler's, etc.). The three journals which Klebs himself inaugurated were named in a style more approved by a modern scientific world which does not so readily countenance great individualism. *Die Prager medizinische Wochenschrift* begun in 1876, the *Korrespondenz-Blatt für Schweizer Aerzte* appearing in 1871, and the *Archiv für experimentelle Pathologie und Pharmakologie* founded with Naunyn and Schmiedeberg in 1873. All have withstood the rigors of passing fashions in scientific publishing and have served a useful purpose for their respective readers.

Upon leaving Zurich, where he had worked for eleven years, Klebs went in 1893 to Karlsruhe for a year, then came to America, settling (1895-96) in the laboratory of a private tuberculosis sanatorium in Asheville, North Carolina, and in August of 1896 moving to Chicago as professor of pathology in Rush Medical College. But in 1900 he returned to Europe to live successively in Hanover (where the *Kausale Therapie*, the fourth and only short-lived medical journal edited by Klebs, was started), Berlin, Lausanne, and Berne. The many vicissitudes of his life, so often rendered poignant and even dramatic by the changeable temperament of the man, have been adequately commented upon by his

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various necrologists<sup>1 3 4 5 7 8 9 35 37 38</sup>, but his work gives little or no evidence of restlessness or indecision of thought

## II WORK

His early studies on the bacteriology of gun shot wounds<sup>1 2</sup> growing out of his experiences in 1870 and 1871 in military hospitals in Carlsruhe and antedating by one year Koch's great memoir on the subject, had convinced Klebs of the bacterial nature of wound infection. He immediately devoted himself to impressing the ardent followers of the Virchow school of the importance of these external agents. These antagonists of humoral pathology, engrossed in the myriad of fresh vistas which new histological methods were bringing beneath their microscopes (Klebs' paraffin-embedding<sup>12</sup>, Cohnheim's frozen sections, etc.), found it difficult to accept the bacterial theory of infection and to Edwin Klebs must be given a large share of the credit for winning them over to this view. His own bacteriological studies included a treatise on the cause of anthrax<sup>19</sup> appearing a year after Koch's work, the first description of the bacillus of typhoid fever<sup>4 5</sup> and of diphtheria<sup>6</sup> and extended studies on cholera<sup>7 20 21</sup> and malaria<sup>22 23 24</sup>. The use of solid media in the form of sturgeon's glue was fully described by Klebs in 1872<sup>25</sup> nine years before Koch. But Klebs saw in the method not a means of separating bacterial species, as did Koch; he was interested in the different colonies as different stages in the growth of the same organism, an interesting observation in view of the recent ideas concerning bacterial dissociation. He felt he could secure pure cultures with his method of fractional dilution, i. e. killing off the contaminants in an impure culture by successive transfers through a series of fresh media. The Koch postulates, first enunciated in 1882 had certainly been foreshadowed in Klebs' statements made in 1877 concerning the etiology of tuberculosis<sup>26</sup>. Having discussed the anatomy of the local lesion, he pertinently remarks

"The simplest way to prove that the cells of the diseased animal neither produce nor in any way increase the virus of tuberculosis is to cultivate it outside of the organism under conditions which do not destroy the life processes of the cells of the warm blooded hosts. If under such conditions, there is still an increase in the toxic action this must be dependent upon the presence of tissues of the animal body remains of dead tissue cells, or upon components of the inoculum which usually foreign to the animal, developed within the tubercle." (a)

(a) "Der einfachste Weg um zu beweisen, dass nicht die Zellen des erkrankten Tieres den Giftstoff der Tuberculose produzieren oder zu seiner Vermehrung irgendwelche Beiträge liefern, blosso zur Erzeugung von miltärer Tuberculose des Peritoneums, wie dieses der Fall ist, wenn man genuine Tuberkulose an dem gelohnten Orte implantiert."

(c) "Gerade Mengen von den Produkten dieser Kulturversuche in die Bauchhöhle von gesunden Thieren eingespritzt, führten blosso zur Erzeugung von miltärer Tuberculose des Peritoneums, wie dieses der Fall ist, wenn man genuine Tuberkulose an dem gelohnten Orte implantiert."

Having described cultivation experiments, using fresh egg white as a culture medium, he continues

"If it can thus be established, as the older inoculation experiments indicated and the ones presented today corroborate, that tuberculous infection can not only be induced by inoculation of tuberculous tissues but also with organisms which are found in such tissues and can be grown outside the body, it becomes necessary to establish the presence of these organisms in the diseased tissues from human and animal tuberculosis." (b)

And in proof of such a proposition he describes at length the organisms he has seen in tubercles. The final step of animal inoculation with culture virus is concisely outlined

Small amounts of the products of this cultivation experiment inoculated into the peritoneum of healthy animals result in the development of a miliary tuberculosis exactly as does the implantation of tuberculous tissue in the same locus." (c)

It is of more than passing interest that in the discussion which followed the reading of the paper no comment was aroused over these experimental results for it is evident that they include the salient points of the well known Koch postulates upon which the recognition of any organism as the etiological agent of a given clinical entity has subsequently been based.

Klebs continued to be absorbed in the problem of tuberculosis during his entire life. His inaugural dissertation and first published work had been entitled *De mutationibus quae in intestino inveniuntur tuberculosis*<sup>10</sup> and he wrote over seventy individual articles<sup>12</sup>, largely concerning the therapy of the disease. The one of greatest interest at present in view of the recent BCG vaccination method is that description of the use of attenuated strains of tubercle bacilli from cold blooded animals, in the development of active immunity in guinea pigs and human beings<sup>2</sup>. His experimental production of the disease with milk of bovine origin has already been noted (d).

His many contributions to the field of path

(b) "Wenn hierdurch auch die Thatsache wohl zweifellos festgestellt ist, dass tuberculöse Affectionen nicht allein in, wie die älteren Impfversuche lehren und die heute vorgelegt in Präparate von Neuem bewährten, durch Uebertragung von tuberculösen Geweben sondern auch durch Organismen geschehen kann, welche aus solchen Geweben stammen und ausserhalb des Körpers sich vermehren können, so fordert diese Erfahrung doch wiederum auf den Nachweis dieser Organismen in dem erkrankten Gewebe bei genuiner Tuberculose der Menschen und Thiere zu versuchen."

(c) "Es ist unnecessary to include all of Edwin Klebs' printed works in view of the excellent bibliography of his scientific writings prepared by his son, Arnold C. Klebs<sup>27</sup> which with its convenient classification of titles according to their contents, i. e. (1) normal and pathological anatomy and physiology (2) histological etiology (3) prophylaxis and therapeutics (4) historical material and reviews (5) texts and (6) periodical contains about two hundred and twenty five titles. We were able to locate only a very few additional items and only one of any importance."





- 4 Ernst, Paul. Edwin Klebs. Münch med. Wchnschr 61 192  
1 1914
- Ernst P. Edwin Klebs. Verhandl d deutsch path Gesell-  
sch 17 555 1914
- 6 Fritzsche und Klebs. E. Ein Beitrag zur Pathologie  
des Rachenwuchses. Klin. und path anat Untersuchungen.  
89 pp 2 pl 5 Leipzig F. C. W. Vogel 1934
- 7 Garrison F. H. Edwin Klebs. Late Professor of Pathology  
at Würzburg. Prague & Zürich. Lancet 1957 1913
- 8 Ghon A. Edwin Klebs. Prag med. Wchnschr 28 6 8  
1913
- 9 Hlava J. Edwin Klebs. Deutsche med Wchnschr 39 518  
1913
- 10 Klebs A. C. Die wissenschaftlichen Arbeiten von Edwin  
Kl. B. 1957 1912 Verhandl d deutsch path Gesell-  
sch 17 550 1914
- 11 Klebs, A. C. Discovery and Discoveries. Ann of Med  
Hist N 5 4 191 193
- 12 Klebs, E. Die multilobuläre quere in intestino in munit  
tuberculosis. Dissert. Inaug. B. rol 1957
- 13 Klebs, E. Die Fätschmelzungs Methode ein Beitrag zur  
mikroskopischen Technik. Arch f mikr Anat Be  
5 164 1909
- 14 Klebs, Edwin. Handbuch der pathologischen Anatomie Bd I  
Abt. L. xvi. Will 5 2 p. 1959 (1959) (In the copy of it a  
part in the Library of the New York Academy of Medi-  
cine the paper cover is dated 1953 (the title page 1965)  
accounting for the two dates given in various ref. ences.)  
Abt. 2. xvi. 11 1 54 pp 1976 Berlin. A. Hirschwald  
Fortsetzung: Schwartz 1976 and Eppinger 1959
- 15 Klebs, Edwin. Beiträge zur pathologischen Anat mie d r  
Schusswunden. Nach Beobachtungen in den Krieg i  
reihen in Carlshu 1870 und 1871 127 pp 10 pl 10 J  
Leipzig F. C. W. Vogel 187
- 16 Klebs, E. Die Ursachen der infektiösen Wundkrankh it n  
Corr Bl f. Schweiz. Aerzte 1 41 1871
- 17 Klebs, E. Die künstliche Erzeugung der Tuberc lose  
Arch. f. exper path u. pharmak 1 162 18 2
- 18 Klebs E. Ueber operative Verletzungen der Herzkla-  
pen und deren Folgen. Prag med Wchnschr 1 9 1876
- 19 Klebs E. Notiz über die Ursache des Milzbrandes Arch  
f exper Pathol. u. Pharmakol 5 69 1877
- 20 Klebs E. Ueber Tuberkulose. Annt Bericht der Versamm-  
lung. Deutsch Naturforsch. u. Aerzte. München 50 74  
1877
- 21 Kl. B. E. Weitere Beiträge zur Entstehungsgeschichte d r  
Endocarditis Arch f exper Pathol u. Pharmak 1 9 5  
1878
- Klebs E. Ueber Syphilis Impfung bei Thieren und über  
d Natur des syphilitischen Contagiums. Prag. med  
Wchnschr 2 409 1878
- 22 Klebs, E. Das Contagium der Syphilis eine experiment lle  
Studie. Arch f exper Pathol u. Pharmakol. 10 161  
1879
- 23 Klebs E. Der Mycetismus eine Schistomycose Arch. f  
Experiment Pathol u. Pharm. 1 31 1880
- 24 Klebs E. Der Bacillus des Abdominaltyphus und der  
typhösen Process Arch f Experiment. Path. u. Pharm  
13 331 1881
- 25 Klebs, E. Ueber Diphtherie. Verhandl des Cong für inn.  
Med. 1 6 1882
- 26 Klebs, E. Mittheilungen zur Aetiologie der Cholera  
Corr Bl. f. Schweiz. Aerzte 15:305 1886
- 27 Klebs E. Ueber cholera asiatica. Corr Bl f. Schweiz  
Aerzte 14:569 und 607 1884
- 28 Klebs E. Die allgemeine Path logi oder die Lehre von  
den Ursachen und dem Wesen der Hyankheitsprocessen  
Ein Handbuch für Studierende und Aerzte. vols xiv [ ]  
514 pp 8 pl., xviii [ ] 826 pp 52 pl 5 Jena. G  
Fischer 1917-29
- 29 Klebs Edwin, and Tommasi-Crudell II On the Nature of  
Malaria. Translated by Edward Drummond. New Syden-  
ham Society: Selected Monographs London 1883 [6]  
54 pp
- 30 Klebs, E. XI Mittheilungen zur Cholera I Zur Pathologie  
und Therapie der Cholera asiatica. Deutsche med.  
Wchnschr 18 975 und 999 1892
- 31 Klebs E. Die Blinddarmschleichen Tuberkelbazillen und ihr  
Verw ndung bei menschl her und Warmblüter Tuberkulose  
Deutsche Aerzte Ztg Berl. P. 487 1905
- 32 Klebs E. und Tommasi-Crudell C. Einige Sätze über  
die Ursachen der Wechselstieber und die Natur der Malaria.  
Arch f exper Pathol. u. Pharmak. 11 1 2 1879
- 33 Klebs E. und Tommasi-Crudell C. Studien über d  
Ursache des Wechselstiebers und über die Natur d Malaria.  
Arch f exper Pathol u. Pharmak 11 211 1879
- Marchisava E. II Prof Edwin Klebs. Medicina nuova  
Rome 5 2<sup>o</sup> 1911
- 34 Marie Pierre Sur deux cas d'acromégalie hypertrophik  
singulière non congénitale des extrémités supérieures,  
inférieures et céphalique. Revue de Med. 6 97 1906
- Nannyn B. Edwin Klebs. Arch. f. exper Pathol u. Phar-  
makol. Leipzig 74 f III 1913
- Strasser II. Edwin Klebs. Corr Bl f. Schweiz. Aerzte  
43 17 1 1913

## MEDICAL PROGRESS

### PROGRESS IN PSYCHIATRY FOR 1934

BY KARL M. BOWMAN, M.D.\*

**D**URING the past year there has been contin-  
ued work in formulating a plan to provide  
some type of certification for qualified psychiat-  
rists. This has finally resulted in combined ac-  
tion by The American Psychiatric Association,  
The American Neurological Association and  
The Section on Neurology and Psychiatry of the  
American Medical Association. As a result a  
meeting was held in New York on October 20,  
1934 at which the American Board of Psychiatry  
and Neurology, Inc., was organized. The fol-  
lowing officers were elected:

Dr H Douglas Singer, President  
Dr C Macfie Campbell, Vice President  
Dr Walter Freeman, Secretary-Treasurer

Other Members of the Board are the follow-  
ing: Dr Lewis J Pollack, Dr George W Hall,  
Dr Franklin G Ebaugh, Dr Lloyd H Ziegler,  
Dr J Allen Jackson, and Dr Adolf Meyer.  
This Board will have authority to issue a cer-  
tificate indicating that the individual is a qual-

ified psychiatrist or neurologist or both. Psy-  
chiatry and neurology have by this step set up  
certain standards for a qualification and are fol-  
lowing the example of a number of the other  
specialists in working out a plan to prevent un-  
qualified persons posing as specialists in a par-  
ticular field.

The annual meeting of The American Psy-  
chiatric Association was held at New York City  
May 29-June 1 1934. Prior to this meeting the  
National Committee for Mental Hygiene again  
arranged a two-day conference on "The Teach-  
ing of Psychiatry in Medical Schools." This con-  
ference again stressed the importance of psy-  
chiatry in the curricula of the medical schools  
and considered plans for improving such teach-  
ing.

There were apparently two points of view  
which showed considerable divergence.

One group felt that the teaching of psychiatry  
to medical students should be largely through  
the use of general medical and surgical material  
in which the psychological factors of physical  
disease were stressed. Certain members of this

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pathic Hospital 1921. For record and address of author see  
"This Week's Issue" p. 75.

ological anatomy and physiology included the first experimental production of valvular disease of the heart<sup>18</sup> and the recognition of the bacterial infection in the production of the subsequent endocarditis<sup>21</sup>, his description of hemorrhagic pancreatitis as a rapidly fatal disease<sup>14</sup>, the introduction of the paraffin embedding method<sup>13</sup>, and his monumental texts, *Handbuch der pathologischen Anatomie*<sup>14</sup> (1869-1876) and *Die allgemeine Pathologie, oder die Lehre von den Ursachen und dem Wesen der Krankheitsprocesse*<sup>29</sup> (1887-1889) which, though never completed, became invaluable source books for pathologists for the next twenty-five years. To the general understanding of the processes of cell necrosis with its phases of karyolysis and karyorrhexis, of infarction, thrombosis and embolism he added much that was illuminating.

It is commonly conceded that Pierre Marie first described the clinical entity acromegaly which is still recognized by the name he so aptly coined. Of Klebs' several biographers<sup>2, 4</sup> only Garrison<sup>2</sup> draws attention to the fact that Klebs' paper on gigantism<sup>6</sup> furnishes a complete and excellent description of the same disease, which antedates that of Pierre Marie by two years. Marie's classical description, appearing in the *Revue de Medicine* in 1886<sup>30</sup>, was concerned with the clinical aspects of the two cases of the disease he had seen simultaneously in Charcot's clinic with notes on five apparently similar cases which he collected from the literature. No suggestion was made of the relationship of the disease to the pituitary gland, neither case having come to autopsy at this time. Marie was content to speculate on the possible etiology of the disease considering such widely divergent explanations as an involvement of the sympathetic nervous system, a generalized disease simulating rheumatism or a developmental defect. Klebs and his clinical collaborator, Fritzsche, describe in detail one case, Klebs being responsible for the painstaking and excellent postmortem descriptions, which in themselves are models of the careful work produced by the well trained pathologist of the nineteenth century. Moreover armed with the pathological findings Klebs proceeded to explain the etiology of the condition in broad physiological terms of growth and development, concluding that a generalized process of hypertrophy was at work, the pituitary hyperplasia being a manifestation of that process and the thymus being definitely involved. It is also interesting to see that he was the first to recognize that pituitary tumors had been associated with similar cases reported in the literature a point overlooked by Pierre Marie.

### III CHARACTER AND INFLUENCE

That Klebs did not push many of his investigations to what to us seems then logical conclusion becomes apparent as soon as one sur-

veys his work. This was a natural failing of early pioneers. They moved in many entirely new fields, and they moved rapidly from one to the other. Klebs described the typhoid bacillus, but it was left for Gaffky to cultivate it four years later. The work on toxicity and non-infectivity of bacterial filtrates<sup>15, 16</sup> was clearly of great significance, but it was not until years later that von Behring, Roux, and Yersin were to clarify the action of toxins and antitoxins. Some of these apparent shortcomings may well have been the result of his restless nature, which always interested itself in new aspects of a problem and was often impatient of the necessities of the moment. Several anecdotes give evidence of these tendencies. Dr. Welch repeatedly told a characteristic story illustrating this trait in Edwin Klebs. On the occasion of a visit by Klebs to Welch's laboratory at Johns Hopkins, Welch placed under several microscopes a series of preparations from a case of Landry's paralysis in which some of the thrombotic changes Klebs had first described were beautifully demonstrated. Welch said that he found Klebs looking into one after the other with but little comment. When pressed for some expression, he replied, "Evidently very good preparations, but those thrombi do not interest me any more. As I was looking at these cells I realized how much we have still to learn about the entire mesoderm." And at least two of Klebs' recorded statements give evidence that he recognized his own tendencies. One is a direct reply to a criticism hurled at his first announcement of the discovery of the diphtheria bacillus at the Second Congress for Internal Medicine held in Wiesbaden on April 19, 1883. To Dr. Korte of Berlin, who suggested that the question of etiology could be settled only after the organisms had been isolated in pure culture and then successfully inoculated into animals, Klebs replied (Reference p 172 of No 26) "I admit that I have devoted my efforts to this task for years, but gentlemen, he who works a great deal has many failures and, after any one of us has worked twenty-five years in this field, he cannot be blamed if he does not successfully achieve the desired goal." In later years, however, he is reported by one of his students to have said "I was the first to see and partially describe many pathogenic bacteria, but I had no success with those methods which yielded conclusive evidence. And everything depends upon these methods a basic idea in modern scientific research. Never fail to search for new methods." And it is as a pathfinder, always searching for the new and the unknown, that Edwin Klebs was known to his contemporaries and deserves to be remembered.

### REFERENCES

1. Obituary. Edwin Klebs. Boston M & S J 169 814 1913
2. Beltz, H. Edwin Klebs. Berl Klin Wchnschr 50 2263 1913
3. Doepfner, Karl. Professor Dr. Edwin Klebs. 1834 1913. Corr-Blt f Schweiz Aerzte 43 1725 1913

special reference to its occurrence in twins by Rosanoff and Handy emphasizes the idea that the most important factor appears to be the age of the mother and the authors feel that some disease of the ovary which occurs with the advancing age of the mother is of the greatest importance in producing this condition. They point out that the condition is more frequent in boys than girls and discuss further factors such as the possibility of the spermatozoon exerting a protective influence.

One of the most pretentious and important articles concerning the nature of mental disease is by Pavlov entitled "An Attempt at Physiological Interpretation of some Neuroses and Psychoses." This article appears in the *Journal of Mental Science* for April, 1934. It can hardly be presented intelligently in brief form and the reader is referred to the article. It may be stated, however, that Pavlov found that by using his concept of the conditioned reflex he was able to work out a characteristic mental state which he called "pathological inertness", and which he felt explained some of the conditions found in mental disease particularly in the obsessional neuroses and in paranoia.

In the field of treatment there have been many articles published but few that seem of much significance. Many have to do with methods of treatments which have already been tried out to some extent but a few represent some new method. Further use of methods of prolonged narcosis have brought out little that is new. Some authors call attention to the need of psychotherapy as a part of any such plan, while there are others who feel that most of the results achieved are due to the psychotherapy rather than to the prolonged narcosis. The standards for determining cure or improvement are so difficult to establish in psychiatry and the lack of control material is so common that most articles on the subject of treatment are largely impressionistic. This is particularly true concerning the manic depressive psychoses where the patients ordinarily recover if no treatment at all is given. When one reads therefore, of 37.7 per cent of cases of manic depressive psychoses recovering under prolonged narcosis treatment, there seems little value to such figures.

One interesting result of the increased frequency of encephalograms is the report from several sources of total improvement in certain cases as a result of the injection of air where certain cases of head trauma appear to have been relieved of headache, dizziness, and even convulsive attacks. Further study along this line seems indicated and it may be that some important therapeutic results can be achieved by such a method of treatment or by some modification of such treatment.

In recent years the concept of suboxidation of the brain as a cause of dementia praecox has attracted considerable attention. Mott held

strongly to this view and it is now generally accepted that there is a tendency toward a low basal metabolism in dementia praecox. At the New York Psychiatric Institute an attempt was made to treat five cases of dementia praecox by keeping them continuously for two and a half months in an oxygen chamber of approximately fifty per cent oxygen. During this period the patients were also given further treatment with carbon dioxide and oxygen. Psychotherapy was also a part of the treatment. Three control groups were used, one group receiving the continuous oxygen treatment and the combined carbon dioxide side treatment, but no psychotherapy. A second group simply lived in the fifty per cent oxygen atmosphere. A third group lived outside the oxygen chamber but received the daily treatments of carbon dioxide and oxygen. From the standpoint of therapy there seemed little value to the oxygen treatment. The cases that received psychotherapy as well did best.

Various other chemical treatments have been attempted and treatment has been carried out by injections of placental blood, of sulphur and gold, of insulin, and of manganese, also various endocrine preparations and extracts of nervous tissue have been used. The results obtained do not point to any important new method of therapy.

In the treatment of depressions hematinopyrin has apparently had some value and it is probable that within the next few years there will be further experiments with this drug. There also has been further use of ovarian extract in the treatment of involutional melancholia with some rather optimistic reports.

There has been further use of fever therapy in the treatment of general paresis and it now seems firmly established that by the use of fever therapy, particularly malaria, complete remissions may be obtained in as high as one third of all cases treated and improvement in another third. Besides malaria a large number of other methods have been used to produce hyperpyrexia. Diathermy continues to be used although the danger of burns is a serious drawback. The injection of substances, such as typhoid vaccine, the use of the electric blanket and the hot water bath, all seem to be possible methods which are somewhat simpler. Still more recently an air conditioned cabinet has been used. It is still too early to determine the advantages or disadvantages from it.

There has also been some excellent work in treating hyperthyroid children with thyroid preparations and following the intellectual development of the child by very careful psychological tests. These tests appear to demonstrate the value of thyroid treatment and indicate that the earlier a condition is recognized and treatment instituted, the greater will be the intellectual development.

group even went so far as to hold that no formal teaching of the psychoses should be given

The other point of view was that since over half of the hospital beds in this country were filled with cases of mental disease, anyone going into the practice of medicine needed some acquaintance with these serious mental disorders. It was pointed out that mental disorders are most commonly seen first by the general practitioner and that he therefore needs to have some knowledge of this subject. Furthermore, it was held that the general public turned to the physician for understanding and advice on the problem of mental disease, and if the physician who was graduated from a Class A medical school has no more knowledge than the laity as to the problems of mental disease, it would cause the lay individual to lose faith in the physician and to turn more to unqualified practitioners in the field of mental disease.

In line with this a report was submitted by Dr Franklin G. Ebaugh, entitled "Ideal Standards for the Teaching of Psychiatry in Class A Medical Schools" which was endorsed both by the Advisory Committee on Psychiatric Education of the National Committee for Mental Hygiene and by the Committee on Psychiatric Education of The American Psychiatric Association. It was held that psychiatry should be one of the fundamentals of the basic training of every physician and wherever possible, instruction should be given during all four years. The ideal type of curriculum was held to consist of

Sixteen hours of "pre-clinical instruction in psycho-biology during the first year"

Sixteen hours of "psycho-pathology and methods of study and formulation" in the second year

Sixty hours of "clinical instruction, didactic work, clinics, and clerkships" in the third year

Sixty hours of "out patient work, inter-departmental consultation participation and examination of individual cases" during the fourth year

On June 21, 1934 Yale University conferred the honorary degree of Doctor of Science on Dr Adolf Meyer as an expression of the great pioneer work which he has done in American Psychiatry.

The second series of the Thomas William Salmon Memorial Lectures was given by Dr C. Macfie Campbell at the New York Academy of Medicine on April 13, 20 and 27, 1934, his subject was "Trends in Psychiatry." These lectures are to be published by the Thomas William Salmon Memorial

In June, 1934 Dr James V. May resigned as Commissioner of Mental Diseases in Massachusetts and resumed his former position as Superintendent of the Boston State Hospital. Dr May had agreed to accept the Commissionership for a period of one year following the death of Dr Kline, but had insisted that he should be

free to return to his former position at the end of that period. Dr Winfred Overholser who had for many years been Assistant Commissioner was appointed Commissioner of Mental Diseases by Governor Ely.

The Rockefeller Foundation made a substantial gift for the increase of work in psychiatry at the Harvard Medical School. The bulk of this fund was given for the establishment and maintenance of a psychiatric unit at the Massachusetts General Hospital to be under the direction of Dr Stanley Cobb and part to establish some new work at the Boston State Hospital.

It cannot be said that any new or startling discoveries have been brought forth in the field of psychiatry during the past year. The literature has continued to be quite extensive and prolific and all varieties of topics have been dealt with.

In the field of heredity, further studies of the factors in dementia praecox and manic depressive psychoses made by Pollack and his associates in New York State and published in the Psychiatric Quarterly indicate the importance of the hereditary factor in both of these diseases.

Two recent articles by E. Bleuler of Zurich defend the idea that certain acquired mental characteristics can be inherited. This is, of course, contrary to the viewpoint of most biologists, but coming from the pen of such a distinguished physician the articles merit serious consideration. It is perhaps worth calling attention to the fact that many prominent men in the field of psychiatry, particularly a number in the psychoanalytic field, have insisted on an inheritance of acquired mental characteristics.

There has also been further work concerning the inheritance of feeble-mindedness which also confirms the hereditary nature of this condition where injury and disease have been ruled out as etiological factors. One of these articles suggests that feeble-mindedness may be transmitted as a recessive trait.

Various attempts have been made to work out causative factors in mental disease particularly in schizophrenia. Most of these studies have led to negative conclusions. Thus Freeman and Looney at the Worcester State Hospital attempted to determine whether a toxin was present in the blood or urine of schizophrenic patients. The question of toxicity was determined by noting the effect of dilutions of blood and urine of the patients on the growth of *Lupinus Albus*. The results were negative and showed no evidence of any such toxin.

Rosanoff and Inman-Kane after a study of premature birth and underweight at birth conclude that children born prematurely and underweight are much more likely to sustain cerebral injury at birth and hence this condition is a factor in the production of mental deficiency.

A study of the etiology of Mongolism with

special reference to its occurrence in twins by Rosanoff and Handy emphasizes the idea that the most important factor appears to be the age of the mother and the authors feel that some disease of the ovary which occurs with the advancing age of the mother is of the greatest importance in producing this condition. They point out that the condition is more frequent in boys than girls and discuss further factors such as the possibility of the spermatozoon exerting a protective influence.

One of the most pretentious and important articles concerning the nature of mental disease is by Pavlov entitled "An Attempt at Physiological Interpretation of some Neuroses and Psychoses." This article appears in the *Journal of Mental Science* for April, 1934. It can hardly be presented intelligently in brief form and the reader is referred to the article. It may be stated, however, that Pavlov found that by using his concept of the conditioned reflex he was able to work out a characteristic mental state which he called "pathological inertness" and which he felt explained some of the conditions found in mental disease particularly in the obsessional neuroses and in paranoia.

In the field of treatment there have been many articles published but few that seem of much significance. Many have to do with methods of treatments which have already been tried out to some extent but a few represent some new method. Further use of methods of prolonged narcosis have brought out little that is new. Some authors call attention to the need of psychotherapy as a part of any such plan, while there are others who feel that most of the results achieved are due to the psychotherapy rather than to the prolonged narcosis. The standards for determining cure or improvement are so difficult to establish in psychiatry and the lack of control material is so common that most articles on the subject of treatment are largely impressionistic. This is particularly true concerning the manic depressive psychoses where the patients ordinarily recover if no treatment at all is given. When one reads, therefore, of 87.7 per cent of cases of manic depressive psychoses recovering under prolonged narcosis treatment, there seems little value to such figures.

One interesting result of the increased frequency of encephalograms is the report from several sources of total improvement in certain cases as a result of the injection of air, where certain cases of head trauma appear to have been relieved of headache, dizziness, and even convulsive attacks. Further study along this line seems indicated and it may be that some important therapeutic results can be achieved by such a method of treatment or by some modification of such treatment.

In recent years the concept of suboxidation of the brain as a cause of dementia praecox has attracted considerable attention. Mott held

strongly to this view and it is now generally accepted that there is a tendency toward a low basal metabolism in dementia praecox. At the New York Psychiatric Institute an attempt was made to treat five cases of dementia praecox by keeping them continuously for two and a half months in an oxygen chamber of approximately fifty per cent oxygen. During this period the patients were also given further treatment with carbon dioxide and oxygen. Psychotherapy was also a part of the treatment. Three control groups were used, one group receiving the continuous oxygen treatment and the combined carbon dioxide side treatment, but no psychotherapy. A second group simply lived in the fifty per cent oxygen atmosphere. A third group lived outside the oxygen chamber but received the daily treatments of carbon dioxide and oxygen. From the standpoint of therapy there seemed little value to the oxygen treatment. The cases that received psychotherapy as well did best.

Various other chemical treatments have been attempted and treatment has been carried out by injections of placental blood, of sulphur and gold, of insulin, and of manganese, also various endocrine preparations and extracts of nervous tissue have been used. The results obtained do not point to any important new method of therapy.

In the treatment of depressions hematoporphyrin has apparently had some value and it is probable that within the next few years there will be further experiments with this drug. There also has been further use of ovarian extract in the treatment of involuntional melancholia with some rather optimistic reports.

There has been further use of fever therapy in the treatment of general paresis and it now seems firmly established that by the use of fever therapy, particularly malaria, complete remissions may be obtained in as high as one third of all cases treated and improvement in another third. Besides malaria a large number of other methods have been used to produce hyperpyrexia. Diathermy continues to be used although the danger of burns is a serious drawback. The injection of substances such as typhoid vaccine, the use of the electric blanket, and the hot water bath, all seem to be possible methods which are somewhat simpler. Still more recently an air-conditioned cabinet has been used. It is still too early to determine the advantages or disadvantages from it.

There has also been some excellent work in treating hyperthyroid children with thyroid preparations and following the intellectual development of the child by very careful psychological tests. These tests appear to demonstrate the value of thyroid treatment and indicate that the earlier a condition is recognized and treatment instituted the greater will be the intellectual development.

An interesting study on blood sugar in relation to emotional reactions by Whitehorn confirms the findings of previous writers that there is little relation between the fasting blood sugar and the emotional state of the psychotic patient. The vast majority of such patients, even in states of extreme excitement, show a normal blood sugar. Where hyperglycemia occurred it was usually in some organic type of case or in women at about the involutional period of life.

An excellent article by Paul Schilder appears in *The American Journal of Psychiatry* for July, 1934. The article entitled "Psychic Disturbances After Head Injuries" does not lend itself to a brief summary and is a discussion of the various types of mental symptoms occurring after brain injury.

The great increase in the smoking of marijuana cigarettes has led to several studies of this subject. The habit has apparently spread from Mexico and Latin-American countries and the drug itself is the American form of hashish or Cannabis Indica. There have been many reports of the effects of smoking these cigarettes and the habit seems particularly prevalent among high school students. A certain exuberance occurs, a tendency to laugh easily, oftentimes an alteration in the sense of time and space, and repressions, particularly sexual, are removed. There is no tendency to habit formation as in opium or cocaine. The drug is little used by criminals who commonly prefer opium or cocaine. A very excellent summary of the subject, entitled "Marijuana Intoxication, A Clinical Study of Cannabis Sativa Intoxication" by Bromberg appears in *The American Journal of Psychiatry* for September, 1934.

#### AN ADVERTISED HEALTH CLINIC

A pamphlet has been circulated in which appears an advertisement of a Health Clinic in Boston with a doctor and dentist in attendance.

The doctor's name does not appear in the Directory of the American Medical Association so far as we have discovered, and the Massachusetts State Board of Registration in Medicine also reports that this doctor's name does not appear in the list of registered physicians. The advertisement sets forth that complete physical examination will be made for \$1.00.

Perhaps this may be a plan for emulating the practice of the Canadian doctor who charged \$1.00 per treatment and has been reported to be making a financial success of manipulation of the feet of his patients.

Whether this venture will be a financial success is doubtful, because the public is growing wary of advertised medical service although there is a gen-

A number of books have appeared which are of considerable interest to the psychiatrist and mention may be made of a few which could probably be of value to the general medical profession.

Elton Mayo has written on "The Human Problems of an Industrial Civilization" in a manner which should interest everyone.

Huddleson's "Accidents, Neuroses and Compensation" gives an excellent summary of our present knowledge of this troublesome condition.

Weyhoefer's "Insanity as a Defense in Criminal Law" has attracted considerable attention and has been generally accepted as one of the best books on this subject.

Nathan G. Goodman has written a book on "Benjamin Rush, Physician and Citizen" which should interest every follower of medicine. The discussion of Rush's service during the Revolutionary War, his criticisms, and quarrel with General Washington, and his ideas concerning mental disease all afford interesting reading.

Campbell's "Human Personality and the Environment" which represents the substance of six lectures given at the Lowell Institute is a book with which all students of personality should become familiar.

Stefan Zweig's "Mental Healers—Franz Anton Mesmer, Mary Baker Eddy, Sigmund Freud" is a very readable account of these three individuals.

The last volume of *The Association for Research in Nervous and Mental Disease*, entitled "The Biology of the Individual" is also a study of personality which will remain for some time as an important contribution to this subject.

eral impression that adequate advertising of most anything will bring favorable returns.

If it is found, on further investigation that this doctor is not registered, there will be more doubt of his competing successfully with other practitioners in Boston. There seem to be some obstacles in the way of this clinic.

#### THE FLOATING CONGRESS

About three hundred physicians from the United States, some with their wives, sailed on the Queen of Bermuda for Rio de Janeiro June 30, as participants in the Floating Congress.

The medical activities will be divided into seventeen sections of medical discussions. The Brazilian medical profession has arranged scientific sessions at Rio de Janeiro and Sao Paulo with special exhibits at the Oswaldo Cruz Institute of Tropical Medicine and at the Sao Paulo University with its Institute Sero-Therapeutic.

patients would all be benefited by vitamin B by mouth. This patient, then, possibly suggested pernicious anemia and he was treated with highly purified liver extract which produced no apparent results. This was evidently not a potent material because two weeks after admission treatment with liver that was potent was followed by excellent response. There was marked improvement in strength and appetite, almost complete disappearance of the soreness of the tongue, the red count rose to two million with twenty six per cent reticulocytes that is about two hundred and sixty thousand reticulocytes which is a maximal response. We see later that his red count rose to four million. In other words, he had an anemia which gave the specific response to liver as shown by maximal reticulocyte response for the red cell level and the problem is simply whether he had two diseases or whether this pernicious like anemia was secondary to his underlying disease. It is rather ridiculous for one to try to decide because there is, I think, no solution of the problem. I doubt if Dr. Mallory can tell us. However the description of the patient does not suggest a typical idiopathic pernicious anemia.

Could radiation so affect gastric activity as to produce pernicious anemia? I do not think I have ever seen it as a result of radiation alone. I wonder what Dr. Holmes will say. It may be that his diet had been grossly wrong but there is nothing in the history to suggest that. Finally he may have infiltration of the stomach with tumor tissue, with diminishing gastric activity with resulting pernicious anemia due to the lack of an intrinsic factor. It seems futile to speculate about this.

When we have a patient with marked headache and a probable leukemia or gland tumor such as this it is wise to think of some central nervous system involvement and it may even include a real leukemic meningitis. I got caught that way once, not paying enough attention to the headache. I will speak of that in a moment.

The problem in this last admission is why he had headaches and blurring vision and what actually caused death. The blurring of vision may be due to retinal hemorrhages as a result of anemia. There is no note of hemorrhages elsewhere. The hemorrhage is noted as subconjunctival and therefore I think it is fair to assume that it was due to increased intracranial pressure. I am going to guess that he had not a discrete involvement in the brain but a diffuse involvement around the meningeal vessels with this tumor and that he had what may really be called a leukemic meningitis. There is no detailed account of the death, and it is not important in this case. I assume we can take it that he did have a terminal pneumonia in addition to everything else. I should say, then that

he had clinically a leukemia which pathologically might be described as lymphoblastoma of some type, that he had an involvement of the meningeal vessels amounting to a leukemia meningitis, and that he had a symptomatic or secondary pernicious anemia.

#### CLINICAL DISCUSSION

DR. BERNARD M. JACOBSON. I took care of this patient during his second admission while he was in Ward 4 and we had all the data about his having been discharged on a previous admission with a biopsy diagnosis of lymphosarcoma. While he was attending the Tumor Clinic for continued x-ray treatment Dr. Chapman noticed the appearance of other symptoms, weakness, dyspnea, sore tongue and the onset of paresthesia in the hands. Dr. Chapman knowing that I was interested in pernicious anemia, got me to see him at the time of his second admission. The physical examination, the history and the blood findings could not be distinguished from that of idiopathic pernicious anemia. It is interesting in retrospect that he did have at least two high color indexes at the time of previous admission but not nearly so high at the time of the second admission.

After his discharge from Ward 4 I followed him in part during the next four months. I did not give him any parenteral liver treatment because he seemed to do very well on whole liver and domestic liver by mouth. About two months after discharge at a time when the red blood cell count was well over four million he came in with a story that was typical of acute gout involving one metatarsal phalangeal joint. He had never had any arthritic symptoms in his life before and no family history of gout. A few weeks later he came in with another story of an attack of acute metatarsal phalangeal inflammation. I saw him after the second attack when the joint was subsiding. He had very slight edema and slight brownish discoloration of the skin. I did not modify the diet in any way and sent him to the house for the third admission.

A PHYSICIAN. I should like to ask one question. Must we make a diagnosis of idiopathic pernicious anemia on the basis of a maximal reticulocyte response to treatment? I have been asked that a number of times and I am not sure whether the therapeutic test is a final test of idiopathic pernicious anemia. I should like to hear a comment on that.

DR. FRANCIS T. HUNTER. I should like to ask Dr. Jacobson whether the cell volume was high.

DR. JACOBSON. The volume index was as high as you will ever find it, around 1.6. It is far higher than we see it in the myeloid leukemias or lymphoblastomas, which rarely run over



of the red blood cells. The platelets were normal. There was an occasional reticulocyte. A gastric analysis showed no free hydrochloric acid even after ergamin. The icteric index was 8.

He was first treated with a highly purified liver extract which produced no apparent response. Two weeks after admission intensive parenteral liver treatment was started following which there was an excellent response. There was marked improvement in strength and appetite and almost complete disappearance of the soreness of his tongue. His red blood cell count was 2,070,000, with 26 per cent reticulocytes. About one month after entry he received x-ray treatment over both upper cervical and preauricular regions. The glands became swollen and somewhat softer following this treatment. He was discharged improved during the sixth week and was told to continue with the liver treatment.

*Third Admission*, four months later

During the interval he was seen in the x-ray clinic. His red cell count had remained around 4,000,000. A few weeks before this entry he developed headaches and blurring of vision. Several of the glands reappeared. On the day before admission, after an x-ray treatment over the skull to include the eyes because of the enlarged glands above each orbit, he became very weak and developed a severe headache. His vision failed.

On physical examination prominent subconjunctival hemorrhages were found. There were soft indefinite masses over each orbit. The liver and spleen were enlarged to percussion but were not felt. The glands in the neck, groin, elbow, axillae and back of skull were enlarged to one centimeter in diameter.

Examination of the blood showed a red cell count of 3,270,000, with a hemoglobin of 60 per cent. The white cell count was 5,200, 57 per cent polymorphonuclears and 10 per cent immature forms.

Liver by mouth and liver extract intramuscularly were given. He was given another course of x-ray treatment but he developed signs of collapse and pneumonia and died six weeks after admission.

#### DIFFERENTIAL DIAGNOSIS

DR WYMAN RICHARDSON: I hate to see a patient with swelling of the neck due to glands because I am always wrong in making a diagnosis of the cause of the swelling, at least until biopsy reports are available. Fortunately in this case they are available.

We have a history of enlarged glands and the only thing that seems to me to be important is that he has had drenching night sweats. I feel that that is rather against the diagnosis of metastatic carcinoma and more in favor of some lymphoid tumor. As to the intravenous

treatment, I am not sure what was in mind there.

Physical examination then is not interesting except for the glands. I think slightly irregular pupils in a man of seventy-seven are of no significance.

The red blood cell counts on the sixth and fourteenth days were 2,550,000 and 2,280,000, that is rather strange in the absence of a story of hemorrhage. I think that the first count of four million probably was an error.

The blood is interesting in comparison with the next episode. The color index according to the Tallqvist scale is high and the red counts are lower than one would expect in view of the history. There is no description of the smear. The differential count shows a slight but absolute lymphocytosis, and there are some immature cells interpreted as lymphocytes. Taken in connection with the glandular enlargement that blood smear would suggest a lymphoid tumor of a cellular type and certainly I think would justify a diagnosis of aleukemic leukemia, taken also in connection with the severe anemia. The blood picture is not that of a Hodgkin's disease, where, having gone this length of time, one would expect to find the lymphocytes reduced instead of increased.

The skin lesion may of course have been due to lymphoid involvement of the skin but there is no more mention of it and we might as well leave it as it is.

The history and physical examination on the second admission are essentially the same as previously except for sore tongue and the weakness and so on, presumably due to anemia of some sort. The scanty hair I think one can dismiss because he was known to have had considerable radiation in these regions.

We again have a very severe anemia which shows this time a relative lymphocytosis, but there is no actual increase of lymphocytes. There are less immature cells this time, not classified. The picture might be consistent with the anemia of aleukemic leukemia. In this condition we frequently get an anemia which shows marked variation in the size of the red cells, sometimes a true macrocytic hyperchromic anemia, one very difficult to distinguish from pernicious anemia. The test that has been used frequently is a therapeutic one, with the use of liver. It is rare in this type of anemia associated with leukemia to get variation in the shape of the red cells. On the other hand this patient had a sore tongue, suggesting vitamin B deficiency. It impresses me when I go around and look at patients with long-continued chronic disease, especially when I look at their tongues, that there frequently is evidence of vitamin B deficiency with or without anemia. I refer especially to patients with diseases such as ulcerative colitis or long-drawn-out gastrointestinal malignancy or patients with difficulty in swallowing or with long chronic illnesses. These

and left nothing behind? How do you feel about it Dr Holmes?

DR. GEORGE W. HOLMES I cannot definitely answer the question. Of course we do get anemias as an end result in these cases of leukemia that have been treated for a long time. Then there are cases of polycythemia which respond very readily to small doses of x ray showing that irradiation does affect the bone marrow. The question may well be raised but it cannot be answered at present.

Dr Richardson raised a question that is worth commenting upon, the question of a change in the stomach causing the anemia. We should have had an x ray examination of the stomach. We are inclined to neglect these studies in patients who have been with us for a long time.

DR. MALLORY The stomach was entirely negative at autopsy. It was a perfectly logical thing to think of, of course.

A PHYSICIAN Was the head examined?

DR. MALLORY No.

DR. HOLMES I should like also to comment on the reaction following the treatment to the head. It is quite common in radiation over the brain to have such a reaction and it is possible that the treatment did increase the intracranial pressure but in this case the situation was desperate and something had to be done.

DR. MALLORY Dr Weiss has recently been collecting cases of leukemia, and finds that central nervous system involvement is more common than not, strikingly more frequent than is generally supposed.

A PHYSICIAN Were there many specimens of bone marrow examined, Dr Mallory?

DR. MALLORY The sternum and vertebrae.

A PHYSICIAN I wonder how he could have such a generalized aplastic anemia and maintain such a respectable blood picture.

DR. MALLORY He was in five weeks and the last red count was taken a number of weeks before his death.

A PHYSICIAN Did he maintain as high a blood count as that at the end?

DR. MALLORY I cannot answer that.

A PHYSICIAN Did they make a diagnosis of leukemia?

DR. MALLORY No.

A PHYSICIAN Do you think he has lymphosarcoma?

DR. MALLORY I am inclined to think he had leukemia, but there is no positive evidence of it from the autopsy. I am inclined to think he had true pernicious anemia. What do you think, Dr Jacobson?

DR. JACOBSON At the end of the second admission the red blood cell count had gone up to three million and the glands began to recur. On Dr Hunter's advice we gave him more treatment.

I should like to ask Dr Mallory if he can distinguish the stomach in pernicious anemia from a normal one?

DR. MALLORY The autopsy was done ten hours postmortem and it would be quite impossible.

DR. JACOBSON We have one method that we have developed in this hospital for the estimation of the hematopoietic potency of various materials and various organs. We have found in one individual, a person dying of some other diseases with no anemia during life, that his liver contained 150,000 guinea pig units of activity per 100 grams of liver. We have assayed the livers of two patients dying of pernicious anemia in relapse and in both these instances there were less than 500 units of activity per 100 grams of liver. In this particular patient who died in what we might call partial remission, the content was 47,000 and these figures all agree with the results of human assays of such livers in three other investigations, namely that the normal liver is about as good as hog or beef liver, the pernicious anemia in relapse liver is practically devoid of activity and the pernicious anemia in remission liver is active but not nearly so active as the normal human liver. So we have some functional evidence that he had pernicious anemia.

## CASE 21282

### PRESENTATION OF CASE

A fifty two year old Irish laborer entered complaining of abdominal pain of three days' duration. (An accurate history could not be obtained because of the condition of the patient.)

Three days before entry, early in the afternoon the patient developed generalized lower abdominal pain. This pain was his chief symptom and was severe enough to keep him awake at night. He had lost his appetite but had not vomited. His bowels had not moved during the past two days. He had been followed by a physician who had given him an enema the day before entry. There was no previous history of abdominal pain. He denied ever having been sick before.

Physical examination showed a very acutely ill man with a very foul breath. His tongue was dry. The heart and lungs were negative. The blood pressure was 100/60. His abdomen was very stiff and uniformly tender, not more on one side than the other. Rectal examination was negative. The reflexes were normal.

The temperature was 101.6°, the pulse 140. The respirations were 34.

No urine could be obtained on admission. The blood showed a white cell count of 34,000.

An abdominal x ray film showed no free air beneath the diaphragms. No fluid levels were seen in the unusual gas shadows of the abdomen.

About 4 liters of 5 per cent glucose was administered intravenously. Another attempt to

13 I think it is the experience of most people that the effect of liver extract in large doses in the non-pernicious anemia, macrocytic anemias—if any effect at all is noticed—is a very irregular one, and I doubt whether anybody has observed a true reticulocyte crisis with a specific gain of red cells and improvement of symptoms in any disease other than something like pernicious anemia. I have one functional test regarding this diagnosis that I will mention later.

DR ARLIE V BOCK Dr Richardson's diagnosis of leukemia seems to me to be almost impossible in view of the response to liver and the great regeneration of red cells. We look upon leukemia as a widespread bone marrow tumor involving with destruction of normal blood forming machinery and if it is a leukemia I should think it would be most unusual to get this response. I think he has two independent diseases.

#### CLINICAL DIAGNOSES

Lymphosarcoma  
Pernicious anemia?

#### DR WYMAN RICHARDSON'S DIAGNOSES

Acute leukemia (lymphoblastoma)  
Leukemic meningitis  
Symptomatic (secondary) pernicious anemia

#### ANATOMIC DIAGNOSES

Lymphoblastoma, ? giant follicular type, with involvement of the spleen, kidney, bone marrow and lymph glands  
Bronchopneumonia  
Septicemia, staphylococcus aureus  
Hydrothorax, bilateral  
Pulmonary edema  
Pulmonary atelectasis  
Pleuritis, chronic fibrous, left  
Arteriosclerosis, marked coronary, moderate aortic  
(Gout)  
Prostatic hyperplasia

#### PATHOLOGIC DISCUSSION

DR TRACY B MALLORY There is one prognosis which Dr Richardson made which is absolutely correct and the safest he could have made, that is that the pathologist would not be able to make a diagnosis. The one thing that most of us expected to find in this patient was a marrow full of cells whatever they might be, if he had pernicious anemia, megaloblasts, if leukemia, lymphoblasts or some form of lymphocyte. The rather surprising result of the autopsy was a completely aplastic bone marrow. I think you can see pretty readily with this low power that the fat cells have been almost entirely replaced but that the actual marrow cells are very few and far between. What makes up the great majority of the marrow is

a sort of gelatinous, edematous fibrous tissue, only here and there can you see a few small collections of marrow cells. I suppose the number of marrow cells is reduced to one-fiftieth or one-hundredth of the normal amount. In other words a very severe grade of aplasia or atrophy of the bone marrow is present.

The diagnosis of lymphoma had been made a few years ago and at that time it was considered to be of the sarcomatous type. On reexamination it is evident that the original diagnosis as to type is wrong, it should have been called giant follicular lymphoma rather than lymphosarcoma. That is a diagnosis with which many of you are probably still relatively unfamiliar. It is only within the last five years that we have been recognizing them. I have no doubt that, if we were to go back over our entire lymphoma material, we would pick up a great many cases that have been classed under other diagnoses.

Follicular lymphomas may logically be considered so nearly the reproduction of normal lymphoid tissue that true, albeit somewhat typical, follicles are found. For that reason it is easily missed and may be passed up as simple hyperplasia. In other instances the follicles are so numerous, so large, and so closely packed together that unless the specimen is carefully examined with a very low power their presence will not be recognized.

The general principle that well differentiated tumors are of low malignancy in comparison with poorly differentiated ones seems to hold for these neoplasms. Ewing goes so far as to regard some of them as benign, our own experience is that they always recur though the interval, as in this case, is apt to be a long one. Five to ten years of good health between primary tumor and death is by no means uncommon. In the recurrences the growth is not so typical and the differentiation is much poorer. That was the case here. Lymph nodes, spleen and kidney were extensively involved but only the kidney showed characteristic follicles.

The puzzle of the case lies in the bone marrow. Did the patient at one time have leukemic infiltration of his marrow so extensive as to displace all the normal cells? I feel that is a possibility since I have seen another case of leukemia—proved by bone marrow biopsy—come to autopsy with a totally aplastic marrow. Did he ever have pernicious anemia? The autopsy gives us no clue. Did he develop a primary aplastic anemia or a secondary one due to excessive x-ray or to Fowler's solution? Those possibilities certainly cannot be ruled out. My personal preference, however, lies with the hypothesis of leukemia. I should like to hear Dr Holmes' opinion. Could x-ray treatment produce this result in a normal marrow or in pernicious anemia, or do we have to assume that there was a lymphomatous involvement of the bone marrow first and the x-ray destroyed that

and left nothing behind? How do you feel about it, Dr. Holmes?

DR. GEORGE W. HOLMES I cannot definitely answer the question. Of course we do get anemias as an end result in these cases of leukemia that have been treated for a long time. Then there are cases of polycythemia which respond very readily to small doses of x ray showing that irradiation does affect the bone marrow. The question may well be raised but it cannot be answered at present.

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The temperature was 101.6°, the pulse 140. The respirations were 34.

No urine could be obtained on admission. The blood showed a white cell count of 34,000.

An abdominal x ray film showed no free air beneath the diaphragms. No fluid levels were seen in the unusual gas shadows of the abdomen.

About 4 liters of 5 per cent glucose was administered intravenously. Another attempt to

procure a urine specimen by catheterization three hours after the intravenous was unsuccessful. Only a few drops of mucus but no urine was obtained. He rapidly went downhill, became comatose and died approximately twelve hours after admission without having regained consciousness.

#### DIFFERENTIAL DIAGNOSIS

DR LELAND S. MCKITTRICK: The positive findings as I see them are severe generalized pain of three days' duration, and no nausea or vomiting in a man who had never been sick before, and whose bowels had not moved for two days. In addition to that we have an acutely ill patient with distress, dry tongue, blood pressure 100/60, which I assume to be the result of his collapse rather than a normal blood pressure, and who has the physical signs of peritonitis. He has passed no urine since his admission to the hospital.

The inability to get urine, and I presume we can assume that the catheter went into the bladder all right, might be due to one of three things: obstruction at the base of the bladder, so that no urine could get into the bladder, frank rupture of the bladder, or failure of the kidneys to excrete it. It is perfectly possible that it might be due to the fact that the kidneys were not excreting urine during the period between the last voiding and the time he was catheterized. I do not think we have anything here to make us assume that he had an obstructing lesion shutting off his ureters. One might say that he had a ruptured bladder with resulting peritonitis. I believe that if you catheterized such a bladder and there was no urine in it there would be blood in what was obtained. Therefore, I believe the inability to get urine was probably due to the fact that urine was not being excreted during the particular time between his last voiding and catheterization. If that is the case it might possibly be secondary to the terminal stages of an abdominal condition. There again without any more lead than we have in the history or physical examination one cannot do much more than speculate as to the cause of peritonitis which I also assume is present.

One may have a peritonitis of the chemical type such as occurs in acute pancreatitis from the bile and blood-tinged fluid, or it might have an infectious origin. I do not believe there is any reason for assuming it to be a chemical peritonitis. I do not believe he has acute pancreatitis because he is not distended, is not vomiting and has not the tenderness along the pancreas that usually occurs with pancreatitis. I do not believe it is blood in the peritoneal cavity because I cannot quite fit together an intelligent story which would give such a picture. If it is a septic peritonitis one might get it

either from perforation of an organ or from gangrene.

This is a rather unusual story for appendicitis with perforation and death. It is possible of course. It is the most common cause but where your cases are selected you cannot very well go on the law of chances. A ruptured diverticulum of the sigmoid or a perforated peptic ulcer might give the same picture. I am interested in the unusual gas shadows.

DR GEORGE W. HOLMES: There is not much to see in this film. It was taken probably with the patient lying on the back and might miss free air in the abdominal cavity. He evidently had a tube in the stomach. The shadow that you see on the left side is probably gas in some part of the gastrointestinal tract. We would not think it was particularly unusual. They do not say what was obtained with the stomach tube.

DR HENRY H. FAXON: Nothing of any great significance.

DR HOLMES: They do not say what results the physician got from the enema.

DR FAXON: The bowels had not moved for two days.

DR MCKITTRICK: That does not help very much. The onset certainly is not typical of a perforated ulcer.

DR FAXON: As I remember the story the present illness was more than three days. He had discomfort in the lower abdomen five days before and felt that the best thing to do was to take something for it. Accordingly he took a sufficiently substantial amount of liquor to become unconscious of pain and kept himself in that state for three days. When he became conscious he found the pain still there and again "loaded up" and carried on until the day of entry, when he was no longer strong enough to go out for any more, so his friends brought him a half pint of straight whiskey. That was one reason we could not get a better story. I think he had more pain than he complained of.

DR ROBERT G. GLENDY: Upon further investigation of the case after death I learned from the doctor who took care of him outside and who saw him three days before he came in here, that the pain was chiefly in the upper abdomen and that he had considerable precordial pain with some nausea and vomiting.

DR MCKITTRICK: I think we had better stop. It is getting more complicated. I still do not think that he had perforated ulcer. I cannot exclude it. I cannot exclude anything. I can only rationalize a little bit and be wrong. The other thing that presents itself to me is to try to coordinate the unusual complete anuria with the abdominal findings. With a pretty good cardiovascular system and good kidneys, this man could not have been as well so he said, never having been sick before, and have a com-

plete shutdown of the kidneys, without some very dramatic accident. He had a 34 000 white count. He is tremendously dehydrated and it does not mean much but I do think that one of the causes of a very short terminal illness, with obscure general abdominal pain and widespread evidence of peritonitis is peritonitis secondary to gangrene of the bowel. A mesenteric thrombosis to me would fit the whole picture of anuria and an early death after a relatively short and obviously very serious illness. I can only say that I believe the man has no mechanical obstruction to his ureters. I believe he died with a peritonitis. I believe his anuria is secondary to the peritonitis plus another fundamental process and my first choice as to the cause of his peritonitis would be a mesenteric thrombosis.

DR. FAXON. When he came in we felt he had a peritonitis. I think that we laid less stress on the failure to get a specimen of urine by catheter than has been brought out in the present discussion. I could not explain the picture but feeling that the man had peritonitis with the most likely etiology on the law of chances a ruptured appendicitis—although it was certainly atypical for that—we brought him to the operating amphitheater. His condition at that time was so critical it was obvious that operative interference would certainly end fatally so we felt that it was wiser to carry him along with intravenous therapy and see if he would respond. Instead of responding he went steadily and rapidly downhill without operation.

#### CLINICAL DIAGNOSIS

Peritonitis, ? cause

DR. LELAND S. MCKITTRICK'S DIAGNOSIS

Mesenteric thrombosis with secondary peritonitis and anemia

#### ANATOMIC DIAGNOSES

Aneurysm of the aorta, dissecting  
Hemorrhage into myocardium about right coronary artery

Central necrosis of liver  
Cloudy swelling of the kidneys

#### PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY. Obviously the data are entirely inadequate for a diagnosis on this case. At Dr. Faxon's suggestion we put in the only lead that there was and emphasized it a little bit. If we had had some of the information which Dr. Glendon has since picked up I think we could have given you a better story. What he had was a dissecting aneurysm of the aorta running all the way from the aortic ring down to the iliacs. Dissection did not extend down any of the branches of the abdominal aorta but I think it is fair to assume that they were probably functionally occluded by pressure at their mouths. The kidneys were not very remarkable grossly. Microscopically they show a diffuse cloudy swelling of the parenchyma. The most definite change and one which I think is strong evidence for circulatory insufficiency was found in the liver where the central two thirds of every lobule was completely necrotic. We have seen this lesion with particular frequency in cases of acute bleeding duodenal ulcer, so that I feel that we have good histologic evidence of insufficient circulation of the liver and suggestive though not certain histologic evidence of interference of circulation of the kidneys. I believe that is the only way in which the symptoms can be connected up. There was little or no blood circulating through the kidneys and consequently no urine was put out. The bladder and prostate were entirely negative.

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## LOVING DARKNESS RATHER THAN LIGHT

THE resolution asking for the appointment of a commission to study the condition of medical education in Massachusetts, which has been before a committee of the legislature for several weeks has, we understand, not met the approval of influential members of the Legislature. A full setting forth of the basis for this action has not been made public but a discussion of the matters involved is pertinent at this time.

Substantially the commission was to be a fact finding body. Possible objection might be raised on the grounds that the commission was incompetent or unnecessary or expensive. The actual objections were on the grounds of expense, prejudice on the part of the commission and lack of need for the investigation as expressed at the hearing. The question of expense need not be considered if the investigation were worth anything it would be worth the fifteen hundred dollars for clerical services as the commission was to be unpaid.

The question of competence does not need lengthy discussion. The commission was to consist of fifteen members: one senator, three representatives, two physicians appointed by the Governor, the Commissioner of Education, the Commissioner of Public Health, the Chairman of the Board of Registration in Medicine, and the deans of the six schools in Massachusetts from which graduates are accepted for examination for the practice of medicine. Until the persons were named and had served, no final judgment could be passed, but the proposed list represents grounds for a reasonable expectation that the report would be intelligent and intelligible.

The chief prejudice was shown by the opponents of the resolve who claimed that the proponents were "tyrants" and that the commission was "packed" against the "small schools", and in the nature of things could not render a fair report. This general insult was gratuitous and unwarranted.

The necessity for the investigation remains to be considered. Are investigations of educational institutions necessary? When? How? By whom? Why? Certainly investigations are necessary and the reports of college and university presidents indicate the self-critical spirit, sometimes a little severe, in which many of the activities of the institutions are reviewed annually. Sometimes a spirit of complacency and self-congratulation is evident, but the possibility for self-criticism exists, and although these documents do not usually receive wide circulation except among alumni, no effort is made to conceal them.

Occasionally there is investigation of another sort, as recently of the University of Chicago by the Illinois legislature. On report of alleged improper activities, it was made promptly and no improper activities were found. Another type of investigation has been made by organizations interested in medical education, because, and it is a matter of record, medical schools were purely commercial organizations in many cases. Commercialism in professional education is intolerable, and the force of public opinion, following the light thrown by these investigations, has caused nearly all of the commercial medical schools to disappear.

It is recognized in scientific circles that a determination of facts should precede action and the beneficial and stimulating effects of knowing the facts can hardly be overestimated. So in recent months there has been undertaken again a careful study of medical education in the United States and the report is expected within the next year. The report will not include schools of medicine or osteopathy which have refused to be surveyed.

Why should a school refuse to be surveyed? Why should it refuse to make known how it car-

ries on medical education, how it provides instruction for its students, how it upholds the ideals of the medical profession?

The recent attempt in Massachusetts to discredit education suggests, perhaps that these schools which refuse and apparently fear a survey, have such high standards that their pre-eminence would subject them to jealous attack. On second thought, however, it seems more probable that they fear exposure because they fear the result of the action of public opinion against matters discreditable.

If their records are clear they ought to be the first to demand a survey so that all men may know that they have been unjustifiably suspected of selling shoddy medical education, or of sharp practice or of something worse.

### PASTEURIZATION OF CERTIFIED MILK OFFICIALLY ACCEPTED

THE American Association of Medical Milk Commissions at its annual meeting in Atlantic City last month recorded two notable achievements, it elected Dr. Milton J. Rosenau as president and it unanimously accepted the pasteurization of certified milk as an official, although not an obligatory, procedure.

Dr. Rosenau, both as professor of hygiene at the Harvard Medical School and as an accepted leader in public health movements, has long been recognized as one of the uncompromising exponents of safe milk and clean milk. His election to succeed Dr. Hugh L. Dwyer, is a tribute to his leadership and a guarantee that the Association of Milk Commissions will continue to be as it has been in the past, a guiding spirit in the progressive improvement of the standards of milk production.

The fact that improvement in the production of so much of our milk supply has tended to lessen the vital importance of certified milk in certain of the uses of milk, such as infant feeding, must not cause us to lose sight of the fact that certified milk has for over forty years set a goal and served as a model in this improvement. Moreover, most of the more recent continued advances except for pasteurization, have been inaugurated by certified milk.

The certification of milk was created at a time when raw milk was considered as an asset, particularly in the feeding of infants, and the raw state was consequently considered as a sine qua non in its production. It may be that pride in the ability conscientiously to combine safety with rawness was one of the factors which delayed for so long the acceptance of pasteurization, in any event, for many years, according to the standards of the Association, certified milk could not be pasteurized milk.

In the face of this prejudicial fact it is a mat-

ter of interest and of considerable local pride that the Boston Medical Milk Commission, some four or five years ago, not only allowed but encouraged its producers to market certified pasteurized milk in defiance of the regulations of the Association, and put the stamp of its approval on the product. Some efforts were made to discipline our Commission for its revolutionary attitude but strong in its convictions it continued its independent course, and the matter was allowed to drop.

Acceptance of pasteurization was the wisest course for the Association to follow. Certified milk has a distinct place in the milk industry, and meets a distinct demand from the consumer for a milk produced as nearly ideally as possible, but without pasteurization, in this day when pasteurization is a household by word, it suffered an insuperable self-imposed handicap, except in such sections as our own where the tradition had been broken. With this handicap removed certified milk may continue to set the standard by which all good milk is produced.

The only unhappy note at the meeting this year was introduced by the resignation of Dr. Harris Moak, for a number of years the secretary and treasurer of the Association.

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

PHELPS O. DRAPER, A.B., M.D., Dartmouth Medical School 1907, F.A.C.S., Urologist, Worcester City Hospital, Cystoscopist, Memorial Hospital, Worcester, Assistant Surgeon, Holden District Hospital, Urologist, Belmont and Louis Pasteur Hospitals, Consultant in Urology, St. Vincent Hospital, Worcester. His subject is "Hemorrhagic Cystitis and Tuberculosis of the Prostate." Page 43. Address: 27 Elm Street, Worcester, Massachusetts.

LELAND, HAROLD L., M.D., Boston University School of Medicine 1917, F.A.C.S., Assistant Professor of Genito-Urinary Surgery, Boston University School of Medicine, Surgeon, Massachusetts Memorial Hospitals, Urologist, Lowell General and St. Joseph's Hospitals, Urologist, Lowell Cancer Clinic, Chief, Lowell Genito-Urinary Clinic. His subject is "Vesico-intestinal Fistula." Page 44. Address: 226 Central Street, Lowell, Massachusetts.

BALDRIDGE, ROBERT R., A.B., M.D., Harvard University Medical School 1925, Junior Assistant Visiting Surgeon and Surgeon to Out Patient Department, Rhode Island Hospital, Assistant Surgeon in Urology, Chapin Hospital, Providence, Surgeon to Rhode Island State Hospital. His subject is "A Case of Congenital



Hypertrophy of the Verumontanum" Page 46 Address 454 Angell Street, Providence, Rhode Island

MERRILL, EARL S B A, M D Harvard University Medical School 1920 F A C S Chief Surgeon Urological Service, Eastern Maine General Hospital His subject is "Hydronephrosis—Report of a Case" Page 49 Address 15 Forest Avenue Bangor, Maine

PEARSON, EDWARD L JR B S, M D Harvard University Medical School 1925 F A C S Urologist North Shore Babies' Hospital, Salem, and Lynn Hospital Lynn Assistant Urologist, Salem Hospital His subject is "Transurethral Resection of the Internal Sphincter in a Certain Type of Cold Bladder" Page 50 Address 33 Summer Street Salem, Massachusetts

CHUTE, RICHARD A B, M D Harvard University Medical School 1927 F A C S Assistant Urologist, Massachusetts General Hospital His subject is "The Recurrence of Benign Obstructing Prostates Years After Prostatectomy" Page 55 Address 352 Marlborough Street, Boston, Massachusetts

JENKINS RALPH H M D Medical College of Virginia 1916 F A C S Assistant Clinical Professor of Urology, Yale University School of Medicine Attending Urologist, New Haven Hospital Address New Haven Hospital, New Haven Connecticut Associated with him is

DEMING, CLYDE L B A M D Yale University School of Medicine 1915 F A C S Clinical Professor of Urology Yale University School of Medicine Then subject is "Crsts of the Testicle" Page 57 Address New Haven Hospital, New Haven Connecticut

BAUMGARTNER, LEONA A B, M A Ph D M D Yale University School of Medicine 1934 Instructor in Bacteriology 1926-1928 University of Montana Research Fellow, Kaiser Wilhelm Institute for Psychiatry, Munich, Germany 1928-1929 Assistant in Pediatrics, Cornell Medical College 1934 Her subject is "Edwin Klebs A Centennial Note" Page 60 Address New York Hospital, 525 E 68th Street, New York City

BOWMAN, KARL M A B M D University of California 1913 Assistant Physician, Bloomingdale Hospital 1915-1921 Chief Medical Officer, Boston Psychopathic Hospital 1921- Assistant Professor of Clinical Psychiatry, Boston University School of Medicine Special Instructor in Social Psychiatry, Simmons College School of Social Work His subject is "Progress in Psychiatry for 1934" Page 63 Address 74 Fenwood Road Boston Massachusetts

## MASSACHUSETTS LEGISLATIVE NOTE

### House 2245

Resolve providing for an investigation and study by the Commissioner of Public Health of the laws relative to public health and to the establishment and administration of a system of health insurance

Report, ought to pass, filed in House, July 3, 1935

Ordered to third reading in House and passed to be engrossed, July 8, 1935

Referred to next annual session in House July 9, 1935

## MISCELLANY

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## PREVIEW OF SCIENTIFIC PROGRAMS

SIXTY FOURTH ANNUAL MEETING  
AMERICAN PUBLIC HEALTH ASSOCIATION  
AND  
MEETINGS OF RELATED ORGANIZATIONS  
MILWAUKEE, OCTOBER 7-12, 1935

More than 2000 professional public health workers from every state in the Union, from Canada and from Mexico, will assemble in Milwaukee the week of October 7 at which time the following organizations will be in convention.

American Association of School Physicians  
International Association of Dairy and Milk Inspectors  
Conference of State Sanitary Engineers  
International Society of Medical Officers of Health  
Association of Dairy, Food and Drug Officials  
Conference of Wisconsin Health Officers

From scientific programs totaling 400 presentations on subjects timely in the fields of public health, preventive medicine and sanitation, a few of the highlights are selected

Mental Hygiene has been forging ahead so steadily in interest that an entire session will be devoted to it this year for the first time

Papers on Economic Consequences of Ill Health, on Health Department Functions—preventive, nursing, medical care, dental care, hospitalization and maternity care—and the Health Department Relationships to the Activities of the Welfare Department and of the Medical Profession will make up a program on the health department and the social security program. The contributors here will be health officers, economists, practicing physicians, welfare directors and officers of government

The Fifteenth Anniversary of the Association's Committee on Administrative Practice is to be commemorated by a program in which those who have been most intimately connected with its development will review its history and accomplishments, detail the present status of its work, and cast an eye ahead upon its hopes for the future

Dr E L Bishop, President of the A P H A. and Dr Walter E Brown, President Elect, are always worth listening to, speaking as they do from a wealth of practical experience and personal philosophy

Professional Education is the subject for discussion at a luncheon meeting on Wednesday. The committee is prepared this year to make some important announcements of policies. Particularly in view of the new personnel that will certainly be drawn into public health work with the passage of the Social Security Bill, the determination of what constitutes adequate preparation for a career in public health is of paramount concern

Another luncheon session, now traditional at Annual Meetings, is the one devoted to Diphtheria Immunization

The many allied organizations and special groups that meet with the American Public Health Associa-

tion add interest and variety to the proceedings. Joint sessions are being arranged by various Sections with the American Association of School Physicians, the International Association of Dairy and Milk Inspectors, the Association of Food and Drug Officials, the Conference of State Sanitary Engineers, the American Association of State Registration Executives, The Association of Women in Public Health, Delta Omega, Johns Hopkins, Massachusetts Institute of Technology and Harvard Alumni, and the Conference of State Laboratory Directors will dine lunch or breakfast and confer.

The ten Section programs reflect present day attitudes and are thoroughly infiltrated with social and economic significance. The federal health program is given a large share of attention and its possibilities and implications are thoroughly covered. The following subjects will indicate the breadth and scope of Section activity:

Public Health Significance of Poisonous Substances in Foods

A Planned Milk Control for State and Nation  
Standard Methods for the Examination of Shellfish

An Improved Agar for Use in Making Bacterial Counts from Milk

Proposed Changes in Standard Methods for Bacteriological Examination of Milk

Whooping Cough and Measles  
Mentality and Morbidity  
Pneumonia as a Community Health Problem  
Child Health at Different Levels  
Growth and Nutrition  
Health Training and Instructions in Schools  
Scarlet Fever  
Animal Diseases Affecting the Public Health  
Recent Progress in Biological Products  
Customer Demand for Vital Statistics  
Sanitation in Rural and Recreational Areas  
Air Conditioning and Industrial Health  
Occupational Diseases  
Present Status of the Vitamin B Complex  
Food Advertising under the Food and Drugs Act

Maternal and Neonatal Hygiene  
Adequate Health Service for the Child  
Commercial Advertising: Challenge to Health Education  
Community Organization for Health Education

FERA Problems

Typhoid Carriers

Institutional Outbreaks of Pneumonia

The preliminary program will be published in full in the September issue of the American Journal of Public Health

# LIST OF GRADUATES AND HOSPITAL INTERNSHIPS OF THE HARVARD MEDICAL SCHOOL CLASS OF 1935

Name	Hospital	Service	Dates
Appleton, F. M.	Mary Hitchcock, Hanover N. H.	Rotating	Jan. 36-Jan. 37
Barrow, W.	Mass. General, Boston	Surgical	July 35-Aug. 37
Bates, O. G.	Children's, Boston	Pathological	June 35-June 36
Beckman, W. W.	Mass. General, Boston	Medical	Jan. 36-Aug. 37
Bell, J. F.	{ Palmer Mem., Boston { Peter Bent Brigham, Boston	Surgical	July 35-Jan. 36
Bell, L. M.	Roosevelt N. Y. C.	Surgical	Feb. 36-July 37
Blenkowski, J.	St. Francis, Hartford Conn.	Surgical	Jan. '36-Jan. '39
Billo, O. E.	Lenox Hill N. Y. C.	Rotating	July 35-July 36
Bolanowski, K. J.	St. Luke's, New Bedford, Mass.	Medical	Jan. 36-Jan. 38
Botsford, T. W.	Children's, Boston	Rotating	July 35-July 36
Brenner, C.	Peter Bent Brigham, Boston	Surgical	Oct. 35-July 37
Caffee, H. H.	Duke, Durham N. C.	Medical	Oct. 35-July 37
Caldwell, C. W., Jr.	Bellevue N. Y. C. 4th Div.	Surgical	July 35-July 36
Campbell, E. C.	Mary Hitchcock, Hanover N. H.	Rotating	July 35-July 36
Campbell, J. B.	Children's, Boston	Surgical	Apr. '36-Jan. 38
Carponter, P.	Memorial, Pawtucket, R. I.	Rotating	Aug. 35-Aug. 36
Clark, S. D.	Hartford Hosp. Conn.	Rotating	July 35-July 37
Clement, D. H.	Boston City 4th Service	Medical	July 35-Jan. '37
Cogan, J. R.	Univ. of Chicago Hosp. Chicago Ill.	Medical	Jan. 36-
Cover, W. L.	Strong Mem., Rochester N. Y.	Medical	July 35-July 36
Cowan, A. W.	Presbyterian, Philadelphia Pa.	Rotating	July 35-July 37
Croce, E. J.	Worcester City Mass.	Rotating	May 35-May 37
Cunneen, J. V.	Salem Hosp. Mass.	Rotating	July 35-July 36
Curnen, E. C.	Children's, Boston	Bacteriological	June 35-June 36
Dawson, W. E.	Bridgeport Hosp. Conn.	Rotating	July 35-July 36
Donaldson, G. A.	Mass. General, Boston.	Surgical	Apr. '36-May '38
Dutton, R.	Worcester City Mass.	Rotating	Aug. '36-Aug. '37
Eddy, M. H.	Bellevue N. Y. C. 4th Div.	Surgical	Jan. '36-Jan. 38
Filmer, G. A.	Denver General, Colo.	Rotating	July 35-Jan. '37

Flannery, W E	Cleveland City, O	Rotating	July '35 July '36
Forster, D E	Johns Hopkins, Baltimore, Md.	Medical	July '35 July '36
French, T A	Mercy, Pittsburgh, Pa	Rotating	July '35 July '36
Friend, D G	Peter Bent Brigham, Boston	Medical	Oct '35 Feb '37
Frothingham, J G	Bellevue, N Y C, 1st Div	Medical	Jan '36 Jan '38
Getting, V A	Worcester City, Mass	Rotating	Nov '35 Nov '37
Giddings, P D	Children's, Boston	Surgical	July '35 Apr '37
Giffin, L A.	Bellevue, N Y C, 2nd Div	Medical	July '35 July '37
Greenleaf, H McC	Charles T Miller, St Paul, Minn	Rotating	July '35 July '36
Grundlav, J H	Marv Hitchcock Hanover, N H	Rotating	July '35 Jan '37
Gundersen, T E	Presbyterian, N Y C	Medical	Oct '35 Nov '37
Hadler, A J	Peter Bent Brigham, Boston	Medical	Feb '36 Nov '37
Hall, D T	Peter Bent Brigham, Boston	Surgical	June '35 Oct. '36
Hanford, R. B	Bellevue N Y C, 1st Div	Surgical	Jan '36 Jan '38
Hawkins, J W	Cincinnati General, O	Rotating	July '35 July '36
Henderson, J W, Jr	Beverly Hosp, Mass	Rotating	Aug '35 Aug '36
Hindman, D H	Beth Israel, Boston	Surgical	Feb '36 Mar '38
Hobbs, W	Abington Mem, Pa	Rotating	July '35 July '37
Holmes, J A	Mass General, Boston	Pathological	July '35 July '36
Holscher, E C	St Louis City, Mo	Rotating	July '35 July '36
Howard, G C	Hartford Hospital, Conn	Rotating	July '35 July '37
Jardine, R R	R I Hosp, Providence	Rotating	July '35 July '37
Jones, J F	St Luke's, Cleveland, O	Rotating	July '35 July '36
Jorgensen, G M	Gorgas, Ancon, Panama.	Rotating	July '35 July '36
Keane, G P	N E Deaconess, Boston	Pathological	July '35 July '36
Kendrick, M H	St Luke's, N Y C	Surgical	Jan '36 Jan '38
Kimball, S	Peter Bent Brigham, Boston	Medical	June '35 Mar '37
Kindschi, L G	Cleveland City, O	Rotating	July '35 July '36
Kinney, R	Bellevue, N Y C, 2nd Div	Medical	July '35 Jan '38
Kjellesvig, K. L	Lowell General, Mass	Rotating	July '35 July '36
Little, M H.	Bridgeport Hosp, Conn	Rotating	July '35 July '36
Manning, I H., Jr	Boston City, 2nd Service	Medical	Jan '36 July '37
Martin, A. G	Lankenau, Philadelphia, Pa	Rotating	July '35 July '37
McCune, W S	Mass General, Boston	Surgical	July '35 Aug '37
McKeen, H R, Jr	Denver General, Colo	Rotating	July '35 Jan '37
Meharg, J G	Philadelphia General, Pa	Rotating	July '35 July '37
Mellen, R H	Bellevue, N Y C, 3rd Div	Mixed	July '35 July '36
Miller, C. C	Palmer Mem, Boston	Surgical	July '35 July '36
Moore, S H, Jr	Albany Hosp, N Y	Rotating	July '35 July '36
Morgan, W A.	Springfield Hosp, Mass	Rotating	July '35 Jan '37
Mote, J R.	Mass General, Boston	Medical	Apr '36 Nov '37
Munce, R T	Peter Bent Brigham, Boston	Surgical	Feb '36 July '37
Nesbitt, S	Fifth Ave, N Y C	Medical	Apr '36 Apr '37
Nev, J	U of Chicago Clinics Ill	Medical	July '35 July '36
Norcross, J W	Mass General, Boston	Medical	July '35 Feb '37
Noves, R E	Latter Day Saints, Salt Lake City, Utah	Rotating	July '35 July '36
O'Brien, J V	Boston City, 1st Service	Surgical	July '35 July '37
Ogden O S	New York, N Y C	Surgical	July '35 July '36
Olcott, C, Jr	Roosevelt, N Y C	Surgical	Jan '36 Jan '39
Parsons, H	St Luke's, N Y C	Surgical	Jan '36 Jan. '38
Partington, P F	Huntington Mem, Boston	Med Research	Sept '35-Sept. '36
Pearman, R O	Cleveland City, O	Rotating	July '35 July '36
Pease, H B	Springfield Hosp, Mass	Rotating	Jan '36-July '37
Poland, W M	Mass General, Boston	Pediatric	Jan '36 Oct. '36
Pope, H G	Boston City, 2nd Service	Surgical	July '35 July '37
Posey, L C	Hillman, Birmingham, Ala	Rotating	July '35 July '36
Putnam, H M	Mass General, Boston	Medical	Oct. '35 May '37
Rauh, A. E	Mass General, Boston	Pediatric	Apr '36 Jan '37
Read, B S, Jr	Methodist Episcopal, Brooklyn, N Y	Rotating	July '35 July '37
Reinhardt, W I	Orange Mem, N J	Rotating	July '35 July '36

Reynolds O S	Charleston General W Va	Rotating	July 35 July 36
Rhea R. L., Jr	Hartford Hosp Conn	Rotating	July 35-July '37
Rhodes P H.	University St. Louis. Mo	Rotating	July 35-July 36
Richardson R. D	R I Hosp., Providence	Rotating	June 35-June 37
Roberts, Q. D	Boston City 4th Service	Medical	Oct. 35 Apr '37
Robertson, J E.	Peter Bent Brigham Boston	Medical	Feb 36 Nov 37
Rosenow El. C.	Faulkner Jamaica Plain Mass	Mixed	June 35-June '38
Ross R. A.	New Haven Hosp Conn.	Pediatric	Sept. 35-Sept 36
Ross R. L., Jr	Boston City 5th Service	Surgical	Mar 36-Mar 38
Rutherford F W	Childrens Boston	Surgical	Jan. '38 Oct. 37
Saunders, G A.	Mass General Boston	Medical	Apr 36-Nov 37
Saxe, I. H	Both Israel Boston	Pathological	July 35-July 36
Shepard K			
Sheridan, W M.	Bellovno N Y C., 1st Div	Surgical	July 36-July 37
Shorman, R. S.	Memorial Pawtucket R. I	Rotating	Aug 35-Aug 36
Shields, J J	Gormantown Philadelphia Pa.	Rotating	July 35-July 37
Simpson H N	Fifth Avenue N Y C.	Medical	Oct. 35-Oct. 36
Starrall H	University Ann Arbor Mich	Surgical	July 35-July '37
Snow R. G	Alameda Co., Oakland Calif	Rotating	July 35-July 36
Snyder J C	Mass General Boston	Surgical	Oct. 35-Nov 37
Soule G W	R. I Hosp Providence	Rotating	Feb 36-Feb 38
Soutter L.	Presbyterian N Y C	Surgical	Feb 36-Mar '38
Stafford D E.	King Co Seattle Wash	Rotating	July 35-July 37
Strachan H L. Jr	Springfield Hosp., Mass.	Rotating	July 35-Jan 37
Sunderland D A	Boston City	Pathological	July 35-July 36
Talmadge, S M	Mass General Boston	Surgical	Apr 36-May 38
Tanner D W	San Francisco General Calif.	Rotating	July 35-July 36
Thornley W F	Newark City N J	Rotating	Jan 36-Jan 35
Todd T C	Presbyterian N Y C	Pathological	(Voluntary)
Toole, A. F	Presbyterian Philadelphia Pa.	Rotating	July 35-July 37
Truax H.	New York N Y C.	Surgical	July 35-July 36
Wallbank W L.	Mercer Trenton, N J	Rotating	July 35 July 36
Warner F A.	Baltimore City Md.	Rotating	July 35-July 36
Warner J H., Jr	Mass General Boston	Medical	Jan 36-Aug 37
Watkins, A. L.	Peter Bent Brigham Boston	Medical	June 35-Mar 37
Webb H.	Henry Ford Detroit, Mich	Surgical	Sept. 35-Sept. 36
Webster G T	University Cleveland O	Medical	Mar '36-Sept. 37
Weir W C	Faulkner Jamaica Plain Mass.	Rotating	June 35-June 36
West, F J	Worcester City Mass.	Rotating	June 35-July 37
Wheeler C. A	Mass. General Boston	Surgical	Jan. 36-Feb 38
Whitelaw G P	Mass. General Boston	Surgical	Oct. 35-Nov 37
Whitfield R. D.	Peter Bent Brigham Boston	Surgical	Oct. 35-Mar 37
Woolley P V., Jr	Childrens, Boston	Bact. & Path	July 35-July '36
Yeomans A.	Presbyterian N Y C.	Medical	Feb 36-Feb 38

## THE NATION'S BIRTH RATE

The report from Washington as published by the Bureau of the Census shows that there were 2,158,919 live births in this country in 1934 a rate of 17.1 per 1000 population which is an increase over 1933 when the rate was 16.6

The three Pacific Coast States had the lowest rate. The high rates were in the Southern States and West Virginia.

The infant mortality for the whole country rose from 58.1 per 1000 live births in 1933 to 59.9 in 1934

## STATISTICS FOR NEW ENGLAND

	Live Births			Deaths Under 1 Year			Stillbirths		
	Number	Per 1000		Number	Per 1000		Number	Per 100	
		Estimated	Population		Live Births			Live Births	
		1934	1933		1934	1933		1934	1933
Connecticut	22 215	18.4	13.6	1 085	48.8	48.4	624	2.8	2.8
Maine	15 719	19.6	18.9	1,112	70.7	60.3	557	3.5	3.7
Massachusetts	63 828	14.7	14.7	3 164	49.0	52.0	1,972	3.1	3.4
New Hampshire	7 869	16.7	15.7	478	60.7	55.0	242	3.1	3.6
Vermont	6,593	18.3	17.0	347	52.6	52.0	217	3.3	3.1

COMPARISON OF DISEASE INCIDENCE IN CONNECTICUT WITH 1934  
AND SEVEN YEAR AVERAGE

MONTH ENDING JUNE 22, 1935

Diseases	1935				Average cases reported for week corresponding to June 22 for past seven years	1934			
	Week ending June 1	Week ending June 8	Week ending June 15	Week ending June 22		Week ending June 2	Week ending June 9	Week ending June 16	Week ending June 23
Cerebrospinal Men	—	1	—	1	—	—	2	2	—
Chicken Pox	94	197	130	101	81	113	145	166	84
Conjunctivitis Inf	4	5	34	—	—	—	1	—	—
Diphtheria	7	5	2	6	9	—	4	3	6
Dysentery Bacillary	—	—	2	1	—	—	—	1	—
Encephalitis Epid	—	1	—	—	—	—	—	—	—
German Measles	257	375	323	247	21	6	13	9	6
Influenza	—	3	1	—	—	1	1	—	—
Malaria	—	—	—	—	—	1	—	—	—
Measles	592	761	667	361	173	183	260	210	178
Mumps	62	39	33	23	50	79	64	88	51
Paratyphoid Fever	—	11	5	—	—	—	—	—	1
Pneumonia (Broncho)	18	14	17	12	11	10	7	13	9
Pneumonia (Lobar)	34	28	19	17	15	13	15	6	10
Poliomyelitis	—	—	—	1	—	—	—	—	—
Scarlet Fever	96	64	77	46	35	41	31	41	17
Septic Sore Throat	6	6	5	9	2	4	5	—	4
Trichinosis	—	—	—	—	—	1	1	—	—
Tuberculosis (Pul)	48	31	35	34	28	29	28	29	21
Tuberculosis (O F)	4	1	1	5	3	1	4	3	1
Typhoid Fever	2	2	2	1	1	—	2	1	—
Undulant Fever	1	—	—	—	—	—	—	3	—
Whooping Cough	44	65	62	49	49	28	65	75	52
Gonorrhea	31	33	40	15	37	42	28	82	31
Syphilis	43	43	46	41	66	47	48	54	31

Remarks No cases of Asiatic cholera, glanders, plague or yellow fever during the past seven years

## CORRESPONDENCE

AN EARLY PLAN FOR PREPAID  
HOSPITALIZATIONEditor, *New England Journal of Medicine*,

If anyone thinks that a monthly or annual payment to insure hospital care in case of need is a new and novel proposition, it may be of interest to note that on January 1, 1867 Rt Rev John J Power established in Worcester a hospital of a few beds under control of the Sisters of St Anne's Convent—"to encourage providence and maintain self respect" a trifling monthly sum was required by which one became entitled to a bed and nursing in time of sickness, or to quote from the announcement "By payment of \$3.00 any person may secure the right to a bed with doctor's care, nursing and medicine for one year"

This was the first general hospital in Worcester

Yours truly,

SAMUEL B WOODWARD, M D

58 Pearl Street, Worcester, Mass

## RECENT DEATH

**TURNER**—MAURICE WORCESTER TURNER, M D, aged seventy eight, of Brookline, Mass, died at his home, 788 Washington Street, June 29, 1935

Dr Turner was born in Brooklyn, N Y, the son of Dr John Turner and Emma Worcester Turner. He graduated from the Boston University School of Medicine in 1889 and soon after settled in Brookline. He filled the chair of Theory and Practice of Medicine in his Alma Mater and was associated with Dr Conrad Wesselhoeft in the Department of Pathology and Practice of Medicine. He served on the staff of the Massachusetts Homeopathic Hospital and was a member of the Board of Trustees of the New England Baptist Hospital. In 1911 he was President of the International Hahnemannian Association and held membership in many homeopathic societies.

He was a Mason, Secretary of the Massachusetts Order of Founders and Patriots of America, and at his death was secretary of this body.

his second year as President of the Sons of the Revolution of Massachusetts at the time of his death.

He is survived by his widow Mrs Abby R (Corliss) Turner and a daughter Mrs Fred B Maynard, of Arlington

## REPORTS OF MEETINGS

### WILLIAM HARVEY SOCIETY

Dr Jonathan O Meakins president of the American College of Physicians addressed the William Harvey Society at its meeting of April twelfth at the Beth Israel Hospital His subject was Cardiology During the Past Three Hundred Years—The Legacy of William Harvey Dr Cadis Phipps presided.

Doctor Meakins briefly reviewed some of the important data in the history of medicine Michael Servetus both a theologian and a scientist of the mid sixteenth century was the first to describe the pulmonary circulation Many of his conclusions were based on direct observation and were an example of the thought and reasoning of his time He did not divorce himself from the idea of the spirits of the body which Galen had promulgated By order of Calvin he was burned at the stake because of his religious theories.

Father Paul may have been acquainted with the valves of the veins but Fabricius was the first to publish a description of them William Harvey after fourteen years of study under Fabricius was thoroughly convinced of the circulation of the blood from the right heart to the lungs and back to the heart where it was pumped into the general circulation His was the first comprehensive investigation of the circulation and his facts were collected from direct observation and experimentation He wrote a masterly discussion of this system and gave his proof for his beliefs Although the book was announced in 1616 it was not published until 1628

At this time the era of experimentation was in full sway in Great Britain. Bacon was a contemporary of Harvey and insisted on experimental observation as the safe method of investigation. After the publishing of Harvey's book his theories received much opposition and his practice fell off greatly

Malpighi was born in 1628 and during his lifetime carefully investigated the mysteries of the capillaries During the next century and a half numerous scientific discoveries were made and by 1650 many intellectuals had banded together for help advice and work. They met weekly in London to discuss philosophical and scientific matters Among other members were Christopher Wren architect, and Robert Boyle physicist.

William Harvey's work was enthusiastically received by the following generation, and further study of the circulation and respiration was carried out. Malpighi with his microscope studied the lung of dogs and demonstrated the small air sacs and their

relation to the capillaries which ran between the arteries and the veins Respiration was thoroughly investigated by several men The change in the color of the blood as it passed through the lungs was shown to be due to a substance which was absorbed in the lungs This great wave of investigation swept away much of the supposed knowledge of Galen and Hippocrates Harvey's legacy consists of the following first, the overthrow of the authority of the past secondly the introduction to the use of hypotheses proved by experimental observation and thirdly the use of man and lower animals to obtain experimental data. For some time after the activity of this era men's minds sank into a sort of lethargy and it was a hundred years after Harvey before there was another important step in the description of the circulation Stephen Hales a clergyman measured the blood pressure and studied the capillaries and their power to dilate and contract. He showed that brandy and certain other drugs could cause a contraction of the capillary vessels and gut, although his observations were not generally accepted for many years In the eighteenth century Lavoisier demonstrated that the act of respiration removed a part of pure air and gave off carbon dioxide. He showed that nitrogen played a most active part. He suggested that the name oxygen be given to this necessary constituent of air and he isolated it in pure form Over a hundred years later Haldane demonstrated the importance of carbon dioxide in the regulation of the respiration

In recent times there has been a rebirth of experimental observation in medicine Sir James McKenzie put cardiac disease on a rational clinical basis His chief work was done before the time of x-ray and the electrocardiogram In 1896 the sphygmomanometer was introduced clinically

Doctor Meakins showed several interesting slides to demonstrate his lecture

### AMERICAN MEDICAL EDITORS AND AUTHORS ASSOCIATION

Atlantic City June 15 1935

The sixty-sixth annual convention was called to order by the President, Dr Dean Lewis, who introduced the Guests of Honor

Hon Harry Bacharach Mayor of Atlantic City welcomed the membership and presented the Association with a key to the City The other Guests of Honor Hon Edward A. Kenny U S Congress Hon. Shirley Wynne M D former Commissioner of Health and Hon. S. S Goldwater M.D., Commissioner of Hospitals New York, were next introduced.

Dr Frederick L. Patry psychiatrist of the New York State Department of Education made a plea for the family physician to increase his knowledge of psychiatry in order to handle more scientifically cases of neurosis due to family friction. Doctors A. A. Brill New York psychoanalyst, and K. Winfield Ney New York Brain Surgeon, added to Dr Patry's suggestion by citing many cases and



examples of the results following the proper use of psychiatry in such cases

Dr Shirlev Wynne told the Association that it was inevitable that a realignment would occur relative to the way medical service would be distributed in the future. At present it is a question whether there will be voluntary or compulsory insurance. State Socialized Medicine looms in the background.

The problems of the Medical Editor were handled by Dr George Lake, Editor of *Clinical Medicine*. Much enthusiasm was developed concerning his copyright plan to eliminate the throw away journals. He stated that Editors should cooperate with the efforts of the Association in their behalf.

The problems of the Medical Publishers were cleverly handled by Mr Paul Hoeber. His address gave an answer to many authors as to why contributions which they considered par excellence were not accepted for publication.

After a get-together luncheon, Dr S S Goldwater told the Association of the Hospital Problems he had to contend with. He said that the institutions needed \$10,000,000 to continue their work and added that facilities were particularly inadequate for the care of chronic and venereal patients. He said that with the majority of internes receiving but little money from home, owing to the depression and getting no salaries, they were finding it difficult to continue their training.

Dr De'n Lewis, President of the Association, addressed the Congress on "Improving the Quality of Medicine." In his address which members will long remember he touched on the subject of fee splitting—a practice he abhorred but would condone if done openly. He said that those who wanted to split fees invariably insisted on secrecy.

Dr H Lyons Hunt, Director General of the Association, closed the program with a report on the financial status and informed the Convention that since Jan 1, 1935, 220 men were proposed for membership in the Association, of which number 48 had been elected.

At the close of the convention, a resolution was passed putting the Association on record as "basically and fundamentally opposed to State medicine, because it lessens the efficiency of service to the public and the dignity of the profession."

#### SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

##### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, JULY 15, 1935

Wednesday, July 17—

\*12 M. Clinico-Pathological Conference Children's Hospital

Thursday, July 18—

\*12 M. Clinico-Pathological Conference Massachusetts General Hospital

Saturday, July 20—

\*10-12 Staff rounds at the Peter Bent Brigham Hospital. Open to practicing physicians

\*Open to the medical profession

\*Open to Fellows of the Massachusetts Medical Society

August 29 - September 5—Latin American Congress of Physical Therapy, X-Ray and Radium. For information address Dr Madge C L McGuiness, 1211 Madison Avenue, New York City

October 7-10—American Public Health Association will meet in Milwaukee, Wisconsin. For information address the American Public Health Association, 50 West 50th Street, New York City

October 21 - November 2—1935 Graduate Fortnight of the New York Academy of Medicine. See page 898, issue of May 9

October 28 - November 1—The Twenty-Fifth Clinical Congress of the American College of Surgeons. See page 1065, issue of May 30

#### BOOKS RECEIVED FOR REVIEW

Report of the Committee for the Investigation of Sterilization. Boston. American Neurological Association. 132 pp

The Story of Medicine in the Middle Ages. David Riesman. 402 pp. New York. Paul B Hoeber, Inc. \$5 00

Précis de Thérapeutique et de Pharmacologie. Septième Edition. A. Richaud et R. Hazard. 1257 pp. Paris. Masson et Cie, Éditeurs. 100 fr

Medical Practitioners in the Diocese of London. J. Harvey Bloom and R. Rutson James. 98 pp. Cambridge. The University Press. \$1 75

Studies from The Rockefeller Institute for Medical Research. Reprints. Volume 93. 593 pp. New York. The Rockefeller Institute for Medical Research

The International Medical Annual. A year book of treatment and practitioner's index. 1935. Fifty-Third year. Edited by H. Letheby Tidy and A. Rendle Short. 522 pp. Baltimore. William Wood & Company. \$6 00

Diagnosis and Treatment of Skin Disease. Including the care of the normal skin. Jacob Hyams Swartz and Margaret Gilson Reilly. 316 pp. New York. The Macmillan Company. \$3 50

The Autonomic Nervous System. Anatomy, Physiology, and Surgical Treatment. James C. White. 386 pp. New York. The Macmillan Company. \$7 00

The Diseases of the Endocrine Glands. Hermann Zondek. Third Edition. Translated by Carl Prausnitz. 492 pp. Baltimore. William Wood & Company. \$11 00

Apparatus and Technique for Roentgenography of the Chest. 1935. Charles Weyl and S. Reid Warren, Jr. 166 pp. Springfield and Baltimore. Charles C. Thomas

Child Psychiatry. Leo Kanner. 527 pp. Springfield and Baltimore. Charles C. Thomas. \$6 00

The Surgical Clinics of North America. June, 1935. Volume 15, Number 3. Chicago. Number 782 pp. Philadelphia and London. W. B. Saunders Company. Paper, \$12 00, Cloth, \$16 00 net.

## BOOK REVIEWS

**Gynecology** Brooke M Anspach Fifth Edition  
With the assistance of Phillip F Williams and  
Lewis C Scheffey 832 pp Philadelphia and Lon-  
don J B Lippincott Company \$9 00

Here are 812 pages of lucid fluent text obviously written by a scholarly cultured gentleman. There are 769 excellent illustrations accurately informative and conveniently placed. This is especially true of the many diagrams and drawings of operative procedures. The detailed completeness of this book, with its utter lack of verbosity and irrelevancy is most impressive. In addition to gynecology there are five chapters of female urology and two of diseases of the rectum. There is an incomparable sixteen-page discussion of backache perhaps the commonest complaint of women. The turbulent subjects of endocrinology menstruation and sterility are presented with erudite conservatism. Consideration of radium and x-ray is adequate for those equipped mentally and instrumentally for their use. Of the main body of the text these portions already mentioned are perfect samples. It is a most excellent book of which the authors should be exceedingly proud—a book well worth purchase and study.

**La Renaissance de la Médecine Humorale** Auguste Lumière 204 pp Lyon Imprimerie Léon Bézanne

This book is by the author of an impressive list of tomes (twenty-three in all) which have dealt largely with a unified theory of disease, and of course a simple system of therapy based on that theory. All disease the theory has it, is based upon a disturbance of the colloids of the body usually in the nature of a flocculation mechanism which in turn is dependent upon humoral instability. The author frankly admits the priority of the ancients in this concept and in his most important chapter (to the reviewer) discusses the various changing views from the times of Hippocrates to the present regarding the importance of the humors in pathological states. He bemoans the fact that the monumental work *Le Nouveau Traité de Médecine* comprising twenty-two volumes and written by fifty-two eminent physicians alludes in no single word or phrase to this important theory.

The second chapter of the volume is devoted to an analysis of the reasons behind the abandonment of "humorism" and the necessity for a quick return because here lies the key to pathologic and therapeutic enigmas. Lumière's theory is based upon the fact that all bodily cells and the circulating fluids are composed of substances present in colloidal states. Life itself according to Lumière is a colloidal set up which, if disturbed results in disease if destroyed in death. Colloidal flocculation results in the sudden entrance into the blood stream of insoluble particles and thus in the symptoms of acute disease. These sudden changes are frequently so slight as to pass unnoticed. Certain

organs however acquire a hypersensitivity to these slight bombardments i.e. in the bronchopulmonary system attacks of asthma may develop. With knowledge of these mechanisms "the mysteries of therapeutics vanish completely."

The process of treating these abnormal humoral states is of the simplest. The author cites the following methods by which the humors may be modified: injections of magnesium hyposulphate, cobalt, colloidal mixtures and hypertonic solutions, hydration and dehydration, hemolysis, hyperthermia, modification of the pH of the blood etc. Magnesium hyposulphate in 10 per cent solution given intravenously is recommended most highly. The book is completed by a series of 28 clinical cases illustrating twenty-six therapeutic triumphs and by these words "Rational and efficacious humoral therapy of the type we have founded inaugurates a new medical epoch." The reviewer sincerely hopes so but is not quite fully convinced.

**Blood Groups and Blood Transfusion** Alexander S Wiener 220 pp. Springfield and Baltimore Charles C Thomas. \$4 00

This book should receive nothing but unequalled approval. It is without doubt the most scholarly and detailed work on the subject of the blood groups in the English language and compares favorably with the German monographs on the subject by Steffan and Schiff. The book may be read with profit by both the beginner and the student who is well versed in the field since it takes up first principles in great detail and yet delves deeply in the complexities of heredity of the blood groups with the associated subjects of genetics and biometrics. About one-half the book is devoted to individual and species differences in blood groups and much that is new is included particularly in the sections relating to the agglutinogens M and N of Landsteiner and Levine. The latter workers found in addition to the four well known blood groups that human blood could still further be distinguished by the presence or absence of the new "agglutinogens M and N." Wiener has done a great deal of investigative work on these interesting factors paying particular attention to their medicolegal applications. Whereas when the ordinary blood groups are used the chances of establishing paternity of a child etc. is only about 1 in 6, the addition of test sera containing agglutinogens M and N raises this chance to about 1 in 3. Unfortunately the preparation of types M and N serum and the interpretation of the reactions obtained with unknown samples of blood are both very difficult and to be entrusted only to an undoubted expert in this very narrow field. Wiener has stimulated much interest in the matter and it is probably due at least partly to his work that the New York State Legislature recently passed a law requiring blood grouping tests in all cases of disputed paternity.

The book is exceedingly well printed on good stock

and contains a wealth of references and a good index. There are fifteen pages devoted to the technique of blood transfusion. The writer should be congratulated upon his complete mastery of this rather intricate subject and the book deserves to be made the standard work of reference in the field of blood groups.

**Psychology and Health** H. Banister. 256 pp. New York. The Macmillan Company. \$2.50.

This is another book by a psychologist on a subject much of which seems to be beyond his ken. Were life and its adjustments all psychology, a psychologist might perhaps adequately handle the topic of psychology and health, but health involves a physical body, subject to traumata, infections, maldevelopments, and malnutrititions, and all the adaptive compromises in physical and mental activities subsequent to the temporary or permanent deletions of function which befall an individual.

The author, watching the gyrations of the tail, forgets too much the dog. He writes well of the inadequacies and fallacies of the theories of Janet, Freud, Jung and Adler. His own theory of sentiment formation is hardly more than a different mode of expressing the thesis that the highest function of the human brain is correlation, which is expressed by an individual in terms of judgment and wisdom.

It is unfortunate that among much that is well said although not new, there appear remarks open to question such as the following: "I do not believe that any breakdown has ever been caused by a study of psychopathology although in certain instances a breakdown may have been precipitated. This I consider a good rather than an evil thing, for the earlier the collapse the greater the chance of permanent recovery." With a greater knowledge of psychiatry it is doubtful if the author would be ignorant of the facts that no mental breakdown is so simple as to be attributable to a single factor and that often the earlier a mental breakdown occurs in life the more difficult is the chance of permanent recovery.

**Failure of the Circulation** Tinsley R. Harrison. 396 pp. Baltimore. The Williams & Wilkins Company. \$4.50.

Harrison divides failure of the circulation into three types—hypokinetic, hyperkinetic and dyskinetic. The first is more commonly known as shock or collapse, the second as effort syndrome, and the third as organic heart disease leading to congestive failure. He discusses these syndromes in twenty-nine chapters and ends with five chapters describing Mixed Types of Circulatory Failure, Failure of the Coronary Circulation and a Summary.

The book is more a work of reference with a review of literature, and a discussion of physiology than a clinical textbook. It is not a book which would be easy reading for one who was not familiar

with the modern physiology of the circulation. However, this makes it all the more worthy of careful study, for the material in it frequently provides explanations for conditions in circulatory mechanics which physicians find obscure or which they have been content to dismiss without an adequate analysis. One subject which is well covered is the mechanism of congestive failure and a strong case is made for an explanation of it on the basis of "backward failure" as described by James Hope 100 years ago, with increase in venous pressure in either greater or lesser circulation, as opposed to the "forward failure" concept which attributes congestive failure to reduced cardiac output with peripheral anoxemia. Explanations of the genesis of various symptoms and signs such as cardiac hypertrophy and dilatation, dyspnea, Cheyne-Stokes respiration, cardiac asthma, and edema are unusually detailed and the logical presentation of them is very satisfying to one interested in causation. Therapy is less fully considered but the discussion of digitalis is interesting. The author's conclusions that a normal heart rate constitutes tachycardia for the hypertrophied heart, with its difficulty in cellular metabolism of its enlarged fibres, seems well borne out by clinical experience. So too is his decision that "the dilated heart is an inefficient pump for, though it may supply an adequate amount of blood to the tissues, it expends excess energy in order to carry on this work. Heart failure is to be attributed, in the main, to inefficiency rather than to insufficiency of the myocardium."

This book is to be recommended to anyone wishing a summary of the physiology of heart failure in which clinical observations are integrated with an historical survey and experimental data.

**Rats, Lice and History** Being a study in Biography, which, after twelve preliminary chapters indispensable for the preparation of the Lay Reader, deals with the life history of Typhus Fever. Hans Zinsser. 301 pp. Boston. Little, Brown & Company. \$2.75.

The keynote of this book may be found in the following sentence: "Swords and lances, arrows, machine guns, and even high explosives have had far less power over the fates of the nations than the typhus louse, the plague flea, and the yellow-fever mosquito." The general theme developed by Dr. Zinsser in this most readable account is the rôle that epidemic disease has played in the history of civilization. The earlier chapters cover various of the great epidemics of the past and touch briefly on their effect on contemporary history. On the skeleton of dullest facts he builds, through his literary style, a pleasant flesh which makes an attractive form. Some readers will recognize the first chapter as one that they had already encountered in the pages of the *Atlantic Monthly*, in which Dr. Zinsser pays his respects as an ardent scientist to modern literature.

**Clinical and Pathological Applications of Spectrum Analysis** Walther Gerlach and Werner Gerlach  
143 pp London Adam Hilger Limited

This is a very useful short practical manual on the clinical and pathological applications of spectrum analysis. The book is essentially a section of 'Die Chemische Emissionspektalanalyse' by Drs Walther and Werner Gerlach translated by Joyce Hilger Twyman and adapted to pathological and forensic problems. Exclusive of the excellent bibliography and index the text comprises about 130 pages devoted mainly to a description of technical procedures. There are included concise discussions of possible variations in technique and of various pitfalls and precautions to be observed.

After describing various light sources and the operation of the optical apparatus the book discusses procedures suitable for taking spectrograms of various types of material. These include the analysis (qualitative and quantitative) of organs, secretin and excreta for the presence of metals and mineral substances. Detailed spectrograms are given for gold, silver, copper, bismuth and lead. The application of the method to specific problems of industrial or forensic importance is interestingly illustrated. Among these are the detection of silicon and aluminium in the lung from pneumoconiosis, the finding of mercury in the urine and the identification of metals in bullet wounds at the site of entrance. There are also useful analysis tables for testing the purity of metals.

The book is tastefully arranged and pleasing in appearance. It should be welcomed especially by workers in toxicology and in the laboratory study of industrial disease. It is particularly valuable to analytical chemists who wish to concentrate upon a highly specialized technique which promises an increasing utility.

**What You Should Know about Heart Disease** Harold E. B. Pardee Second Edition 127 pp Philadelphia Lea & Febiger \$1.50

This small volume is written for the layman with or without heart disease and is intended to clarify his knowledge of etiology, anatomy, physiology, treatment and prognosis to the end that a better co-operation with the physician may be secured. As is the case with all such books the author has to steer carefully through the sea of controversial matter and in this instance to present what is still unprobed about heart disease only moderately colored with his own point of view. That he is successful in this seems clear and the patient is given enough knowledge and caution to prevent a desire to be his own doctor. In addition to a discussion of causation of heart disease and its manifestations there are chapters on Exercise, Treatment and Climate and Surgical Risks. Some viewpoints do not conform entirely with those of Boston cardiology. Especially notable is the failure to divide the effects of hypertension on the heart from those of coronary arterio-

sclerosis as in the statement that "neither diabetes nor high blood pressure will harm the heart unless the arterial branches supplying blood to the heart muscle are especially affected by arteriosclerosis. Also lead and alcohol are considered as the most important chemical poisons causing arteriosclerosis. Tobacco is thought to be much less harmful."

While the toxic effects from digitalis are well described the unpleasant and at times alarming symptoms from nitroglycerine are not mentioned. The importance of contraceptive advice for women with heart disease is not considered and chloroform is advised as an induction anesthetic to precede either in surgical operations.

This is a book to recommend to certain patients who demand more detail about their disease than can sometimes be discussed in the limited time of an office consultation and will be found helpful in the emphasis of important directions in the conduct of their lives.

**Diseases of the Mouth and Their Treatment** A text book for practitioners and students of medicine and dentistry Hermann Prinz and Sigmund S. Greenbaum 602 pp Philadelphia Lea & Febiger \$9.00

This volume is presented as a textbook for practitioners and students of medicine and dentistry with an effort made to treat the entire subject matter as a medico-dental problem. This approach makes the book a welcome addition to stomatological literature. The chapters dealing with the oral manifestations of metabolic disturbances of blood dyscrasias of avitaminosis and of the ductless glands of infectious diseases, tropical diseases, animal parasites and skin diseases bring together scattered information on this important but neglected subject and should serve as a convenient and reliable guide for both physician and dentist. These chapters especially will help to clarify some of the many borderline conditions—(The No-Mans Land) which exist between the practice of medicine and dentistry. For this effort alone the book should be highly commended.

The authors have made much freer use of European literature than is common among American writers and this influence is apparent for many dentists of Europe take the full medical training.

This book with its rather different objective should find its way into the libraries of physicians and dentists interested in modern stomatology.

**Stammering and Allied Disorders** C. S. Bluemel 182 pp New York The Macmillan Company \$2.00

The author believes that "the problem of therapy is simplified if the mechanics of speech are disregarded and if attention is directed to the neurophysiology of speech—one might almost say the biology of speech—in which the production of the

**Economic Problems of Medicine** A C Christie 242 pp New York The Macmillan Company \$2 00

The author brings together in this book abstracts from the studies of the Committee on the Costs of Medical Care, the report of the Commission on Medical Education, and similar material. His discussion of the data is, on the whole, open minded and judicial although at times he emphasizes certain aspects of specific matters without a similar consideration of opposing points of view. One feels in some places a defensive attitude with reference to the medical profession. He makes a strong plea for greater interest by physicians in preventive measure and indicates quite clearly the advantages of the extension of private practice into this field.

The reviewer is not entirely sympathetic with his attitude with reference to the place of hospitals in medical practice feeling that he is unduly critical of the extension of work by the hospitals in taking care of the sick.

His final chapter which discusses a comprehensive plan for medical care, presents clearly and sympathetically various steps in such changes as would seem to be inevitable.

Particularly to be commended throughout his book is the insistence on the need for coöperation between the medical profession and lay individuals and groups interested in improving the quality of medical care. He rightly emphasizes the need of leadership by the medical profession in developing plans which look toward the extension of the benefits of medical science to all groups in the community and the provision of adequate compensation for those rendering the service.

**Diseases of the Rectum and Colon and Their Surgical Treatment** J P Lockhart Mummery Second Edition 605 pp Baltimore William Wood & Company \$10 00

The first edition of this work appeared eleven years ago and represented a gathering together and revamping of material included in two previous books by the author one on the rectum and the other on the colon. This present second edition has been largely rewritten and brought quite up to date. The author's long experience as surgeon to St Mark's Hospital for Cancer, Fistula, and Other Diseases of the Rectum, Etc, in London, gives to his opinions the weight of an unusually extensive acquaintance with the diseases of which he writes. St Mark's Hospital is outstanding as an institution where a large amount of proctologic work can be seen in a short period of time.

In reviewing this book, one is impressed with the sound common sense shown in the author's discussion of details in diagnosis and treatment. Although due recognition is given to worthy contributions by other writers, the author does not hesitate to emphasize his own ideas when he thinks they are superior. In connection with rectal bleeding the rôle of an ulcer in a Meckel's diverticulum, as one of the less common causes is emphasized. Numerous

accounts of individual cases of various sorts, many of them unusual and rare, increase the readability of the book. The common and most frequent rectal and anal conditions are systematically covered, each in its own chapter. The ligature operation for hemorrhoids is given preference over other procedures.

The author's operation for correction of complete prolapse of the rectum is given in detail. It is now one of the generally accepted procedures both here and abroad.

In view of the many recent contributions tending to prove almost indisputably that most if not all so called benign or simple strictures of the rectum are due to lymphogranuloma inguinale, it is surprising that no mention of this fact is made in the chapter on "Simple Stricture of the Rectum."

Lockhart Mummery has for some years favored the treatment of cancer of the rectum by simple colostomy, followed by perineal excision of the rectum, except in high tumors. His low mortality of 4 per cent in private cases is a good argument for this procedure and his high five year cure rate is impressive.

This book is complete and well written.

**Aids to Surgery** Cecil A Joll and Reginald C B Ledlie Sixth Edition 612 pp Baltimore William Wood & Company \$2 75

This very handy pocket edition on surgery is reminiscent of the handbooks on birds and flowers. It is packed full of brief descriptions covering general surgery as well as the specialties, and considers both diagnosis and treatment of the various diseases. One is truly amazed at what a wealth of accurate information the authors have condensed into 600 pages.

If one has little time for a general review of surgery up-to-date, this volume will give it as briefly as one could ask.

**Methods of Treatment** Logan Clendening Fifth Edition 879 pp St Louis The C V Mosby Company \$10 00

According to its preface this book "was planned to furnish an outline of all the methods of treatment in internal medicine." The italics are the reviewer's, because much of the material is presented in the merest outline—and few other methods of treatment than those touched upon can be imagined. In many respects it is up to date—in others it is dogmatically out of date. The illustrations, and much of the text, are primitive for the practicing physician. There are, however, occasional tables and summaries that are entertaining and that under certain circumstances would be very useful. If the reviewer were critically inclined he might prick a hundred holes, but the bottom is so large that still the ship would float. For the medical student it is a comprehensive book for physicians reference it is spread too thin, for the library shelves it is handsome, and we are assured by the publishers, durable, for the reviewer it was well worth the two evenings he spent upon it.

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## The Massachusetts Medical Society

### DISLOCATIONS\*

BY W. E. GALLIE, M.D.†

Mr President, Ladies and Gentlemen

THE subject of my lecture to night is one which, in an historical sense, is well known to this Society. Many important and original contributions on it have been made by its members. Of these contributors perhaps the most distinguished was Henry Jacob Bigelow who was almost a contemporary of the founder of this Lectureship. His treatise on "The Dislocations of the Hip" is a classic to which the student of surgical pathology still turns when he wishes to acquire basic knowledge of the subject. Perhaps the shade of George Cheyne Shattuck, the elder, will pardon the introduction of this subject to-night when he recalls that the study of it brought so much distinction to a surgeon of his own time.

The phase of the subject that has interested me chiefly has been the pathology and treatment of those dislocations that have shown a tendency to recur or to persist in spite of apparently successful reduction. The number of such cases is surprisingly large and is sufficiently impressive to increase greatly one's idea of the importance of dislocation as a cause of permanent disablement.

The dislocation with which all are familiar is the ordinary traumatic dislocation in which the articular surfaces are forcibly separated from one another after the rupture or stretching of the ligaments or tendons which ordinarily hold the bones in apposition. This injury to the ligaments may occur as a transverse tear or as a split between the fibres, or more often as an avulsion of the ligaments from the bones on one or the other side of the joint.

It is not often that one has an opportunity to make a postmortem examination of a dislocation but I have had many opportunities to observe the morbid anatomy at operation and have been struck with the frequency with which dislocations, particularly subcoracoid dislocations of the shoulder, have been accompanied by avulsion of the ligaments from the bone. I

am impressed that in dislocation of the shoulder this avulsion of the capsule from the anterior and lower part of the rim of the glenoid is the chief cause of recurrences. These recurrences are due to the incompleteness with which the avulsed capsule heals down to the bone, either as the result of too early movement of the limb or of failure of the ligaments to return to their normal position. As a result the capsule is much weakened and lengthened so that it no longer is able to prevent forward and downward movement of the head.

The tendency to recurrence of dislocation depends decidedly on the shape of the bones forming the joint. Thus, the hip joint rarely shows a tendency to recurring dislocation because its strength depends on the ball and socket arrangement of the bones and not on the strength of ligaments. In the case of the shoulder the reverse is the case as the shape of the bones is only moderately helpful in preventing dislocation and the strength of ligaments and tendons is very important. In a third type of joint, such as the acromioclavicular and the sternoclavicular, the shape of the bones is of so little importance that the natural tendency of the joint is toward dislocation and this is prevented only by the ligaments. If these are torn or avulsed, the usual result is a permanent dislocation.

The study of a large number of dislocations has impressed on me the importance of congenital abnormalities of the bones and ligaments as a cause of dislocation. I have lately seen three cases of dislocation of the shoulder in which displacement occurred without any trauma whatever. One occurred when the patient made an unusually powerful stroke while swimming; another during an ordinary dive off a six foot dock and the third when reaching suddenly for something above his head. The x rays showed the glenoid unusually small and the anterior lower lip very low. Examined under anesthesia the head of the humerus could be pushed in and out of the glenoid with a finger tip.

The same observation may be made in regard to recurring dislocation of the patella. In some

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For record and address of author see "This Week Issue,"  
page 120

cases, of course, a poorly repaired laceration of the capsule is the sole cause of the bad result but in most of the cases the trouble has no relation to traumatism but is a symmetrical disturbance, occurring in adolescent girls, due to extraordinary laxity of the capsule and absence of a proper outer lip of the patellar groove of the femur. Repetition of the dislocation naturally makes matters worse, but the real cause is the original anatomical abnormality. Even in dislocations in which violent traumatism is the undoubted cause of the first dislocation, there is plenty of evidence that the subsequent tendency to recurrence is often the result of some old anatomical defect such as a low anterior lip on the glenoid.

In an age when operations have become so important in the treatment of fractures it is surprising that they have not become more popular in the treatment of dislocations. The explanation is that the results of conservative treatment are, on the whole, satisfactory. I feel sure, however, that a good many bad results could be prevented if severe ruptures of ligaments were inspected early through an appropriate incision and measures taken to repair the damage accurately. Nobody thinks of leaving a wound of the skin wide open or neglects to bring together the separated fragments of a patella or olecranon, yet how seldom does one hear of a similar operation for the immediate repair of a crucial ligament in the knee or a trapezoid or costoclavicular ligament in the dislocations of the clavicle. Immediate operation has been established as the best treatment for ruptures of the quadriceps and the ligamentum patellae, the ruptures and avulsions of the tendon of the supraspinatus and the capsule of the shoulder, so why not also in those other joint injuries that lead in so many instances to permanent or recurring dislocations?

The time-honoured treatment of dislocations has consisted of the reduction of the displacement and the placing of the limb in such a position that the injured ligament may heal and be restored to normal as quickly as possible. Only those movements are allowed that do not stretch the healing scar. This plan has undoubtedly resulted in satisfactory recovery in the vast majority of these injuries and one must admit at once that the need for any modification of the plan is evident only in the small minority of dislocations that do not respond to the treatment and are left with serious disability. These, unfortunately, are not rare and constitute a considerable problem both in civil and industrial surgery.

A typical example is seen in severe dislocations of the acromioclavicular joint. In the mild injuries the damage to ligaments is limited to the capsule and the amount of displacement is slight, so that, in spite of the fact that the treat-

ment is usually quite futile and the slight amount of displacement almost invariably persists, the function is not disturbed. In the severe dislocations, however, where the coracoclavicular ligaments are ruptured, the clavicle rides up over the acromion and stays there and the result is a deformed and painful and permanently disabled shoulder. It is perfectly simple to reduce the dislocation by manipulation and it may be possible to hold the articular surfaces in fair approximation by apparatus, but the conoid and trapezoid ligaments have been torn across or avulsed and they never repair themselves, so that as soon as the apparatus is removed the displacement recurs.

The obvious remedy for this sort of thing is to perform an operation that will restore the rup-

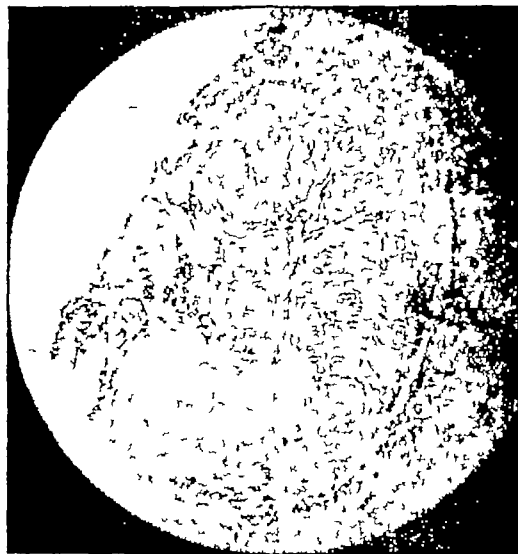


FIG 1. Low power photomicrograph of a cross section of a living suture made from fascia recovered 18 months after implantation.

tured ligaments to something like normal. More or less successful attempts to do this have been made by suturing the torn ligaments with catgut or silk or by tacking down avulsed ligaments with metal tacks. Such operations, however, often prove disappointing because the scar upon which the repair must depend is liable to stretch and so allow the displacement to recur. This has been the common experience in ruptures of the quadriceps and patellar tendons.

The discovery that fascia lata and tendon would continue to live practically unchanged after transplantation from one place to another in the same individual has done much to solve the difficulty. By means of them it is possible either to repair old ligaments or to make new ones and if certain points in technique are observed, to restore joints, even after prolonged disability, to normal.

I have here a few slides which illustrate the well-known viability of transplanted fascia and tendon. The photomicrograph (fig 1) shows a living suture of fascia lata recovered eighteen

months after it was inserted. It demonstrates the way in which a flat strip of fascia will fold up into a cylindrical structure like a tendon and continue to live unchanged, as far as its microscopic appearance is concerned. Figure 2 shows



FIG. 2. High power photomicrograph of living suture from fascia, cut longitudinally recovered 18 months after implantation.

the same strip of fascia cut longitudinally, and demonstrates the normal structure of fascia even after eighteen months' transplantation.

If one proposes to repair a rent in a ligament or in a tendon which forms part of the capsule of a joint, no better suture material can be found than living fascia lata. It can be threaded into a needle and moved backwards and forwards like catgut or silk and, if the grip of the ruptured ligament is secure, the repair that will result will be just as strong and permanent as the normal strain requires. Possibly a more perfect living suture can be made from the tendon of the plantaris or the palmaris longus but I have used these only when they have been exposed in the field of the operation.

It is not often, however, that one finds an opportunity to make an immediate attempt to repair a ruptured ligament as it is rare for these patients to come under the care of a surgeon until it is evident that the conservative methods of treatment have failed. By this time the possibility of closing the rent in the ligaments by any type of suturing is gone, owing to the sealing over of the ends of the ligament and their wide separation from one another. Thus in the dislocations of the acromioclavicular joint, there is no chance of repairing the coracoid and trapezoid ligaments even with living sutures. It is in such cases that the making of new ligaments finds a useful place and it is this subject that constitutes the principal part of my lecture.

What I have to recommend has been im-

pressed on me after some satisfactory and many unsatisfactory experiences. The desire to reduce the time of the operation and the risks of infection of the wound have often led to attempts to introduce ligaments where none had existed before and so avoid the more difficult procedure of replacing the injured one. All most invariably these attempts have failed or have been only partially successful and it has been gradually borne in on me that it is usually folly to try to improve on nature. It is now our plan to study the morbid anatomy of the injury as carefully as possible and then, if an operation is decided upon, to try to replace the injured ligament as perfectly as can be done. Thus, unfortunately, is often difficult and calls for specially designed technique, as in the case of the shoulder and the knee, in order that the ligaments may be properly placed. It is our definite conclusion, however, that the more perfectly the new ligament can be made to resemble the injured one the more perfect will be the final result of the operation.

The technical difficulties of making new ligaments are all associated with attaching the fascia or tendon to the bones and with securing the proper degree of tightness in the new ligament after it has been inserted. Each of these must be discussed in detail.

The fastening of a new ligament to a bone is not so simple as it might seem. Years ago I pointed out that in the operation of "tendon fixation", done for the purpose of converting the tendons of paralyzed muscles into ligaments, it was necessary to bury the scarified tendon in a tunnel in the bone for a distance of an inch or more. Only then would the adhesion of the tendon to the bone be strong enough to prevent it from pulling out. In the case of new ligaments made of fascia, the amount of adhesion is never sufficient to be depended upon and it is always necessary to do something more to make sure that it holds. The most satisfactory plan has been to tie a knot in the end of the fascia which is oversewn with fine silk so as to prevent it from untying, and then to draw the new ligament through a tunnel in the bone until the knot lodges against the entrance of it. In this way dependence is placed on the knot instead of on the adhesion of the smooth shiny fascia to the tunnel. (Fig. 3)

Where the new ligament is expected to be subjected to considerable constant or intermittent strain further precautions must be taken in implanting the ligament as strain is very likely to exert destructive pressure on the bone and so allow the new ligament to cut out. I have seen this happen several times after transplantation of the extensor proprius hallucis into the head of the first metatarsal. At first the adhesion of the tendon to the bone was perfectly solid but after a few months the roof of the tunnel in the bone was cut through com-



pletely and the effect of the operation destroyed. To get over this it is a good plan to pass the new ligament through a hole drilled in the bone in the line that the ligament will assume when the operation is completed. By this arrangement the knot is on the opposite side of the bone and cannot possibly cut out (Fig 3)

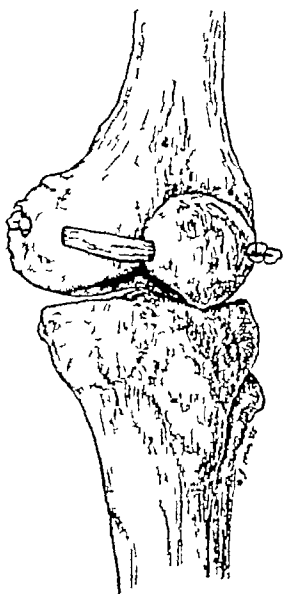


FIG 3 Operation for the prevention of recurring dislocation of the patella. A strip of fascia lata or semitendinosus tendon has been passed through tunnels in the patella and inner condyle of the femur and prevented from slipping by knots tied on the ends of the transplant.

In fastening fascia or tendon to bones by passing them through drill holes, care must be taken that the drill hole is so placed that it does not seriously weaken the bone. These holes never fill up with osseous-tissue and they always weaken the bone at that point so that fracture is liable to occur if the proper force is applied. For this reason it is unwise to bore holes through the clavicle for the insertion of new trapezoid ligaments.

The tightness of the new ligaments after healing is completed and movements are once more allowed is an important factor in the success of the operation. In those cases in which muscles are attached to the ligaments as in the quadriceps, the ligamentum patellae and the supraspinatus, complete success after fascial repair of the ligaments or tendons may be counted on as the muscles take up any slack that may persist. Where no muscles are attached to the ligaments, however, and where tightness is important, as in the internal lateral ligament of the knee the making of new ligaments is apt to come short of perfection. It seems to be impossible either to pull up the new ligament tightly enough or to keep it tight enough afterwards to prevent lateral instability in the joint. The best results may be expected in those joints in which the ligament that has been injured is not under constant tension but is called on to act as a check to too wide a range of movement. Good examples are seen in the operation for recurring dislocations of the patella and of the shoulder.

It is not my intention in this lecture to enter at great length into the anatomical details of the treatment as it is applied to the various joints but simply to pick out here and there examples that will illustrate the principles involved.

Recurring dislocation of the patella is perhaps as simple an example as one can find and it is particularly interesting because the structures involved are so close to the surface. This occurs occasionally as the result of an accident which forces the patella outward and tears the inner portion of the capsule, but it is much more often the result of an anatomical anomaly in which the patellar groove is unusually shallow and the capsule unusually lax. Each time the dislocation occurs the capsule is further stretched and the subsequent synovitis makes matters worse. My first case was that of a soldier who sustained a lateral dislocation of the patella when blown up in a trench. The dislocation was reduced but, owing to the marked knock-knee deformity which was present, the tendency was for the patella to slip off again. He was then operated upon and a plication of the capsule between the patella and the inner condyle of the femur performed. This operation proved futile, as one might expect, and the dislocation recurred within three months. When he came under my care some months later the patella was lying on the lateral aspect of the outer condyle and the man was walking only with the aid of crutches. In the operation which was undertaken the patella and quadriceps tendon and the ligamentum patellae had to be dissected free before the deformity could be reduced and the patella was then tethered to the internal condyle. This was accomplished by means of a strip of the tendo Achillis cut from the same leg and passed through holes in the patella and internal condyle. The result in this case, in spite of a gross knock-knee, has been perfect and now, after the lapse of twenty years, the patella continues to swing normally at the end of its tether and the new ligament can be felt easily stretching from patella to condyle.

Since that first operation we have had many opportunities to test the value of the method but in none has there been a better result. To avoid the risk of seriously weakening the tendo Achillis, however, we have abandoned this source of the new ligament and have used fascia lata or the tendon of the semitendinosus. I think I prefer the latter as it provides a long and very strong tendon, the removal of which seems to cause very little, if any, disability. In several cases in which this tendon was well developed, it was split longitudinally and only half or three-quarters of it removed for the purpose of the transplant. At one end a knot is tied and carefully oversewn with catgut or fine silk. The other end is then drawn through a hole drilled transversely through the patella and

another in the internal condyle of the femur and is finally anchored by tying another knot in it and oversewing with catgut or silk. Thus the new ligament will be fastened to the patella and the femur both by the fibrous adhesion between itself and the tunnels in the bone and by virtue of the knots which cannot pull through the drill holes. It is well to make sure that the new ligament enters the internal condyle at a point which is approximately the centre of the circle through which the patella moves during flexion and extension of the knee, and also that the drill hole in the femur is more or less on the line of a projection of the new ligament so

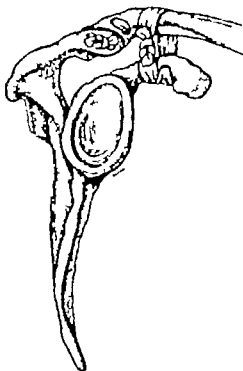


FIG 4 Bunnell's operation for repair of ruptured anterior cruciate ligaments

that the tendency to cut out the cortex of the bone or to wear out the ligament itself at the point at which it enters the bone may be reduced to a minimum (Fig 3) (Gallie and LeMesurier, *Brit J Surg*, 12 289, 1924-25)

Of the persisting or permanent dislocations one of the most interesting is that of the acromioclavicular joint when this is complicated by rupture of the coracoclavicular ligaments. As mentioned above the outer end of the clavicle slips up over the acromion and rests there like a beam on a St Andrew's cross, and no conservative measures will have the slightest effect in bringing about a cure. This is one of the best places in which to apply the principle of replacing the injured ligament by a new one and the technique described by Bunnell is an excellent example of it.

The chief point of the operation is the insertion of a new coracoclavicular ligament to replace the ruptured one. This is done through an incision commencing at the clavicle and extending downward across the tip of the coracoid and along the border of the deltoid (Fig 4). The incision is deepened to expose the clavicle and coracoid thoroughly. A strip of fascia lata  $\frac{3}{4}$ " wide and 10" long is then cut from the thigh and passed subperiosteally over

the clavicle and under the coracoid. One of the ends is wrapped once around the coracoid and is finally tied to the other in a triple knot which is carefully oversewn with fine silk to prevent all possibility of loosening. When the knot is being tied the clavicle is pressed down into position and the new ligament is drawn very tight so as to lift the whole scapula up to the clavicle and so make sure of the permanent prevention of redislocation.

Most of the cases that I have seen have come for treatment months after the original injury and by that time the articular cartilage of the acromioclavicular joint had been replaced by fibrous tissue. In these cases the operation just described has been supplemented by the introduction of a new interosseous acromioclavicular ligament. This is inserted in the form of a mattress suture through two drill holes in the end of the clavicle and in the acromion which appear close together in the former acromioclavicular joint. The ends are tied tightly together.

The results of this operation have been excellent. At first we were disappointed because the joint seemed too loose but after we learned



FIG 5 X-ray of knee joint of man operated on by Alwyn Smith of Cardiff in 1915 in which a ruptured anterior cruciate ligament was replaced by the Ilizar-Groves method. The tunnels in the femur and tibia are easily seen. This man has a perfect knee.

the importance of drawing the new trapezoid ligament very tight and lifting the coracoid close up under the clavicle our troubles were over and we have come to expect these patients to return to physical labor after a disability period of three to four months.

This is one of the dislocations which should be treated by immediate operation. There is no chance of a satisfactory healing of the coracoclavicular ligaments, no matter what the treatment, so that one might as well save time by going straight ahead and repairing the damage.

at once. If this is done, the articular surfaces of the joint can be saved and the patient returned to a condition that is practically normal.

I have always thought that one of the most interesting operations performed on joints is that of Hey-Groves in which he introduces new ligaments to replace torn cruciates. The operation for a torn anterior cruciate is the one most often performed as the injury is much more common than in the case of the posterior cruciate. The results are sometimes perfect (Fig 5).

Injury to the posterior cruciate is rare but decidedly disabling. In order to prevent the backward slip of the head of the tibia it is necessary to have a taut posterior cruciate ligament and this means that if a new ligament is to be effective it must be anchored solidly both back and front. To accomplish this the semitendinosus is cut free from its muscle and dissected down to its point of insertion on the antero-internal aspect of the head of the tibia. It is then drawn through a hole drilled through the head of the tibia to appear in the popliteal space just below the attachment of the capsule of the knee to the tibia. In this way it obtains solid anchorage to the tibia. The knee is then opened in front through a split patella incision and the new ligament, threaded into a sharp pointed bodkin, thrust through the posterior capsular ligament and into the synovial tube covering the remains of the old posterior cruciate and then into the joint cavity. The new ligament is then drawn through another drill hole in the inner condyle of the femur which is so placed that it enters the joint at the point of anterior attachment of the cruciate. In this way the tendon of the semitendinosus is made to lie exactly in the position of the old posterior cruciate ligament and when it is drawn taut, to take on perfectly its function. By keeping the bodkin and the tendon buried in the synovial sheath of the old cruciate, one readily makes the new ligament extra-articular, exactly like a true cruciate, so that none, or practically none, of the tendon is exposed in the synovial cavity (Gallie and LeMesurier, *Ann Surg* 85 592 [April] 1927).

The success of these operations on the cruciate ligaments depends on the new ligament maintaining tightness and to make sure of this the greatest care must be taken to keep the tendon drawn taut while it is healing to the tunnels in the bone. I prefer the knot on the end of the tendon as the safest way of preventing the development of slackness. A good many surgeons have been disappointed in the results of these operations for the repair of injuries to the cruciate ligaments, due, practically always, to laxity of the new ligaments. This results from some defect in anchoring the ligament and not from the stretching of it as is so often stated.

But while the dislocations of the patella, clav-

icle and knee provide interesting opportunities for the substitution of new ligaments for old, the really important place for the employment of the principle is in recurring dislocation of the shoulder. This condition is comparatively common and is so disabling that in most instances some form of operative treatment must be tried. Our plan is based on the idea that there is some defect in the capsule in its antero-inferior portion, that is, in the region of the inferior glenohumeral ligament. Usually this defect is at the attachment of the ligament to the glenoid rim and is due to failure of the ligament to heal to the bone. This may result from wide separation of the avulsed ligament from the bone after reduction of the dislocation or from stretching

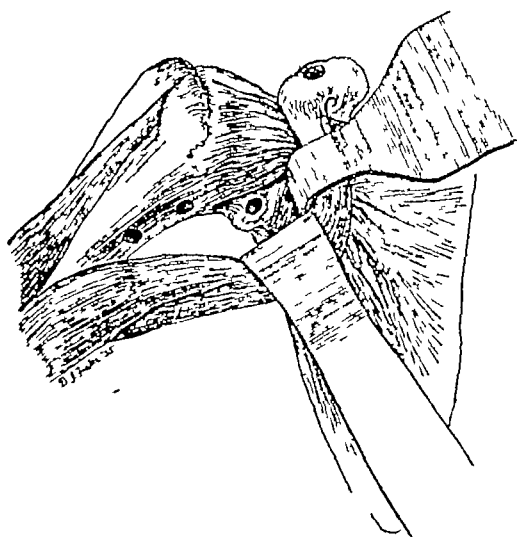


FIG 6 Drawing of dissection by which the antero inferior border of the glenoid is exposed. The combined tendon of the short head of the biceps and the coracobrachialis have been retracted inward and the subscapularis upward so that the capsule of the shoulder joint is exposed and one's finger or an instrument can be placed on the margin of the glenoid.

of the scar before it has become strong. In addition to these recurring dislocations which result from gross damage to the ligaments there are a few which come on without traumatism and are due to congenital laxity of the ligaments. These as well as the traumatic cases call for the introduction of a new inferior glenohumeral ligament which will prevent the head from sliding downward and forward out of the glenoid when the appropriate leverage is applied.

A review of the anatomy of the shoulder joint will show that the anterior lower lip of the glenoid is so remote that in order that a new ligament may be attached to it some new technique must be devised. This has been accomplished by the following steps.

Through an incision along the anterior border of the deltoid from the tip of coracoid to a point opposite the tendon of the pectoralis major, the deltoid is separated from the pectoral till the coracoid and the short head of the biceps and the coracobrachialis are exposed. These are dissected away from the head and neck of the humerus and drawn inward. One then sees

the lower border of the subscapularis as it passes over to its insertion into the lesser tuberosity and by blunt dissection in the areolar tissue below it one is able to get under it and retract it upward and inward. One then sees the capsule of the shoulder as it lies on the prominent lower anterior lip of the glenoid and one can confirm this by pressing the finger against it while the head of the humerus is rotated. This is the spot where the old inferior gleno-humeral ligament is normally attached and it is the spot where the new one must also join the bone (Fig 6). To bring this about a large drill is applied to the anterior lip of the glenoid and is driven backwards, upward and inward through the capsule of the shoulder and the neck of the scapula until it bulges the skin just below the spine of the scapula in the back. The skin over the point of the drill is then incised and the drill, in which an eye has been provided at the tip, comes into view (Fig 7).

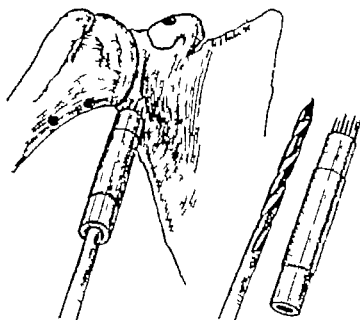


FIG 7. Drawing to illustrate the drilling of the hole through the neck of the scapula. The casing over the drill prevents accidents to the great vessels and nerves.

In the meantime an assistant has out a strip of fascia lata ten inches long and an inch wide and tied a knot in one end of it and oversewn it with fine silk. The other end of the strip of fascia has been transixed and ligated with heavy silk which is passed through the eye of the drill. The drill is now withdrawn and with it goes the silk through the hole in the neck of the scapula. In this way the strip of fascia is drawn through the scapula and with a little manipulation the knot on the end of it is pulled through the incision in the skin and finally comes to rest on the posterior surface of the neck of the scapula. Thus the new ligament is solidly anchored to the edge of the glenoid at exactly the right place (Fig 8).

The operation is then completed by drawing the new ligament through holes drilled in the anatomical neck and shaft of the humerus as shown in the diagram (fig 9), and finally through a hole in the tip of the coracoid and anchored there. The new ligament is drawn

sufficiently tight that when healing has occurred the range of motion of the joint, in the direction of abduction and external rotation, will be slightly limited.

This operation has been tested thoroughly on thirty five occasions and has given excellent re-

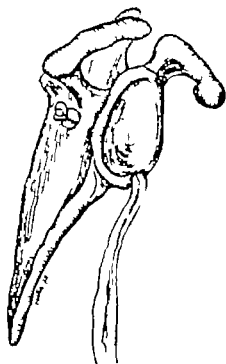


FIG 8. Drawing of scapula to show how the new inferior gleno-humeral ligament is attached to the bone.

sults. One patient was a well known football player and he has played through three seasons since his operation, without mishap. One was a professional lacrosse player and one a champion wrestler. Two were epileptic and in each

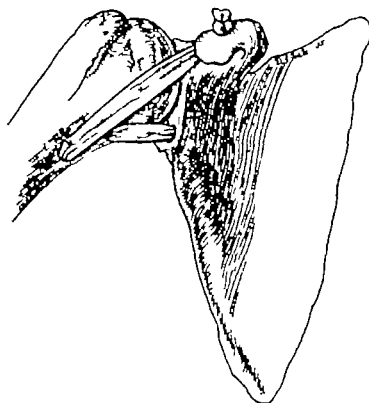


FIG 9. Operation completed with the new inferior gleno-humeral ligament in place and finally attached to the tip of the coracoid process.

of these both shoulders were operated upon. In one of them a recurrence developed six months after the operation and from the story and the subsequent examination I think the new ligament was either broken or torn out of the bone. The same thing happened to one other patient when carrying a heavy pack sack on his shoulder.

ders His arms were stretched up above and behind his head and as the pack toppled backward he tried to hold on to it, with the result that the head of the humerus slipped out All the other thirty-three cases have been cured and are without disability of any kind (Gallie and LeMesurier, Trans Am Surg Assn 45 392, 1927)

One could go on at great length reviewing instances in which ligaments have been repaired or replaced Thus, dislocation of the sternoclavicular joint, if complete, calls for an operation in which a new costoclavicular ligament is introduced Recurring dislocation of the base of the metacarpal bone of the thumb lends itself well to the making of a new capsule Recurring dislocation of the hip can in some instances be cured by plicating the capsule with a living suture of fascia In fact, if one applies the principle of repairing the damage by restoring the injured ligament to as near normal as possible, many causes of permanent disablement will have been removed The most serious difficulty one meets with in these operations is the fastening of the new ligaments to the bone so that when they come into use, they are as tight as their work requires This is particularly so in the case of the internal and external lateral ligaments and the anterior cruciate ligament of the knee In these injuries I have come to think that strips of fascia lata are not so suitable as segments of tendon because it is impossible to make them adhere solidly to holes in the bone Thus in rupture of the external lateral ligament of the knee a thick strip of the tendon of the biceps can be cut free from the muscle, leaving it attached to the fibula, and made to replace the ligament by drawing it through a two inch drill hole in the external condyle If this is drawn tight and anchored with the knee flexed  $45^{\circ}$  it may be expected to support the joint satisfactorily when healing occurs, for if it was tight in flexion it will certainly be tight when the joint is extended to  $180^{\circ}$  Similarly in injury to the internal lateral ligament the

tendon of the sartorius or the gracilis can be used to replace the ligament

The chief point of the matter is that, if operative treatment for these injuries has been decided upon, the anatomy of the part must be reviewed carefully and that technique decided upon that will enable the surgeon to restore both the anatomical structure and the function of the injured ligament most perfectly This means that textbook instructions can rarely be followed and that the plan for each operation will have to be decided upon according to the pathological condition found If the few general principles referred to in this lecture are remembered some at least of the pitfalls will be avoided

The preparation of the material for my lecture tonight has led me into several paths of reading that have given me the greatest pleasure One was the very interesting history of the Massachusetts Medical Society written by Dr Walter L Burrage In this I found that in his will, George Cheyne Shattuck left a sum of money which was to provide for the collection and publication of historical or other essays on the climate or the diseases of Massachusetts I knew nothing of the climate of Massachusetts except that when I am here the sun always shines, but I did remember that many distinguished members of this society had studied dislocations, so I concluded that this condition must be particularly prevalent in Massachusetts and could therefore be considered a suitable subject for this Lecture Another revelation to me, derived from Dr Burrage's book, was the astounding way in which the distinguished names of a hundred years and more ago, still appear and with equal distinction as the members of this society today Coming from a new country, as I do, I envy you in the tradition you have built about our profession For this and many other reasons I regard as the highest honor the invitation you have given me to deliver the Shattuck Lecture and to add my name to the list of distinguished men who have already addressed you

THE RETICULOCYTE RESPONSE IN GUINEA PIGS  
FOLLOWING THE ORAL ADMINISTRATION OF  
CERTAIN ANTI ANEMIC SUBSTANCES\*

BY D K MILLER, M.D.,† AND C P RHOADS, M.D.†

**A**MONG the different methods which have been suggested for testing the potency of the purified fractions of liver which are used in the treatment of pernicious anemia the procedure of Jacobson<sup>1</sup> has received particular attention. This procedure depends upon the fact that a certain number of normal guinea pigs react to the injection of particular anti anemic substances by a rise in the percentage and absolute number of reticulocytes in the peripheral circulation. Experiments which are based upon this observation and which are concerned with the relationship of certain dietary substances to hematopoiesis have been made in this laboratory. The substances which were tested were fed rather than injected parenterally. The results are of interest for two reasons. First, they confirm the experiments of Jacobson which indicate that the mechanism described by Castle<sup>2</sup> for pernicious anemia is also operative in the causation of reticulocyte rises in the guinea pig. Secondly, they show that increases in the number of circulating reticulocytes which are similar in degree, duration and time of occurrence to those obtained by Jacobson<sup>1</sup> may be induced by potent, anti anemic substances which are orally as well as parenterally administered.

## METHODS

Adult male guinea pigs weighing from 500 to 600 grams were employed. They were kept in groups of four in metal cages with shavings as bedding. A standard diet of oats, hay, and cabbage was employed. All of the substances tested were fed daily from graduated pipettes to make certain that the desired amounts were taken. Reticulocyte counts were made daily. Blood obtained by pricking an ear vein was smeared on cover slips upon which a film of brilliant cresyl blue had been dried previously. The preparations were then stained by Wright's method. Five hundred cells were counted. An increase in the average number of reticulocytes to a value of over 2 per cent was considered to be a positive response.

The rice polishings concentrate used was prepared by the Burroughs-Wellcome laboratory. It is known to contain 33 rat-growth units of vitamin B<sub>1</sub> and 0.5 rat growth units of vitamin

B<sub>2</sub> (G) per gram. This material has been tested on human beings with pernicious anemia and has proved to be a source of dietary anti anemia factor. Miller and Rhoads<sup>4</sup>. The autolyzed yeast concentrate (Vegex) has been reported by Strauss and Castle<sup>5</sup> to be a source of dietary anti anemic factor. The alcoholic extracts of vegex were prepared by bringing a 50 per cent water solution of vegex to the desired concentration of alcohol, stirring thoroughly, filtering through paper, and evaporating the filtrate in vacuo to a volume which was equal to the volume of Vegex originally extracted.

Certain of the substances tested were administered after incubation with normal human gastric juice according to the technique of Strauss and Castle<sup>6</sup>. The gastric juice was obtained after the intramuscular injection of 0.5 cc. of a 1:1000 dilution of histamine hydrochloride. Twelve grams of the substance to be tested were mixed with 160 cc. of gastric juice and incubated for one hour at 37°C. The pH was adjusted before using to 5.5 with concentrated NaOH.

## THE SELECTION OF ANIMALS

As shown in table 1 eighty five guinea pigs were tested for rises in reticulocyte percentages.

TABLE 1

TESTS OF THE EFFECT ON THE RETICULOCYTES OF NORMAL GUINEA PIGS OF FEEDING 0.6 GM LIVER EXTRACT No. 343 DAILY

Diet Supplement	No of An- imals	No of Animals Reacting with a Rise of Reticulocytes	Level of Response	Day of Response
0.6 Gm liver extract q.d.	85	30	27.8%	7th 12th

following the oral administration of 0.6 Gm daily of liver extract Number 343 N. N. R. Of the entire group thirty, or 35 per cent, proved to be suitable for subsequent use as shown by reticulocyte rises to values of from 2 to 7.8 per cent occurring between the seventh and twelfth days after the beginning of treatment. In the remaining animals the average reticulocyte percentage was less than 1 and at no time was

\*The term vitamin B<sub>2</sub>(G) is used in this publication to refer only to the thermostable vitamin which is required by rats for growth. It has no reference to the heat labile fraction of the water soluble vitamin B complex known as factor PP which is preventative and curative of canine black tongue and of human pellagra.

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greater than 18 One positive test was considered sufficient to warrant classifying the animal as one which was capable of giving a reticulocyte response Such animals were segregated and after a suitable interval were employed to test substances of unknown potency

#### TESTS OF RICE POLISHINGS CONCENTRATE AND OF GASTRIC JUICE

The results of four tests of these substances are presented in table 2 In the first the effect

TABLE 2

TESTS OF THE EFFECT ON THE RETICULOCYTES OF REACTIVE GUINEA PIGS OF FEEDING RICE POLISHINGS CONCENTRATE AND GASTRIC JUICE

Diet Supplement	No of An- imals Tested	No of An- imals Giv- ing Re- sponse	Level of Response	Day of Response
Rice polishings concentrate 1 Gm q d	7	0	—	—
Rice polishings concentrate—gastric juice incubate 4 cc q d	3	3	55.8%	11th 13th
Autoclaved rice polishings concentrate—gastric juice incubate 4 cc q d	4	3	23.6%	8th 9th
Gastric juice alone 2 cc q d	3	—	—	—

of feeding one gram daily of rice polishings concentrate to seven reactive guinea pigs was investigated No reticulocyte rise occurred in any animal This fact is considered to be evidence that the substance is without antianemic potency if it is administered alone In a second test an incubated mixture of the rice polishings concentrate with normal gastric juice was fed to three guinea pigs which had been shown to be capable of responding to the administration of potent material A reticulocyte rise to between 5 and 5.8 per cent was effective in all three animals between the eleventh and thirteenth days This result is evidence that some constituent of the rice polishings concentrate was so altered by incubation with normal gastric juice that it gained an hematopoietic potency which had been lacking previously The third test is similar to the second except that the rice

polishings concentrate was autoclaved for four hours at neutrality before using in order to eliminate any effect which might be due to its high content of vitamin B<sub>1</sub> Three of the four reactive animals tested responded with a rise in reticulocytes to between 2 and 3.6 per cent on the eighth and ninth days after the treatment was begun Gastric juice alone was fed in a fourth test and no response was effected

#### TESTS OF AUTOLYZED YEAST (VEGEX) AND VEGEX EXTRACTS

Untreated vegex was tested by feeding one gram daily to each of five guinea pigs which had been proved to be capable of responding by a reticulocyte rise to the administration of liver extract No effect was obtained, as would be expected from the report of Strauss and Castle<sup>6</sup> After the vegex had been treated by incubation with normal gastric juice, however, the feeding of one gram daily resulted in a positive response in three out of five instances Reticulocyte rises to from 2.2 to 3.4 per cent occurred on the ninth to the eleventh days after treatment was begun

TABLE 3

TESTS OF THE EFFECT ON THE RETICULOCYTES OF REACTIVE GUINEA PIGS OF FEEDING VEGEX AND VEGEX EXTRACTS

Diet Supplement	No of An- imals Tested	No of An- imals Giv- ing Re- sponse	Level of Response	Day of Response
Vegex 1 Gm q d	5	0	—	—
Vegex gastric juice incubate 4 cc q d	5	3	22.34%	9th 11th
95% alcoholic extract vegex	4	0	—	—
90% alcoholic extract vegex—gastric juice incubate 4 cc q d	2	2	32.54%	12th

In a third test four known reactive animals were fed a 95 per cent alcoholic extract of vegex without effecting any change in the reticulocyte levels When a similar extract was fed after incubation with gastric juice both of the two test animals gave positive responses The reticulocytes rose to between 3.2 and 5.4 per cent between the tenth and twelfth days

This result is in keeping with the report of Strauss and Castle<sup>6</sup> concerning the hematopoietic potency of alcoholic extracts of vegex after incubation with gastric juice

#### DISCUSSION

The usefulness of the reticulocyte rise in reactive guinea pigs as a test for potent anti-anemic substances can be established in only one way. It must be shown clearly that the induction of the reticulocyte rise depends upon the same pathological mechanism as that which obtains in the human being with pernicious anemia. That mechanism is not wholly clear but one finding is encountered with great constancy. The gastric juice of the patient with pernicious anemia is incapable of converting certain dietary constituents into a factor which is required for normal blood formation. Such a conversion can be effected by normal gastric juice. From these two facts certain conclusions as to the etiology of pernicious anemia have been drawn. The experiments reported indicate that the factors inducing the reticulocyte rise in the guinea pig

are similar to those causing hematopoiesis in human beings with pernicious anemia. In the absence of a crystalline substance, however, it cannot be said with absolute certainty that the substance inducing the reticulocyte production is the same in the guinea pig as in the patient with pernicious anemia.

#### CONCLUSION

The reticulocyte response in suitable reactive guinea pigs presents certain similarities in its causative mechanism to that obtaining in human beings with pernicious anemia.

#### REFERENCES

1. Jacobson, B. M. On a pernicious anemia like state in the guinea pig. *J. Clin. Investigation*, 13: 714, 1934.
2. Jacobson, B. M. The response of the normal guinea pig to the administration of liver extracts. *Science*, 80: 11, 1934.
3. Castle, W. B. Observations on the etiological relationship of achylia gastrica to pernicious anemia. *J. Clin. Investigation*, 6: 2, 1934.
4. Miller, D. K., and Rhoads, C. P. The presence in egg white and in rice polishings convertate low in vitamin B<sub>12</sub> (G) of anti-pernicious anemia principle. *New Eng. J. Med.*, 11: 921, 1934.
5. Strauss, M. H., and Castle, W. B. The nature of the extrinsic factor of the deficiency state in pernicious anemia and in related macrocytic anemias. *New Eng. J. Med.*, 67: 55, 1932.

## THE EARLY CLASSIFICATION AND EARLY DIAGNOSIS OF CANCER OF THE BRONCHUS\*

With An Analysis of Thirty One Case Reports, Including Three Pathological Diagnostic Errors

BY MILTON S. LLOYD, M.D.†

AS our knowledge of carcinoma of the bronchus increases, our opinions must be revised. A study of the literature on the subject both here and abroad leads only to confusion in diagnosis and hopelessness in prognosis. The author is of the opinion, however, that, with a well-ordered knowledge of the clinical syndromes of the disease and the proper application of our present technical methods the diagnosis can always be made early. Rapid strides are at present being made in the field of thoracic surgery and the anatomical structure of the lung offers some advantages for the total extirpation of malignant tumors. The author believes therefore that a number of these growths if found early and favorably situated, should be placed together with carcinoma of the larynx, among the malignancies with a definitely hopeful prognosis.

To draw these conclusions from a series of cases, few of whom were diagnosed early and practically all of whom are dead, would seem, at first sight, to be unjustifiable. But an analysis of the data here presented and a study of many other case reports, both published and

unpublished, show that symptoms definitely indicative of carcinoma of the bronchus, existed and persisted, frequently for months and some times for years before even an x-ray of the chest was taken. B. M. Fried<sup>1</sup> in one of the best treatments of the subject, yet to appear in print, states reassuringly, "The frequency of metastases in bronchiogenic cancer in man diminishes with the distance from the central axis of the body." At the same time from the admittedly late cases now being seen, records of successful surgical removals are appearing in the literature with increasing frequency.

Two important conclusions therefore appear. The first is that the early diagnosis of cancer of the bronchus is an urgent necessity. The second is that the clinical apprehension of the disease lags unjustifiably, in view of the mass of information extant upon the subject. The reason for this retardation undoubtedly arises from the fact that little has been done to lead the clinician through the multiplicity of confusing details which may beset the early diagnosis. A departure from the usual methods of treatment would appear to be indicated. To say the least the subject needs further study and clarification.

If in the following lines, the author presumes to take issue with many of the well known au

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thorities, it is not because he wishes in any way to deprecate their efforts. On the contrary he is willing to acknowledge them as the source, either directly or indirectly, of most of the information and all the inspiration of which he is possessed.

#### CLASSIFICATION

A clinical classification which serves no purpose for diagnosis, prognosis or treatment is useless. Miller and Jones<sup>2</sup> in their study of thirty-two cases, laid down a classification of ten types. There is little however in their grouping to assist in rounding out clinical syndromes. Fried<sup>1</sup> concludes "From the material studied it is apparent that a reasonable classification of bronchiogenic cancer based on clinical features is as superfluous at the present time as that based upon their gross anatomy." The present author does not feel that this statement applies to-day. It must be realized that any attempt to study the early clinical manifestation of carcinoma of the bronchus from the end picture seen upon the autopsy table, cannot be more productive of results than an attempt to learn the causes of the World War by visiting the battle fields of France. The only way to master the clinical course of cancer of the bronchus is to study it clinically.

Fortunately the anatomy of the chest and the mechanics of respiration are such, that a simple and sane subdivision of these tumors, covering their common and important symptoms, can be easily made. If the thoracic cavity is examined dimensionally, it will be found that the bifurcation of the trachea is situated almost exactly at the geometric centre of the air bearing tissue of the lungs. As Nelson<sup>3</sup> states, "This can be expressed diagrammatically, by imagining the chest to be a sphere, the centre of which is the bifurcation of the trachea." Departing from this point the cavity may be divided into three zones, viz, a central or hilar zone, a middle or bronchial zone and a peripheral or parenchymal zone. The clinical phenomena will depend in large part upon the zone in which the new growth primarily takes origin. The cause of symptoms in the three groups may be assigned as follows—

Central Zone.....Hilus Infiltration  
Middle Zone.....Bronchial Obstruction  
Peripheral Zone.....Centrifugal Expansion

To these must be added the rarer types of "Miliary Carcinosis," which are principally of anatomicopathological interest and the type of carcinoma which is "bronchiectatic" or according to Letulle "cavitaire d'emblée" and which should be in the early stages diagnosed by an accidental bronchoscopic finding.

Tumors of this group, fortunately the least common, spring from the lower part of the trachea and from the stem bronchi. Due to the solid structure of the air passages in this

region dissemination of malignant cells is in part controlled. Infiltration takes place by extension along the bronchial walls or the vascular structures, into the lung and the hilar glands or by direct invasion of the surrounding tissues. Their anatomical location and their proximity to important structures, may bring dysfunction of other organs or remote symptoms into the picture. On the other hand obstruction, due to the ample size of the airways, occurs late.

#### Bronchial Obstructive Group

These growths arise in the second division or smaller bronchi. From the periphery of the lung up to this point, drainage is effected, principally by bronchial and ciliary movements.



HILUS INFILTRATING GROUP

FIG 1 Case 1. Carcinoma arising in the lower end of the trachea and involving the esophagus by direct extension. Principal symptoms: substernal pain four months; dysphagia two weeks.

There ensues the usual train of the clinical manifestations of impaired drainage up to complete obstruction with atelectasis or pneumonia. The paths of infiltration are similar to those in the central zone group, but their distance from the mediastinal structures delays the direct involvement of other organs.

It seems unnecessary under this heading, to introduce, as has been done by some authors, special subdivisions, depending upon the presence or absence of cavity or the varying degree of patency of the bronchus.

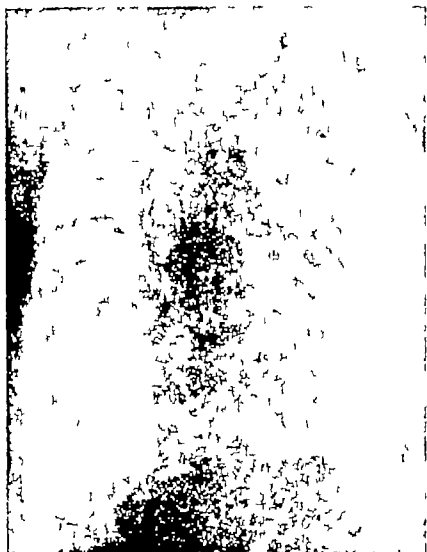


FIG 3 Case 1. X-ray photograph of the barium swallow of the esophagus. The pipe stem character of the middle third of the tube is notable. A slight filling defect at the level of the sixth posterior interspace corresponded with the site of the lesion.

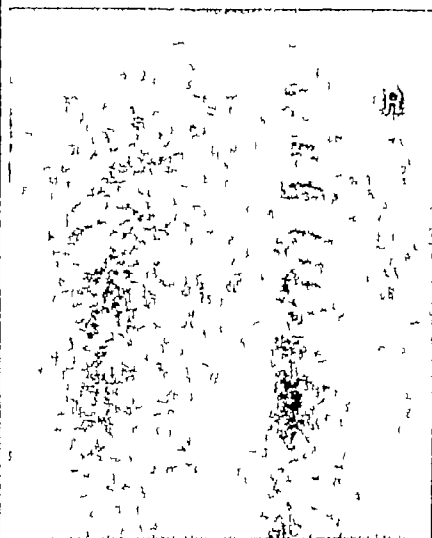


FIG 4 Case 2. Carcinoma arising in the left stem bronchus. Principal symptoms: pain left upper chest and neck four months, cough and dyspnea two months, hemoptysis two weeks. Almost complete absence of air from the left lung. Striations may be seen in the right lung similar to those on the left side in Fig 3. An exploratory thoracotomy showed massive involvement of the mediastinum.

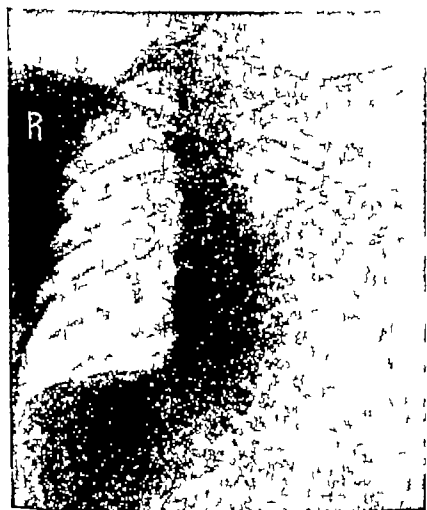


FIG 3 Case 2. Carcinoma arising in the left stem bronchus. Principal symptoms: cough, dyspnea, substernal pain seven months, very severe pain left side of neck and left arm three months. Marked loss of volume of the left lung is visible, together with radiating striations representing lymphatic extension into the pulmonary field. Such films are frequently interpreted as "interlobar plastic pleurisy." Bronchoscopy fourteen weeks prior to this x-ray showed the secondary characteristics of infiltrating new growth. Biopsy however was reported "fibrotic nodules."

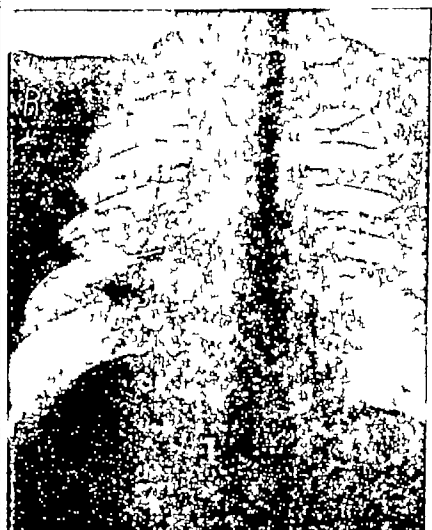
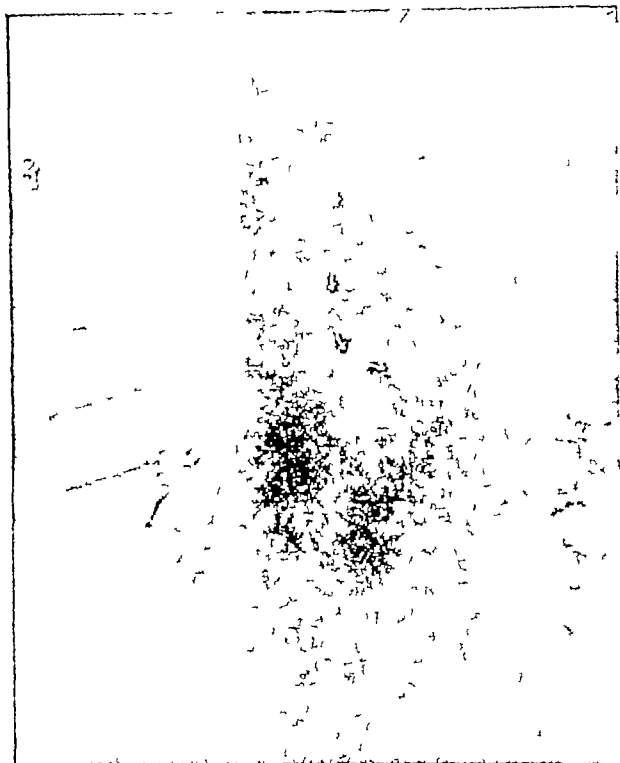


FIG 5 Case 4. Carcinoma arising in the right stem bronchus, level of the middle lobe bronchus. Principal symptoms: cough five months, pain three months, hemoptysis on week. Most important physical sign: a thymoid wheeze. X-ray shows shifting of the mediastinum downward, rotation of the left scapular fissure (retouched) and early lymph glandular and vascular infiltration.



## BRONCHIAL OBSTRUCTIVE GROUP

FIG 6 Case 5 Carcinoma arising in the left upper lobe bronchus. Principal symptoms: bronchitis, pain, dyspnea, cough and hemoptysis six months. Lipiodol injection reveals marked retraction of the trachea. The upper lobe is completely atelectatic and a cavity with fluid level is present in the apex. This patient lived for two years after this picture was taken without treatment.

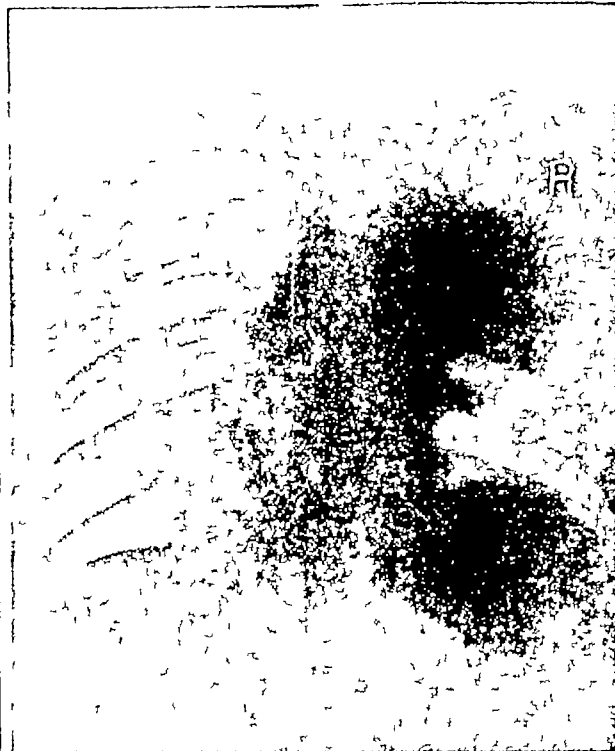


FIG 8 Case 7 Advanced carcinoma involving the right upper and middle lobe bronchi. In this instance the phrenic nerve is also involved.

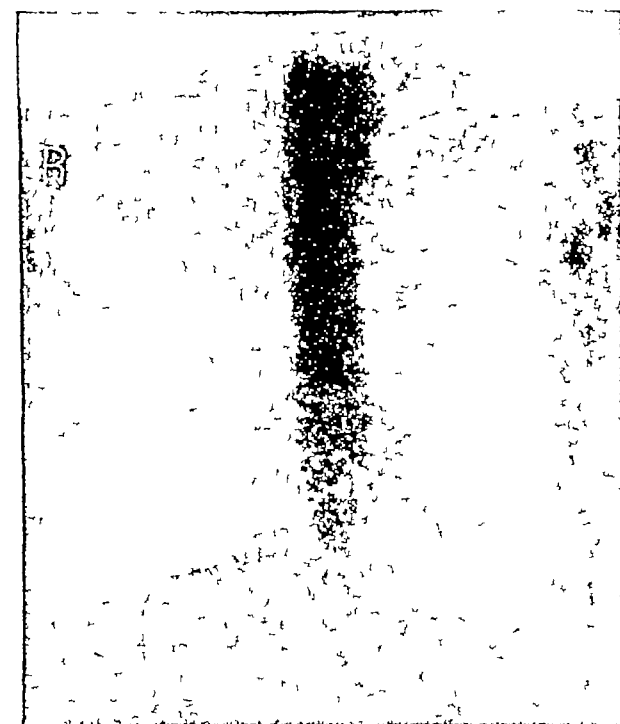


FIG 7 Case 6 Carcinoma arising in the right upper lobe bronchus. Principal symptoms: cough, hemoptysis one year, dyspnea two weeks. Most important physical signs: asthmatic wheeze and after breathing. Complete atelectasis of the right upper lobe with typical rotation of the interlobar fissure.



FIG 9 Case 8 Early carcinoma arising in a second division branch of the right lower lobe bronchus (fourth division from trachea). Although this growth was no larger than the head of a match, impaired drainage with early atelectasis is already present. The interlobar fissure has rotated downward one interspace. (Interlobar fissure retouched)



FIG 10. Case 9. Carcinoma involving the right lower and middle lobe bronchi. This patient had a metastatic growth in the brain. (Interlobar fissure retouched.)

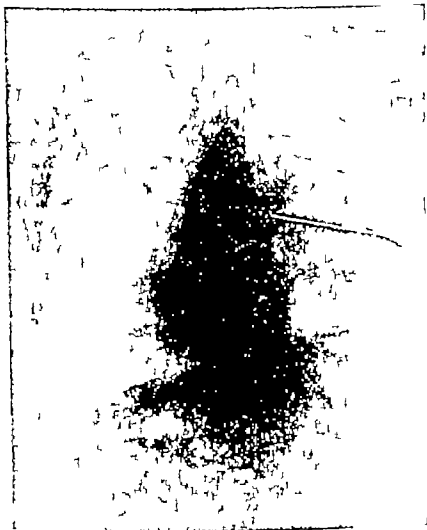


FIG 11. Case 9. Repeat x ray following the spontaneous evacuation of the bronchus of a plug of tissue and mucus. The fallacy of introducing a separate classification to cover this eventuality is obvious. In spite of restored patency of the bronchial lumen, the lower lobe has suffered a loss of volume as compared with fig 10 taken five days previously. (Interlobar fissure retouched.)



FIG 12. Case 10. Lipiodol injection in a case of carcinoma of the right lower lobe. The patient had just recovered from "pneumonia." This examination demonstrated the necessity for bronchoscopy and forestalled the proposed cure of a winter in Florida.

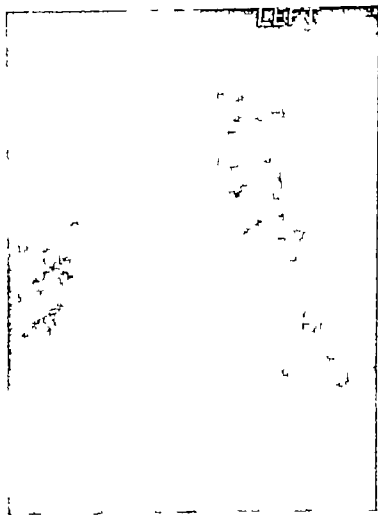
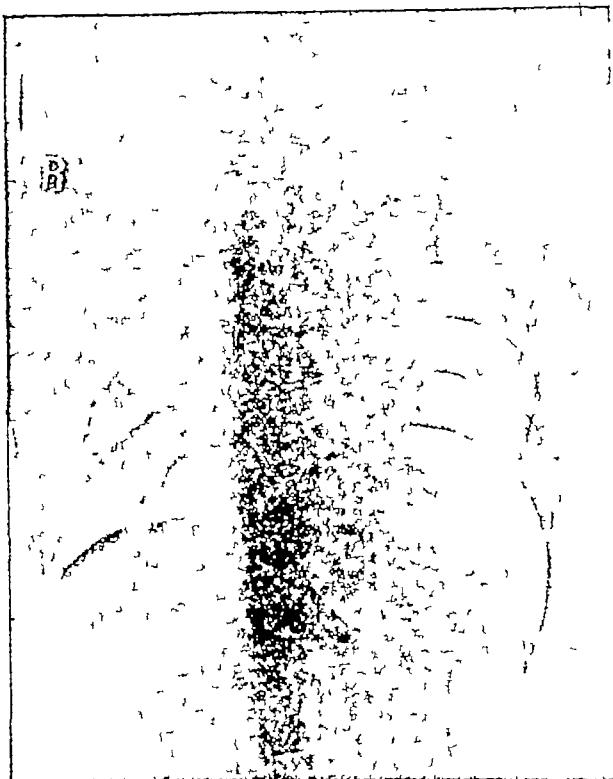


FIG 13. Case 11. Carcinoma of the right upper lobe bronchus simulating lung abscess. Principal symptoms eight ounces daily foul expectoration, rubbing of the fingers. A cavity with fluid level is visible. Bronchoscopy negative for new growth. Diagnosis made by biopsy at second stage thoracotomy for drainage of abscess.



## CENTRIFUGAL EXPANSIVE GROUP

FIG 14 Case 12 Carcinoma arising in the parenchyma of the left upper lobe and contacting the chest wall below the scapula. Localization was made by x-ray and thoracoscopy and diagnosis by punch biopsy. In this case limited movement on the left side was the indication for x-ray of the chest.



FIG 16 Case 14 Carcinoma arising in the parenchyma of the left upper lobe. The shadow of the tumor is obscured by the presence of an effusion. Principal symptom very severe pain of the intercostal neuralgia type. Diagnosis made by biopsy of a left axillary gland.

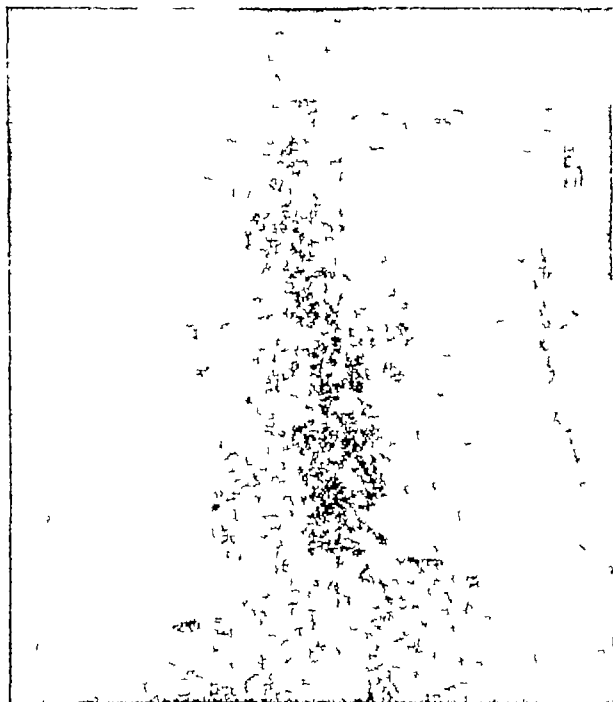


FIG 15 Case 13 Carcinoma arising in the parenchyma of the left upper lobe. Principal symptom severe pain left shoulder. The remaining features of the syndrome of superior pulmonary sulcus tumor were absent. Marked pressure distortion and destruction of bone can be seen. With the exception of evidence of external pressure on the tracheal wall bronchoscopy was negative. Diagnosis made at operation.

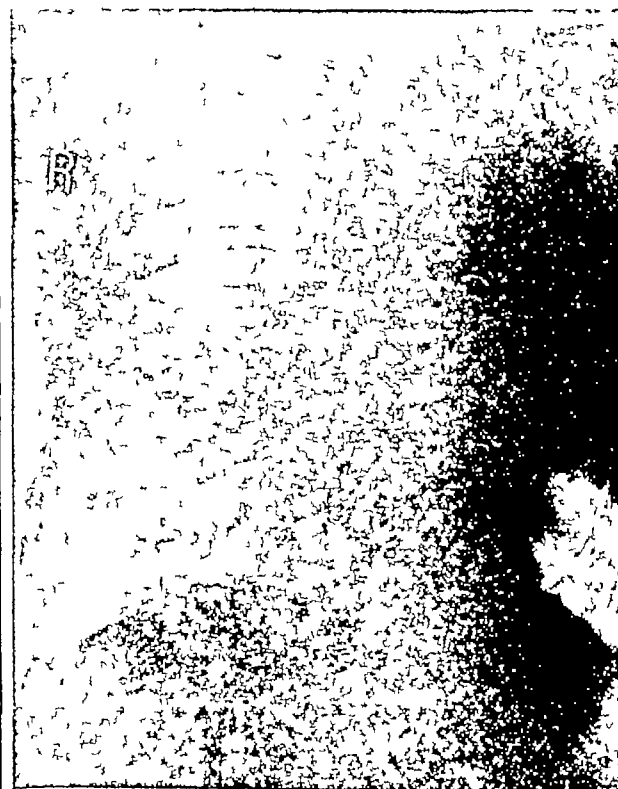


FIG 17 Case 14 Repeat x-ray two months later. The gradual involvement of an entire hemi-thorax obliterates the group characteristics and makes classification from the end picture almost a clinical impossibility.



FIG 18. Case 18. Complete atelectasis of the left lower lobe. Symptoms entirely gastric. Biopsy at this time reported "carcinoma" later changed to "adenoma." Note elevation of the diaphragm and shadow at the first interspace simulating carcinoma with fluid level.



FIG 19. Case 18. X-ray taken ten months later. Condition has remained the same with no evidence of recurrence for three and one-half years. The diaphragm remains elevated, probably due to adhesions. The patient had been operated on twice for gastric ulcer and once for adhesions and ventral hernia.

### Centrifugal Expansive Group

A cancer arising in the air bearing tissue of the lung (terminal bronchiole or alveolus) is surrounded by a soft spongy medium offering reduced mechanical resistance to its expansion and that resistance approaches equality on all sides. The resultant tumor is round and frequently sharply defined and continues to grow centrifugally, until some structure is reached, which alters the destiny of its shape or course. The most frequently involved structures are the pleurae and the chest wall. Without involvement of the chest wall these tumors are the most likely to be overlooked clinically in the early stages and are the most difficult in which to obtain early pathological and diagnostic confirmation. With involvement of the chest wall, the diagnosis is simplified but the prognosis is impaired.

#### EARLY DIAGNOSIS

Like any other disease cancer of the bronchus cannot be diagnosed in its early stages by any single sign, single instrument or single procedure. The clinician must be alert to its possible existence in every syndrome, however trivial, involving the health of the lungs and the specialist must often be prepared to exhaust every means at his disposal, before a final diagnosis is established.

### Symptomatology

The complaints presented by the patient, in order of frequency, follow the percentages given refer to the particular series of cases reported herewith, the less common symptoms being placed under their separate groups.

a Cough	_____	Early 90%	late 10%
b Pain	_____	Early 70%	late 30%
c Dyspnea	_____	Early 40%	late 30%
d Pneumonitis (bronchitis colds grippe influenza, pneumonia)	_____	Early 40%	late 30%
e Hemoptysis	_____	Early 30%	late 20%
f Loss of weight	_____	Early 30%	late 65%
g Asthma	_____	Early 5%	late 15%

It must be noted that the early symptoms of cancer of the bronchus are, as a rule, suggestive of some much less important disturbance. Their true significance, however, soon reveals itself in the "atypical" onset or course, which will, subsequently, be examined in greater detail.

### Hilus Infiltrating Group

Symptoms may be local or remote, depending upon the structures involved. Substernal pain and discomfort and pain in the shoulder radiating up the neck or down the arm via the phrenic nerve and the cervical or brachial plexus, are the outstanding complaints. The pain varies from a sense of discomfiting tightness under the sternum to a constant, unbearable, shoulder ache from which the patient desperately seeks relief.

It is not, however, of the localized burning character, below the sternum, associated with acute bronchitis

There may be difficulty in swallowing, gastric dysfunction, hoarseness or cardiac disturbance, due to direct extension of the growth, or involvement of the nerve leading to the organ concerned

Cough, in the opinion of the writer, is generally present much earlier than admitted by the patient in the usual history, due to the association of tuberculosis with chronic cough and the racial abhorrence and apprehension of that disease, and hemoptysis and dyspnea are important, if not always early complaints

### *Bronchial Obstructive Group*

With this group, cough is the chief complaint. Due to the impairment of drainage, there is retention of secretions and a localized bronchitis. The patients find difficulty in "clearing the lungs" and the cough takes on the character of a paroxysm, in many cases, in their effort to obtain relief. The amount of sputum is increased in nearly all cases, and it frequently contains blood. Frank hemoptysis may appear early and then disappear without recurrence for an interval of weeks or months.

In this group, is also heard, particularly the story of repeated "colds" with chills and fever, from which the patient may have been confined to bed on more than one occasion, with recovery "almost but not quite complete." At the same time there is a gradually increasing difficulty in obtaining sufficient air, which finally amounts to a shortness of breath. There is generally some degree of pain which may best be described as a pulmonary distress, or it may accompany the episodes of fever in the nature of a pleurisy, lasting or evanescent.

Remote symptoms are relatively few, except when a rapidly developing atelectasis on the left side causes gastric disturbance by elevation of the diaphragm.

### *Centrifugal Expansive Group*

The peripheral zone group probably have a "silent period", during the earliest stages, when the patient may realize that something is amiss, inside the chest cavity, but can scarcely describe his sensations. The earliest case seen by the author in this group, described his feeling as a "sense of oppression" and a "weakness in the lung." Later, however, when the pleura is involved, pain may be stabbing and severe. If the intercostal nerves are directly affected there may be a neuralgia of such severity as to require blocking of the trunks at the vertebrae, and when the growths are apically placed, pain in the shoulder closely simulates that experienced with the central zone group. (The relation of the so-called Superior Sulcus

Tumor<sup>5</sup> to these intrapulmonary apical growths, has not, at this writing, been definitely determined.)

Cough, while generally present at an early date, is not distressing and hemoptysis, in this series, did not occur.

### *Physical Examination*

The most constant and most important physical sign is a limitation of movement on the side of the affected hemithorax. Laennec's contraction, with drooping of the shoulder and "winging" of the scapula may be marked. The trachea is frequently shifted to the affected side. Neumann<sup>6</sup>, speaking in reference to cancer of the upper lobe, states, "The most valuable diagnostic sign of these cases is a solid (starre) dullness in the medial portion of the infraclavicular fossa, which encroaches upon the manubrium, even reaching its opposite border, but which does not fuse with the cardiac dullness." While this may be true of the far-advanced cases, it cannot be said to apply to the early, or even the moderately advanced cases, regardless of their site of origin. On the contrary, shifting of the mediastinum more frequently carries the hyperresonant note of the emphysematous contralateral lung, toward the affected side.

### *Hilus Infiltrating Group*

The central zone tumors present the greatest diversity of signs. Horner's syndrome<sup>7</sup>, inequality of the pupils, paralysis of the vocal cords, slowing or irregularity of the heart beat, diminished respiratory excursion (sympathetic, phrenic or vagus nerve involvement), stasis in the jugular and mammary veins or edema of the arm. The percussion note is not altered early in these cases, except for a widening of the mediastinal dullness, which is difficult to demonstrate dependably. The diagnosis should be made by other methods before the later physical signs appear.

### *Bronchial Obstructive Group*

Growths in the middle zone are nearly always accompanied by some degree of atelectasis and consolidation or effusion, with an associated decrease in resonance and fremitus. Signs heard through the stethoscope vary from day to day, even from hour to hour, depending on the patency of the bronchus. They are constant, however, in the broader sense, that they always indicate a unilateral bronchitis or asthma, a localized atelectasis or effusion or one of their combinations. Even when these patients are suffering from "pneumonia" with high fever and prostration, the bronchophony is subdued and mixed with a variety of rhonchi and never corresponds in intensity with the degree of dullness obtained upon percussion, but is roughly parallel with that normally heard in the interscapular area. The partially atelectatic, par-

tially consolidated lobe serves as a filter, suppressing the finer, but allowing the louder sounds to come through. If the patient is asked to take a few deep breaths, pronouncing the word "nine" with each expiration, the differentiation of the consolidation of cancer and that of true pneumonia may be dramatized. An alternation of bronchophony during expiration and silence during inspiration will replace the usual accentuation of both phases, found in true pneumonia.

These episodes terminate in "unresolved pneumonia", a term which has entirely lost its meaning and has no place in the medical vocabulary of to-day.

Among the most positive signs, must be mentioned the asthmatoïd wheeze and after breathing. These may be only rarely present in the early cases, but when recognized, are pathognomonic of obstruction to the lumen of a bronchus. The asthmatoïd wheeze must not be confused with the laryngeal wheeze sometimes produced by a nervous patient, when respiration is under conscious control. The best way to familiarize oneself with this sound is to spend a few sessions in a bronchoscopic clinic where it can frequently be heard through the bronchoscope with unmistakable clearness and intensity.

#### *Centrifugal Expansive Group*

It is possible for tumors in the peripheral zone to attain considerable proportions without revealing any other clue to their presence than diminished respiratory movement. Rounded tumors may also be tangential with the chest wall below the scapula and so escape detection in the early stages.

On the other hand early invasion of the pleura produces local signs which simulate, or represent when present, a circumscribed effusion while apical infiltrations require as far as physical signs are concerned, careful differentiation from the fibrotic type of tuberculosis. Enlargements of the regional lymph nodes axillary or cervical are not, uncommonly, an early finding.

#### *X Ray Signs*

In the general run of cases the x ray may be depended upon to reveal more information than any other method of examination. The findings are characteristic for each of the three groups.

#### *Hilus Infiltrating Group*

Due to the absence of air as a contrast medium the presence of these tumors in the early stages is most easily overlooked. Widening of the mediastinal shadow or bulging of the tumor mass into the airways or the lung field and fixity, rigidity or deformity of the esophageal lumen are characteristic of direct invasion. With peribronchial infiltration there is reduction in size of the hemithorax, shifting of the trachea and mediastinum toward the lesion and ac-

centuated radiating striations from the lung root. Individual increases in the width or density of these shadows may produce triangles at the lung root with the apex pointing peripherally or broad bands extending into the lung field. In the latter there is danger of misinterpretation as "interlobar plastic pleurisy", but the multiplicity of radiations of lesser importance, found in cases of infiltrating new growth, should prevent the commission of this error.

In all cases, elevation of the diaphragm on the affected side, and particularly progressive elevation as revealed by serial x ray films is significant.

#### *Bronchial Obstructive Group*

In this group are found the usual signs of complete or partial atelectasis of a lobe or part of a lobe. This process may be solitary or it may be associated with a suppurative necrosis or a simple degeneration in the cancer tissue, producing cavitation. Either of these complications to a fixed lobar atelectasis is sufficiently typical to permit of accurate interpretation to the experienced eye. When however, the atelectasis is incomplete, the differentiation becomes more difficult and the lesion might easily be mistaken for a chronic localized inflammation of the lung. Three possible diagnoses emerge under these circumstances pulmonary tuberculosis, pulmonary suppuration (including foreign body as an exciting cause) and new growth.

Tuberculosis can be ruled out by the history, the absence of tubercle bacilli in the sputum and the relative indemnity of the remainder of the homolateral and the totality of the contralateral lung fields.

From chronic suppuration the differentiation is not so easy. In distribution, however these lesions tend to be limited by anatomical boundaries lobule or lobe while the extent of the shadow of new growth is characteristically self limited (within the lobe). In chronic suppurative processes, where atelectasis and inflammation begin together, the pleura is generally involved before any extensive degree of shrinkage has taken place. Adhesions form between the parietal and visceral layers and the subsequent loss of volume of the involved lobe drags its content away from the level of these attachments. In new growth of the bronchus on the other hand, where atelectasis precedes or may remain free of inflammatory complications, pleural adhesions occur late and offer no mechanical impediment to the uniform shrinkage of the lobe. This is most easily detectable on the right side where shifting of the interlobar fissure is one of the striking accompaniments of these conditions. The x ray film, in consequence, reveals this fissure carried upward or downward, in the direction of the lesion. In inflammations the peripheral end is retarded in movement, while in new growths the peripheral end



either moves with or advances beyond the remainder of the line. In other words inflammatory lesions are characterized by a convexity of the interlobar fissure in the direction of the shift, whereas new growth shows either a straight line or a concavity in the direction of the shift. This advance movement of the lateral end of the inferior border of the atelectatic shadow, in upper lobe tumors, has already been pointed out by Golden<sup>9</sup>.

It has also been claimed by certain authors, notably Santé<sup>10</sup>, that obstructive emphysema may occur in tumors of this class, if a suitable intrabronchial impediment to the movement of air is developed. In the opinion of the writer, however, this is not the case. Loss of volume of the involved lobe starts with the beginning of impaired drainage and before obstruction occurs, the lobe is so reduced in size by the chronic atelectatic and infiltrative process, that a check-valve mechanism could scarcely reinflate it, even to its normal size. No photographic record of this condition has, to this author's knowledge, appeared as yet in the literature.

A point of lesser importance but equally noteworthy, is the fact that in inflammatory lesions (including tuberculosis), cavitation in the midst of the circumscribed or mottled x-ray shadows produces sufficient rarefaction to bring the Haversian system of the bones into detailed relief within its contours. In bronchial carcinoma, however, the opacity of the surrounding lung is sufficiently great to obscure bone detail, even in the centre of the shadow of a cavity.

#### *Centrifugal Expansive Group*

In the peripheral zone the shadow of the tumor mass is probably round until some important structure is encountered. Unfortunately, due to the absence of well-defined signs and symptoms in the early stages, x-rays are not often taken before the pleura is involved. The shadow is then obscured by collateral infiltration, effusion or atelectasis. Not infrequently bone destruction has already taken place.

#### SPECIALIZED DIAGNOSTIC METHODS

Carcinoma of the bronchus is rapidly being placed in line with other malignant diseases, where an early diagnosis is only made by the alertness of a good clinician and roentgenologist who establish the indications for biopsy whenever possible.

#### *Bronchoscopy*

Undoubtedly among the specialized methods for the obtainment of biopsy material, bronchoscopy ranks first. In practically all growths of the central zone and in the majority of the middle zone group, tissue can be taken from the tumor on direct examination. When seen, they are generally far enough advanced to be cyanotic, fungating and ulcerated with a sec-

ondary, acute, localized bronchitis. In cases of complete or nearly complete obstruction, quantities of mucopurulent material mixed with blood are retained distal to the mass and expelled upon the restoration of patency to the bronchial lumen.

Occasionally the removal of a biopsy specimen may instigate hemorrhage of disturbing severity. This blood should be sucked out to prevent accumulation in the bronchus or flooding of the branches leading to other lobes or the opposite lung. It is rarely dangerous and can always be controlled. By passing the end of the tube beyond the site of the lesion, the escape of blood is stopped by pressure and if it recurs the bronchus may be packed by narrow tape, attached to a strong thread leading out of the patient's mouth, the whole being left in situ for an hour or two. At any rate, the operator should never retreat from the field at the sight of an unusual amount of blood, as a subsequent atelectasis with fever and prostration will almost certainly replace the customary amelioration of symptoms, which follows the opening of a bronchus and the draining of the involved lobe.

Even when the necessary pathological confirmation cannot be secured in this way, a number of typically characteristic and strongly positive observations may be made. The trachea is commonly shifted toward the lesion, its wall or the wall of a bronchus bulges into the lumen, there are rigidity and fixity both in respect to motility and mobility, and the mucous membrane, instead of presenting the normal corrugations corresponding to the cartilaginous rings, may be uniformly smooth and pale or dull, thick and lustreless.

Accurate as bronchoscopy may be in the majority of bronchial new growths, it has little or no value in tumors arising in the smaller branches or the parenchyma of the lung, 35 per cent of the cases in this series. Two years ago a well-known internist in this city asserted that he would rather allow his patient to die than to advise his submission to bronchoscopic examination. Happily the acquisition of improved technical methods by a continually increasing number of men has long since removed the justification for such paternally protective measures. Bronchoscopy can always be carried out safely, without pain, under local anesthesia and frequently leads to the discovery of a benign growth or an unsuspected foreign body, which can be removed with every prospect of complete cure. An early bronchoscopy with negative results is always better than a late one with positive findings, but a negative bronchoscopy simply means that one method of diagnosis has failed. Jackson and Jackson<sup>11</sup> in their latest edition of the masterly treatment of the subject of peroral endoscopy state, "It is now generally accepted

that the bronchoscope affords the only means of making an early and positive diagnosis of malignant disease of the bronchi and lungs." Perhaps this attitude should not be too greatly stressed, as the mistake of considering this method as the only reliable procedure is certain to retard the diagnosis of a number of cases on the basis of exclusion and to allow them to drag on to a hopeless consummation.

#### *Pneumothorax and Thoracoscopy*

Effusion into the pleural cavity is a common accompaniment of carcinoma of the bronchus. In the peripheral zone group it occurs as a direct result of invasion of the visceral pleura by the malignant cells. Under these circumstances diagnostic tap may produce a hemorrhagic liquid containing cells which are useful in diagnosis. A clear straw-colored effusion is, however, equally typical. In the middle zone group effusion in the early stages is more likely to be a part of the general picture of the complicating "pneumonia." A chest tap produces a clear liquid without blood or tumor cells. There may even be a spontaneous clearing of these collections, together with the subsidence of fever and other acute clinical symptoms when the bronchus is opened by accident or by design.

At the same time that a specimen of pleural fluid is taken for laboratory study a useful diagnostic move can be made by evacuating the entire content and replacing it with air. X rays taken following this procedure will show a density of the involved lobe, much greater than that seen in other clinical types of pleurisy with effusion. There is also revealed a marked reduction in the volume of the lobe and a corresponding emphysema of the remainder of the lung or a portion of the border of the tumor mass may be brought to light.

In the peripheral zone group, even when no fluid is present, a great deal of information may be gleaned by creating a pneumothorax and inspecting the pleural cavity from inside by means of a thoracoscope. Although the author has attempted to do so on several occasions, he has never succeeded in obtaining biopsy material from the pleural surface of the lung. Adhesions are not always present at the site of the tumor even when it is near the surface.<sup>13</sup> If the patient is seen early enough this procedure should be a practical possibility in a limited number of cases without danger of traumatic collapse of the lung. At the same time secondary characteristics, corresponding in importance to those seen in bronchoscopy may be observed. The pleura is lustreless and boggy in appearance over the affected lobe. There is a reduction in mobility of the lung, increasing to complete fixity as the pleural attachments are approached. The cardiac impulse instead of being transmitted by

the normal wave like fluctuation of the lung surface, becomes a massive rise and fall of diminished amplitude in the involved lobe. At the site of attachment between the two pleural layers, the string and band adhesions of an inflammatory process are absent and a circular fusion on a broad base is seen. The angle between the two pleural layers at the line of approximation instead of being acute as in inflammatory processes is rounded out by the spread of the malignant cells.

In cases where tumor tissue cannot be obtained the thoracoscope may also be of considerable assistance in judging the operability of the case. It may also assist in localization for the next procedure either by transillumination of the chest wall or by the guidance under direct observation of the end of an exploring needle inside the pleural cavity.

#### *Punch Biopsy*

When the tumor has been accurately localized by x ray or thoracoscopy or both, a biopsy trocar can be inserted directly into the mass for the taking of tissue. Crossing free pleural space should be avoided. Even the peripherally located growths are surrounded by an area of impaired drainage and retained infection. The danger of empyema is obvious.

#### *Operative Biopsy*

In the experience of the writer, metastatic glands, especially in the neck and axilla, are found more frequently in the peripheral zone group than in those more centrally located and always it would appear after the pleura has been reached and infiltrated.

In one case of this series where the diagnosis was in doubt and where biopsy tissue could not be obtained there was an associated pulmonary suppuration. In this instance a two-stage operation was deliberately done with the object of draining the abscess and at the same time of removing tissue for pathological examination. Naturally the possibility of a chronically draining malignant sinus was visualized. The patient was immediately placed under deep x ray therapy when the diagnosis was established and the sinus closed with surprising rapidity. The question is therefore left open as to how frequently this method should be used.

#### *Bronchography*

The injection of opaque substances into the bronchial tree can be carried out as an office procedure. It may show obstruction, stricture or deformity of the bronchial or tracheal lumen. In this way the necessity for bronchoscopy may be graphically demonstrated to the patient or his responsible associates. It should never be used as a substitute for bronchoscopy. The author has never used this method of examination in the bronchiectatic type of tumor and cannot therefore speak of its value.

## DIFFERENTIAL DIAGNOSIS

The author willingly subscribes to the protean manifestations of this disease and to the many difficulties to be overcome before an accurate diagnosis can be made. He believes, however, that the disease can be diagnosed always in its early stages if the observer will train himself to be clinically sensitive to certain well-defined criteria. These may be individual and pathognomonic or inter-related and "atypical" but nevertheless indicating the next step in diagnostic procedure. Most of the errors, both of diagnosis and differential diagnosis, can be avoided by observing the following rules.

Substernal pain is nearly always a sign of important disease and demands thorough investigation.

A chronic cough with pain or dyspnea or both is rarely tuberculosis and should never be so diagnosed unless proved by repeated positive sputum examinations.

A constant chest pain should arrest attention and vagaries in chest pain demand immediate clarification.

In cases of pain in the shoulder extending up the neck or down the arm, look for Horner's syndrome, venous stasis, hoarseness, dysphagia.

"Unresolved pneumonia" is not a diagnosis and frequently masks cancer of the bronchus.

An apparent recovery from an "atypical" pneumonia does not rule out cancer of the bronchus.

Hemoptysis where the x-ray is negative or indefinite is an indication for bronchoscopy (suspected aneurysm excepted).

Diminished respiratory movement or diaphragmatic excursion if unilateral and not part of a clearly defined clinical entity is an indication for x-ray study.

Asthmatoid wheeze or after breathing are diagnostic of bronchial obstruction and are indications for bronchoscopy.

Unilateral bronchitis or unilateral asthma are indications for x-ray and bronchoscopic study.

A negative bronchoscopy, or the finding of tubercle bacilli in the sputum, does not rule out cancer of the bronchus.

Diminution in size of a hemithorax or shifting of the interlobar fissure with concavity toward the lesion is highly suspicious of carcinoma of the bronchus.

Elevation of a diaphragmatic dome, especially progressive elevation, is worthy of wide investigation.

## SUMMARY

An analysis of the observations made on twenty-eight cases of primary carcinoma of the lung and three cases of pathologic diagnostic error are presented.

A classification is offered of three groups,

which, in the author's opinion, demonstrate a logical and serviceable interrelation between the anatomical situation and the clinical expression of the disease, and under these group headings the signs and symptoms are presented in an attempt to delineate definite clinical syndromes.

In order to maintain simplicity, the rarer forms, e.g., miliary carcinosis, bronchiectatic carcinoma and those with remote metastases have not been brought into the discussion. With the same purpose symptoms of a pulmonary arthropathic nature, directing attention to the inflammatory lung complication rather than the primary disease, such as, clubbing of the fingers and rheumatoid manifestations, are excluded from the typical clinical pictures. Discussion is likewise limited intentionally, to the early clinical findings in each group, wherever the later clinical features might cause confusion by overlapping with another group.

The application of the different technical methods which may be serviceable in diagnosis is discussed.

## ANALYSIS OF CASE REPORTS

Of the thirty-one cases upon which this paper is based twenty-eight ran a typically malignant course and three cases although diagnosed carcinoma by examination of material obtained at biopsy through the bronchoscope, ran, subsequently, a benign course.

The malignant cases were all white males of the average age of forty-five years, the youngest thirty-six years and the oldest sixty-eight years. The occupations varied greatly and apparently had nothing to do with the etiology of the condition. Of these cases twenty-five are now dead and the remaining three are rapidly approaching death. Of the twenty-five who died, twenty-four lived for one year or less after the diagnosis was made. One case lived for two years and it is worthy of note that he was among those who received no treatment curatively intended.

Erythrocytopenia and leukocytosis were characteristic. The average red cell count was 4,106,000 per cu mm and the average white cell count was 14,900 per cu mm. The increase in white cells appeared to be associated with pulmonary inflammatory complications.

Bronchoscopy proved to be the most useful diagnostic method. Seven cases were not bronchoscoped because of the patients' poor clinical condition, metastases to the brain or the bones of the neck or shoulder, or because the tumor was so near the periphery of the lung that no purpose could be served. In the remaining twenty-four cases, satisfactory biopsy material was obtained in seventeen. Tissue obtained from the remaining seven cases was reported normal in five, chondroma in one and fibrotic nodule in one. It must be credited to the value of bron-

choscopy, that in two fatal cases, where no malignant tissue was found microscopically, definite secondary, intrabronchial, malignant characteristics could be observed and in three cases where microscopic evidence of malignancy was seen, but the subsequent course was benign, the bronchoscopic diagnosis was, congenital web of the bronchus, papilloma of the bronchus and fibrochondroma of the bronchus.

In view of these observations the author feels that a shadow of doubt is cast over the accuracy of previously reported cases of malignant disease of the bronchus "cured" by removal through the bronchoscope. The latter three cases have now been under observation for periods of from three and a half to four and a half years and it is difficult to believe that the mere removal of tissue from within a bronchus, or even the removal of a pedunculated growth, could completely eradicate a true carcinoma. It is much more logical to assume that carcinoma of the bronchus may fall into the category of growths such as appear in the urinary bladder, where the establishment of the grade or even the existence of malignancy is known to present insuperable difficulties on some occasions. Similarly, in spite of the death-dealing qualities of the average cancer of the bronchus, the possibility of malignant potentialities making a delayed appearance in an apparently benign growth, cannot be entirely denied. In this series, two cases suffered from cough, loss of weight and occasional hemoptysis, over a period of eight years prior to their last illness, according to the onset given in their personal history. In both of these cases, however, death followed within six months of the occurrence of symptoms leading to the diagnosis of cancer of the bronchus. The question whether such tumors do or do not exist can only be answered by repeated bronchoscopic and biopsy examinations of suspected cases over long periods of time. A check up of this kind was pursued for a period of three years in the three cases brought into question above, but in each instance the diagnosis was finally reversed.

Subdivided according to location, one tumor arose from the trachea to the right of the bifur-

cation, nineteen were in the right lung and eleven in the left. There were of the Hilus Infiltrating Group, five cases, Bronchial Obstructive Group, twenty cases (seventeen malignant—three benign), and Centrifugal Expansive Group, six cases.

In the single instance of tumor arising from the trachea the first symptom was dysphagia due to infiltration of the wall of the esophagus.

All cases in the peripheral zone showed involvement of the pleura and chest wall. In three instances destruction of bone had already occurred. One of these patients exhibited a definite "Pancoast Syndrome" of "Superior Pulmonary Sulcus Tumor." So distinctive, indeed, is the clinic of this type of tumor that it almost isolates itself and defies classification with other tumors of the lung.

The author is indebted to a number of his medical colleagues for assistance in many ways. To assign credit to them individually would be impractical. He especially desires however to mention the names of Dr. L. T. Perrault and Dr. R. F. Harloe for assistance in the collection of clinical data and to Dr. W. E. Youland of the Flower Hospital for a critical review of the pathological material.

#### REFERENCES

1. Fried D. M.: Primary carcinoma of the lung. *Medicine* 10:375 (Dec.) 1931.
2. Miller James A. and Jones, O. R.: Primary carcinoma of the lung. *Am. Rev. Tuberc.* 31:1 (Jan.) 1930.
3. Nelson, H. P.: Postural drainage of the lungs. *Brit. M. J.* 351 (Aug. 11) 1934.
4. Leclaire, Maurice: *Le Pneuon*. A. Maloine et Fils, Editeurs. P. 60.
5. Pancoast, H. K.: Importance of careful roentgen ray investigations of apical chest tumours. *J. A. M. A.* 83:1497 (Nov.) 1924.
6. Superior pulmonary sulcus tumour. *J. A. M. A.* 99:1291 (Oct.) 1925.
7. Neumann, W.: *Die Klinik der Beginnenden Tuberkulose Erwachsener*. Wien: Julius Springer. Volume 3. 1925.
8. Jackson, Chevalier: A new diagnostic sign of foreign body in trachea or bronchi: the "asthmatic wheeze". *Am. J. M. Sc.* 186:626 (Nov.) 1918.
9. Lloyd, M. S.: After-breathing: a useful sign in the diagnosis of diseases of the lungs. *New York State J. Med.* 31:1147 (Sept. 15) 1931.
10. Golden R.: The effect of bronchostenosis upon the roentgen-ray shadow in carcinoma of the bronchus. *Am. J. Roentgenol.* 13:121, 1929.
11. Sants, L. R.: *The Chest, Roentgenologically Considered*. Annals of Roentgenology. New York: Paul B. Hoeber Inc. Volume II. P. 174. 1931.
12. Jackson, Chevalier and Jackson, Chevalier L.: *Bronchoscopy, Esophagoscopy and Gastroscopy*. Philadelphia: W. B. Saunders Company. Third Edition. P. 219. 1934.
13. Young, Archibald: Primary carcinoma of the lung. *Ann. Surg.* 100:11 (July) 1934.

For a more complete bibliography the attention of the reader is especially directed to references 1 and 2 above.

words of mine are being taken down, and I hope that they will be published in the transactions, because at the end of the next fifty years, I shall be quite curious to see if my prophecy came true

PRESIDENT LORD It gives me the greatest of pleasure to call next upon Dr Frank E Kittredge of Nashua

DR FRANK E KITTREDGE *Mr President, and Gentlemen of the Society*—I have not Dr Flanders' wit, and I shall make no attempt at a speech, but I want my young friends, particularly the young men around Nashua who do work such as I do, not to think for a moment that fifty years of practice in medicine or of receiving honorable mention places me upon the shelf As Dr Flanders has said, I believe that I have practiced medicine during the best medical period in history I think that the doctors during the past fifty years have been more interested, have been able to do their work with a greater degree of comfort than they ever will be in the future

Now, if there are those among you who ever will stand where I am now standing, or who have practiced medicine for the greater number of fifty years, and who have received as much satisfaction and as much fun out of the practice of their profession as I have received out of practice, you certainly can rest assured that you made no mistake in the choice of your calling

PRESIDENT LORD I hate to voice this suspicion, but I think that a little detective work would reveal, in reference to the last two speakers, that somebody has been tinkering with the birth certificate records

I am going to ask if Dr Frank S Lovering of Moultonboro is here

[There was no response]

Is Dr William S Manuel of Portsmouth here?

[There was no response]

Is Dr Edward E Twombly of Colebrook here?

[There was no response]

These three men have also been in the practice of medicine for fifty years

I will ask, now, if Dr Ellen A Wallace of Manchester is here

DR ELLEN A WALLACE *Mr President and Gentlemen of the Society*—Fifty-three years ago, when I decided to be a doctor, all my family and my friends opposed it, because my health was not good and they said that I would never live to be a doctor Since I heard from Dr Metcalf that my fifty years was over, I have wished some of those people could know

that I had practiced medicine for fifty years [Dr Clifton S Abbott then assumed the Chairmanship of the Session]

CHAIRMAN ABBOTT Members of the New Hampshire Medical Society, you are now witnessing the high spot in the career of the Vice-President of your Society So far as I know, this is the only official duty that the Vice-President has But this, unfortunately for the Vice-President, has not escaped the eagle eye of our President or that of our Secretary, both of whom say, "No more will there be a year of delightful indolence for the Vice-President, for next year the Vice-President must have a job"

This being so, I will proceed with my job, and present to you the President of the New Hampshire Medical Society, Dr Frederic P Lord, who will deliver the President's Address

The President's Address was followed by a symposium on Obstetrics with the following speakers

Ante-Partum Care—Marion F Eades, Boston, Mass

Mechanics of Delivery (especially as it relates to intracranial hemorrhage)—Frederick C Irving, Boston, Mass

Post-Partum Infections—Foster S Kellogg, Boston, Mass

Care of the Newborn Infant—Richard S Eustis, Boston, Mass

Open discussion

WEDNESDAY MORNING, MAY 8, 1935

The Session convened at ten-fifty o'clock in the morning, with President Lord presiding

PRESIDENT LORD The meeting will please come to order

We have been entertaining angels for the last two days, mostly from New England, and, as their wings are not visible, I am going to ask them to stand as I call their names, and then, as each one wishes to say a word, I will be glad to hear from them These men are none other than the visiting delegates

Is Dr Charles Kinghorn from Kittery, Maine, here?

Is Dr Pillsbury of Lowell present, or Dr Dutton of Wakefield?

[Dr Dutton arose and the audience applauded.]

PRESIDENT LORD Is Dr Cutter of Providence here?

DR CUTTER *Mr President and Members of the New Hampshire Medical Society*—My colleague here says that I am the senior member, and I am very glad to bring the greetings of the Rhode Island Medical Society to this meeting of the New Hampshire Medical Society

It has been a very enjoyable meeting, and I have had a great deal of pleasure in listening to the program thus far. Our Society and our State organization are probably very similar to yours. We have the same problems to meet that you have, and we have the same threatening of industrial or state medicine that seems to be hanging over the rest of New England. I don't know when it is coming, but we have some indications of it at the present time.

Our treatment and care of the indigent patients, or the patients who are on relief, emergency relief, now have been delegated to the general profession in Providence. Instead of having city physicians or special physicians appointed to attend these patients they are allowed to call any physician in the community and that physician, if he gets an authorization from the Public Aid Department, can render a bill for fifty per cent of the normal ordinary fee which is charged. If the case is properly on relief, that bill will be paid, otherwise the physician is out of luck, as he frequently is.

The number of those cases, of course, and the number of cases that are entirely charity cases in our city, is very large indeed so that our income as physicians has been greatly curtailed, while the amount of work that we are doing has been perhaps up to par or a little better, but a large part of it has been and has to be charity work. People are not allowed to suffer, and we are not always able to discriminate between patients who will pay and the patients who will be entirely charity cases.

All the members of the profession in Rhode Island, I think, have been fairly busy. Their incomes have all been cut. I know that the income tax that we are paying as physicians is about fifty per cent of what it was six or seven years ago, and I presume that is true all over New England. The earned income that we receive is very much curtailed. And some of us find that as we are getting older, our work is also decreasing. I know, for myself, that for the past year or two my work has consisted very largely in signing death certificates.

**PRESIDENT LORD** Thank you, Dr. Cutter. We appreciate your remarks about Providence.

Is Dr. Philip Batchelder of Providence here this morning?

**DR. PHILIP BATCHELDER** I join with Dr. Cutter in bringing the greetings of the Rhode Island Medical Society. I am enjoying the meeting very much, too.

**PRESIDENT LORD** Our representative from Connecticut who I hope, is here, is Dr. Arthur B. Landry of Hartford, Connecticut.

**DR. ARTHUR B. LANDRY** Mr. President and members of the New Hampshire Medical So-

ciety—It is indeed a great pleasure for me to be here to represent the membership of the Connecticut State Medical Society.

I want to tell you that the State of Connecticut is celebrating its Tercentenary this year, and while I have not been delegated to invite you to come to our State and help us celebrate this great anniversary, I am going to do so just the same. I hope that as many of you who can come to Connecticut will do so.

The Connecticut State Medical Society holds a clinical congress in New Haven each year, and this year we hold the Congress in September. If you gentlemen can escape the fascinating influences of your medical centers for a while and can think of coming down to New Haven to this Clinical Congress, I am sure that you will be well entertained.

I want to thank you very much for the hand some way in which you have received us, and I hope that we will, accordingly, receive your delegates when they come to see us this month.

**PRESIDENT LORD** Is the delegate from Vermont here?

[There was no response.]

**PRESIDENT LORD** Are there any other visiting delegates present?

**A MEMBER** There is a gentleman here at my left, Mr. President, who informs me that he just arrived here by plane from Palo Alto, California, and tomorrow he is going to hop off again. He is Dr. Grooms of California.

**DR. GROOMS** I suppose it is rather a novelty for a medical man to travel much by plane. Since 1914, up to the present time, I think I have traveled something like 150,000 hours a year.

Traveling by air has its advantages and some disadvantages. I found out, too late, that you have a field here, otherwise, I would have landed on your doorstep instead of grounding at Boston. However, I hope that I will come this way again and I will make use of your local airport.

**PRESIDENT LORD** We hope you will, and we hope that others will try the same.

Our first presentation this morning will be on the subject of Bronchoscopy, given by Dr. John A. Coyle of Hanover and Dr. Leslie K. Sycamore of Hanover.

The morning program continued with the following two papers:

"Treatment of Burns," Grover C. Penberthy, Detroit, Michigan. Discussion opened by Walter H. Lacey, Keene, James W. Jameson, Concord.

"Nutritive Failures as a Clinical Problem," James S. McLester, Birmingham, Alabama. President Elect, American Medical Association.

WEDNESDAY AFTERNOON, MAY 8, 1935

The Session convened at three o'clock in the afternoon, with President Lord presiding

PRESIDENT LORD The meeting will please come to order

The first matter on the program this afternoon is slightly different from the usual order of things We are going to introduce our new President to the Society a little earlier than formerly

In his régime as Vice-President, as he says himself, he had "nothing to do", but we have now fixed it up so that in the future the President will have nothing to do because the Vice-President will do it all So it will work out that Dr Abbott has had nothing to do as Vice-President, and he will also have nothing to do as President He has been Secretary of his own county society, and we all know him very well and have known him for many years

I take great pleasure in presenting our new President, Dr Clifton S Abbott

PRESIDENT-ELECT ABBOTT My friends, I thank you for this fine reception and I thank you for this distinguished honor that you have done me by electing me your President I am beginning to realize that there are exacting duties, perplexing problems and considerable hard work associated with the office All that I can say at this time is that I hope, with your help, I may carry on as acceptably as some of my eminent predecessors in the past

PRESIDENT LORD Gentlemen, I wish you to listen to a man who will speak to us in regard to a matter in which we are all interested I will ask Lt Col John T Aydelotte if he will come to the platform

LT COL AYDELOTTE *Mr President and members of the New Hampshire Medical Society—*My message, happily, is brief It is an important message, nevertheless

It is my purpose to discuss one or two features of the present military medical preparedness of our country For a period after the war, we had many thousands of medical men who knew much about the art of war in a medical sense Those of you who were in the army know that you must be something more than a private practitioner in order, properly, to take care of such work

I believe that it may be properly said to be a truth that it is a little late to begin to learn after war is being declared For that reason, wise heads in our Federal Government believed, fought for, and finally brought to pass a law which would continue the knowledge gained in war Among other methods, there was established what was known as an R O T C unit in the principal medical schools Schools in every portion of America were represented with

R O T C units, in which medical students were taught military science, as it pertains to medicine, with their medical career

I know that those units were well received, and that the teaching was believed to be of value by the faculty We, ourselves, in the regular Army Medical Corps, were proud of what we were doing

The Congress, in recent years, has failed to appropriate money for the maintenance of these units As a consequence, the last one of our classes graduated members and commissioned them in 1935

How are we going to get replacements for the Reserve Corps of the Medical Department hereafter? Fifty per cent of our reservists commissioned in the Medical Department came from our medical units But that is lost to us now, and I would say that we are somewhat concerned as to where our replacements are to come from hereafter And it is not sufficient to say "replacements" only, for we not only require replacements, gentlemen, but actually, we require additions The only thing that we can do is to come to the medical profession of the country And so, we come out and tell our story to you

What am I asking you to do about it, gentlemen? Only this You must be preparedness-minded

Whom do we want? We want all physically fit medical, dental and veterinary men, that is true, but we must have the young fellows, too The older men have learned much, but after all, the older men are not going to be with us so long as the younger ones, and we would like to train the latter as soon after they leave the medical schools as possible

The trained men will certainly get a better berth They will get a better commission when war starts than the ones who will take potluck if they wait

Please advise the young men of the medical profession, then, that it behooves them, as a part of their duties, to be prepared in case of war I don't know how Mr Young Medical Man may feel about it now, when war is perhaps so remote But I do know this I know that many thousands of doctors came into the army during the war, and how much better for every one of them who came in if they had had some training before the day arrived when they were to put on their uniforms

PRESIDENT LORD There is a sentence in our By-Laws to this effect, concerning the duties of the Committee on Public Relations, Public Policy and Legislation, now changed to the Committee on Public Relations, that it shall have the authority to be heard before the entire Society upon questions of great concern at such time as may be arranged during the annual session

This committee feels that this is an occasion where we wish to have presented to you a matter of great concern, and I am going to ask the Chairman of the Committee on Medical Relief to speak to us to-day

Dr. ROBERT J. GRAVES *Mr President and Gentlemen*—The basis for the work of the Advisory Committee on Medical Relief are two fundamental premises, the first of which is that the patient shall have an opportunity within reasonable limits, of selecting his own doctor, and the second of which is that the doctor shall receive a reasonable remuneration for his services.

Probably the shortest way of getting across what we have done to date, which is tentative but reasonably final, will be to read our report which we made to the House of Delegates.

[Dr Graves then read the report referred to]

PRESIDENT LORD In arranging this program, the Committee was very anxious to have some discussion in regard to medical economics, in which we are all interested

Perhaps the trouble is that too many of us would like to talk about it. So we have gone to the one who could tell us more authoritatively about it than any one I know

It is a great pleasure for me to present to you at this time Dr Nathan B. Van Eitten of New York City, Vice Speaker of the House of Delegates of the American Medical Association who will address you on the subject of "Medical Economics of 1935"

The program continued as follows

"Bright's Disease," Harold E. MacMahon Boston, Mass. Discussion opened by A. Philip LaFrance, Laconia, Clarence O. Coburn Manchester

"Treatment of Skull Fractures," Harry E. Mock, Chicago, Illinois. Discussion opened by Emery M. Fitch, Claremont, Herbert L. Taylor, Portsmouth

#### REPORT OF THE TRUSTEES OF THE NEW HAMPSHIRE MEDICAL SOCIETY

For the Year Ending May 1 1935

#### RECEIPTS

December 26 1934—Received from Carleton R. Metcalf Treasurer. This was deposited in the Nashua Trust Company as a part of the General Fund. \$500.00

#### EXPENDITURES

August 27 1934—Paid D. G. Smith Delegate to the A. M. A., his expenses for the Cleveland meeting by check from the Portsmouth Trust and Guarantee Company \$81.02

#### SPECIAL FUNDS

##### The Bartlett Fund

Deposit in the Portsmouth Savings Bank—Book No. 21110. The original bequest (\$352.11) by the terms of the will is kept as a permanent fund. \$5 645.23

##### The Pray Fund

Deposit in the Strafford Savings Bank—Book No. A 42. \$1000.00 of this must be kept as a permanent fund the income of which is to be expended for prize essays. 1 357.95

##### The Burnham Fund

Deposit in the New Hampshire Savings Bank—Book No. 80100. \$1,140.00 must be kept permanently the income to be expended for prize essays. \$100.04 was withdrawn for this use in 1934. 1 964.12

##### The Benevolence Fund

Deposit in the New Hampshire Savings Bank—Book No. 99559. 902.09

##### The General Fund

Deposit in the Portsmouth Trust & Guarantee Company—Book No. 12813. 3 078.61

Deposit in the New Hampshire Savings Bank—Book No. 35598. 4 938.44

Deposit in the Nashua Trust Company Savings Department—Book No. 4882. 500.00

Total Funds on Deposit. \$18 386.43

#### FUNDS NOT FOR GENERAL USE

The Bartlett Fund. \$352.11  
The Pray Fund. 1 357.95  
The Burnham Fund. 1 964.12  
The Benevolence Fund. 902.09  
4 576.27

Present Funds Available for General Use. \$13 810.16

Funds Available for General Use May 1 1934. 13 035.84

Net Gain for the Year. \$774.52

The balance due the Society from the Merrimack River Savings Bank—Book No. 26934—in process of liquidation is \$733.55  
Your Trustees consider this of little value

The Accounts of the Treasurer have been examined and found correctly cast and properly vouched.

HENRY O. SMITH  
THOMAS W. LUCE.

PRESIDENT LORD If there is no further business to come before the meeting, I declare this One Hundred and Forty Fourth Annual Session of the New Hampshire Medical Society adjourned



## MISCELLANY

EXCERPT FROM VITAL STATISTICS  
OF NEW HAMPSHIRE

During the year 1933 there were 7,419 births, 6,304 marriages and 6,498 deaths, while during 1934 there were 7,864 births, 7,261 marriages and 6,398 deaths. This makes an increase of 445 births and 957 marriages during the year 1934, while there was a decrease of 100 deaths.

During the year 1933 there were 615 divorces (legal separations and annulments included), while during 1934 there were 737. There were 545 minor children affected by the divorces for the year 1933, while for the year 1934 there were 696 children affected.—*Health* Issued monthly by the New Hampshire Board of Health.

## RECENT DEATHS

REMICK—EDWIN REMICK, M.D., of Tamworth, New Hampshire, died suddenly, June 2, 1935. He was born in Tamworth, New Hampshire, in 1866, the son of Levi and Harriet Beede Remick, and was educated in the public schools, Fryeburg and Northwood Academies and was graduated from the University of Vermont Medical School in 1894.

He was a member of Carroll County Medical Society, the New Hampshire Medical Society, and the American Medical Association.

Dr Remick is succeeded by his son, Dr Edwin C Remick, of Tamworth.

MOUSLEY—BAYARD TAYLOR MOUSLEY, M.D., of Walpole, New Hampshire, died at his home, May 30, 1935. He was born in Oxford, New Hampshire, January 17, 1879, the son of the late William and Catherine Quint Mousley.

He graduated from the Kimball Union Academy at Meriden, studied two years at the University of Vermont and obtained his degree in medicine at the University of Maryland.

FELLOWS—GEORGE ROBERT FELLOWS, M.D., of Seabrook, New Hampshire, died late in June 1935, aged eighty six years. He had practiced in Seabrook for forty-nine years and was in Florida where he went in an effort to regain his health.

The announcement from Florida was dated June 28, but without specific statement of the date of death. He is believed to have been the oldest practitioner of New Hampshire.

Dr Fellows was a member of the New Hampshire Medical Society.

COMBINED EXTRA-UTERINE AND INTRA-UTERINE  
PREGNANCY\*

## A Report of Two Cases

BY ROY J HEFFERNAN, M.D.†

CO-EXISTING extra-uterine and intra-uterine pregnancy is unusual but not extremely rare. Neugebauer<sup>1</sup> collected 243 cases from the literature up to 1913. Stein<sup>2</sup> added 36 cases more up to 1928, including one of his own. A fairly comprehensive search revealed no further cases. Thus the instances described below make the total number reported to date, 281.

CASE 1 Mrs J, aged twenty five, family and past history unimportant, no previous pregnancies. The last regular period occurred June 12. On July 23, the patient began flowing and developed sharp pains in the right lower quadrant. Her family doctor performed a curettage at home on August 7. The flowing and pains continued intermittently, with dizziness and syncope. On August 22, I was asked to see the patient and found her resting comfortably in bed with a normal temperature, a pulse rate of 112 and a respiratory rate of 24. The complaints were low abdominal discomfort with pain on sitting or attempt at defecation. Physical examination revealed pallor of the skin and mucous membranes. A tender mass, more prominent on the right, extended to the level of the umbilicus. Vaginal examination showed a nulliparous introitus, with slight bloody discharge. The cervix was closed and cer-

vical tug was very painful. The fundus seemed displaced to the left but could not be definitely outlined. The patient was transferred to St. Margaret's Hospital, Dorchester, with a diagnosis of ruptured extra uterine pregnancy.

On August 23, under gas ether anesthesia the abdomen was opened by a median suprapubic incision, exposing a hematocele which filled the right side of the pelvis. The clots and fluid blood were removed disclosing a rupture of the outer third of the right tube. The uterus was about twice normal size, the right ovary and left adnexa appeared normal. After a right salpingectomy, the abdomen was closed in layers without drainage.

Seventeen months later I delivered this patient, by low forceps, of a full term normal female child.

Eight months later the patient informed me, by telephone, that she had missed two periods, had begun to flow one hour before and had severe pain in her lower left abdomen. She said "I think my left tube is bursting now!"

Examination showed a moderate bloody flow, a uterus enlarged to the size of a ten weeks' pregnancy, with the fundus in good anterior position. There was general pelvic tenderness most marked in the left vault, which contained a lemon sized tender mass. The patient was transferred to the Carney Hospital and prepared for immediate operation.

The abdomen was reopened in the median line disclosing considerable free blood and clots with a break of the middle third of the left tube, which contained a ruptured vessel, pumping blood. It was remarked that the uterus appeared larger than usual.

\*Read at a meeting of the Obstetrical Society of Boston February 19, 1935.

†Heffernan Roy J—Visiting Gynecologist and Obstetrician Carney Hospital. For record and address of author see "This Week's Issue" page 130.

for a tubal pregnancy. A left salpingectomy was done, the blood clots were removed but the fluid blood was undisturbed. The incision was then closed without drainage. As an intrauterine pregnancy was suspected the patient was kept under the influence of morphia for three days but on the fourth day after the operation the patient expelled a two months fetus with membranes intact. She made a good recovery and left the hospital on the thirteenth day.

**Case 2.** Mrs. C., aged thirty four was seen in consultation with Dr. Francis Broderick of Jamaica Plain on March 24 at the Forest Hills Hospital. The past history and family history were irrelevant. There had been one miscarriage four years previously and one full term normal delivery fourteen months ago. In January there had been one scant period the first since delivery but the patient thought her amenorrhea was due to the fact that she was still nursing the baby.

On March 23 while tugging at the baby carriage she felt a sudden, severe pain in the right lower abdomen. Thinking she had strained a muscle the patient went to bed but the pain became more severe and she was sent to the hospital.

Examination showed extreme pallor a pulse of 148 and the blood pressure 60 over 0. The abdomen was moderately distended with marked tenderness in the right lower quadrant. Vaginal examination revealed a purous introitus with no signs of inflammation and no bloody discharge. The cervix was closed and cervical tug very painful. The fundus was enlarged but definite palpation was impossible because of pelvic tenderness. An indefinite tenderness could be felt in the right vault.

Glucose and salt solution were given by vein and

hypodermoclysis. A donor was secured and 750 cc. of blood were given by the citrate method. The pulse dropped to 112 and the patient's general condition was very much improved. Under local anesthesia supplemented later with nitrous oxide and oxygen the abdomen was opened by a median suprapubic incision. The peritoneal cavity contained a tremendous amount of fluid and clotted blood. The distal half of the right tube was ruptured. This was quickly removed and all easily accessible clots were extracted. The incision was closed without drainage and the patient returned to bed in fair condition pulse 114 blood pressure 94 over 48.

Three days later, with very little flowing the patient expelled a ten weeks fetus promptly followed by placenta and membranes. After an afebrile convalescence the patient left the hospital on the fifteenth day and soon regained her normal health.

#### SUMMARY

Two cases of combined extra uterine and intra uterine pregnancy are described, bringing the total number reported to date up to 281.

Clinically the condition should be borne in mind lest the passage of conception products per vaginam lull one into a false sense of security concerning extra uterine pregnancy.

#### REFERENCES

1. von Neugebauer F. Eine neue Serie von 12 Fällen isochroner heterotoper Zwillingschwangerschaft, das eine Z1 intrauterine das und re extrauterin implantiert dabei Schlussfolgerungen. Gynak. Rundschau. 7 809 1913.
2. Stein, A. Coexisting extrauterine and intrauterine pregnancy with the report of a case and a study of thirty five cases published since 1913. Am. J. Obst. & Gynec. 18:169 (February) 1914.

## CASE REPORT BRONCHIAL ASTHMA DUE TO PAPER SENSITIVITY

BY THEODORE BENNETT, M.D.\*

**T**he following case of asthmatic bronchitis is reported because of its unusual etiology and its subsequent cure, upon the discovery and removal of the irritating cause.

I. S. a white female aged ten, was first seen by me in August, 1931 with a history of attacks of difficulty in breathing occurring at irregular periods for the past six years. The attacks would occur suddenly were accompanied by expiratory dyspnea and considerable wheezing and would last from a day to as long as one week. They were relieved temporarily by the administration of either adrenalin or ephedrine sulphate and in the more prolonged attacks by the use of morphine.

Skin tests performed by competent allergists for the routine foreign proteins were all negative.

Past history revealed the fact that shortly before the onset of the asthma the patient had had pertussis followed by pneumonia. The family history disclosed a definite history of allergy the mother having hay fever and a younger sister having occasional attacks of urticaria.

During the month of August the patient had three asthmatic attacks and on discussing the case further with the mother the following information was obtained namely that in infancy the patient developed the habit, which has persisted up to the present time, of eating paper of all descriptions. As she became older the habit became so entrenched that

in spite of the most severe and strict supervision the family was unable to bring about its correction. A skin test for paper showed a marked reaction and instructions were given to the mother in an attempt to remove this irritating habit.

The patient was not seen again until April of 1934 when she was brought to me because of loss of weight, persistent cough and night sweats. An interval history disclosed the fact that she had been sent away to a foster home as a problem child but in spite of strict supervision she still ate paper when excited resulting in an attack of asthma shortly thereafter. Examination at this time disclosed a marked degree of malnutrition and secondary anemia. Height, 57½ inches (2 inches shorter than average for age). Weight, 65 pounds, (17 pounds underweight). Tuberculosis was ruled out by a negative tuberculin 1:1000 and a negative x-ray of the lungs. With complete bed rest and high caloric diet the patient gained five pounds in two weeks but one week later after eating paper developed an attack of asthma.

Because of the direct relationship between the asthma and the eating of paper and because it was impossible to break this pernicious habit, she was referred for psychoanalysis in an attempt to find some cause for this peculiar mental aberration. After three months of this form of treatment (May to August) she stopped the habit and for five months has not had an attack of asthma.

The time is too short to state definitely that this patient is completely cured but the case is interesting from its etiological standpoint.

\*Bennett Theodore—Assistant Physician, Pediatric Department, Boston Dispensary. For record and address of author see "This Week's Issue" page 130.

# CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C CABOT, M D

TRACY B MALLORY, M D, *Editor*

CASE 21291

## PRESENTATION OF CASE

A fifty-eight year old Italian candy worker entered complaining of chest pain and afternoon fever

Eleven months before admission he had sudden onset of sharp pain in the anterior portion of the left upper chest. The pain was constant and not aggravated by deep breathing or exertion. It lasted for about three days and then completely disappeared. There was some associated cough with slight blood streaked sputum on two or three occasions but no frank hemoptysis. He remained in bed during this three day period, having an afternoon temperature of 99° to 100°, and then returned to work. He felt perfectly well although he began to lose weight and during the next seven months lost twenty-eight pounds. He still had some cough, worse in the morning, which he attributed to cigarettes. Four months before admission he noticed fever at night but no real night sweats. At about this time he began having a low grade fever of 99° to 100° every afternoon with a normal temperature in the morning. Two months before admission he had another attack of chest pain similar to the first which lasted only one day and this time was associated with more purulent and blood streaked sputum. As before there was no malaise and no relation to exertion or deep breathing. Several sputum specimens were sent to a laboratory and were reported as negative for tubercle bacilli. X-rays at this time were said to show pleurisy. He was put to bed however, and remained there during the past two months. He continued to have afternoon fever but felt strong and gained nine pounds during the past six weeks. Four weeks before admission he had a third attack of chest pain exactly similar to his previous attacks and again lasting three days. His sputum again was negative for tubercle bacilli and x-rays again were reported as having shown pleurisy in the left chest.

His family history is non-contributory.

He had been married thirty-two years. His wife and six children were living and well. One of his sons had had a tuberculous knee for four

years without, however, any evidence of pulmonary involvement.

He had influenza eight years before entry followed by acute nephritis and nocturia for the following three months. He had frequent sore throats and had had typhoid fever at the age of 20.

Physical examination showed a well-developed and nourished middle-aged man in no apparent distress. His teeth were dirty and there was moderate pyorrhea. The chest was barrel shaped and expansion was better on the right. The right lung was normal. The upper half of the left lung anteriorly showed flatness, absent tactile fremitus, diminished spoken voice and bronchial breathing. Posteriorly at the left base there was flatness, absent tactile fremitus and diminished breath sounds. There were fine râles at the angle of the left scapula and coarse râles just below the right scapula. Because of the flatness in the lung fields the left border of the heart could not be made out. No murmurs were heard. The blood pressure was 110/66.

The temperature was 98.4°, the pulse 100. The respirations were 20.

Examination of the urine showed a specific gravity of 1.010 to 1.025 and a "green with" test for sugar. The sediment was negative. The blood showed a red cell count of 4,470,000, with a hemoglobin of 90 per cent. The white cell count was 24,650, 84 per cent polymorphonuclears. The stools were negative. Six sputum examinations were negative for tubercle bacilli. A few were blood tinged. A Hinton test was positive, a Wassermann negative. The phenolsulphonephthalein test gave 65 per cent excretion in two hours, 20 per cent during the first fifteen minutes.

X-ray examination of the chest showed hazy homogeneous dullness involving the greater portion of the left lung field. There was only a small amount of radiant lung above the costophrenic angle. A lateral view showed that the dullness lay entirely anterior to the septum between the upper and lower lobes and was sharply limited by the septum. The diaphragm on the left was high in position and somewhat limited in excursion. The heart shadow and trachea were displaced to the left and there was narrowing of the interspaces on this side. The right lung field was clear. There was a 2 centimeter irregular area of calcification at the left lung root.

He continued to have a slightly elevated temperature in the afternoon and evening. On the ninth day a bronchoscopic examination showed a generalized thickening of the mucosa of the left bronchus. The left upper lobe bronchus was very definitely narrowed but there was no outcropping. A small amount of purulent secretion was seen coming out of this upper lobe bronchus.

The carina between the upper lobe bronchus and the main bronchus was thickened. The following day he was put on potassium iodide solution, 15 drops three times a day. An x ray film following pneumothorax on the thirteenth day showed fluid in the left costophrenic angle. There was a questionable 3 centimeter cavity with a fluid level in the region of the collapsed lung field. This cavity could not be seen very well on a lateral film. The findings were consistent with an abscess cavity in the collapsed left upper lobe. The bones in the chest showed no evidence of metastases. On the sixteenth day 100 cubic centimeters of turbid yellow fluid was removed from the left pleural cavity. The fluid showed a specific gravity of 1.030 and had a cell count of 10,000 per centimeter, 90 per cent lymphocytes and 10 per cent polymorphonuclears. A smear showed no tubercle bacilli. A guinea pig inoculated with this fluid died ten days after inoculation of a streptococcus infection.

Another film with the artificial pneumothorax showed that the fluid level previously described at the left base was still present and in addition there were several other ringlike shadows just above the fluid level at the left base. Re-examination two days later showed a shifting fluid level which in the anterior posterior view was at the left of the fourth left anterior interspace upon deep inspiration. In the right lateral anterior posterior view the fluid level occupied the pleural space of the diaphragm up to the axilla. He was discharged approximately three weeks after admission.

At home he managed fairly well for a month or so and then began suddenly to go downhill very rapidly. There were no particularly acute episodes and he died approximately three months after discharge from the hospital.

#### DIFFERENTIAL DIAGNOSIS

DR. EDWARD D. CHURCHILL. The clinical course was that of a fifteen months' illness in the case of a fifty-eight year old Italian progressive except for one period when he gained six pounds in weight, and punctuated by hemoptysis, cough and pleuritic pain. I think we must take into consideration the fact that this man was perfectly well and then was affected by an illness of a total duration of fifteen months with a progressive downhill course terminating in death. There were many sputum examinations all of which are reported as negative for tubercle bacilli.

#### X RAY INTERPRETATION

DR. GEORGE W. HOLMES. This patient has had a large number of x ray films taken, some of which were taken at this hospital, some in another institution. This is the first film that we have a record of and it shows a very definite

extensive lesion involving the right upper lobe. The film taken about two months later shows an extension of that process apparently beyond the upper lobe. The left lung is unusually clear and brilliant, probably some compensatory emphysema but certainly no evidence of disease in this lung. An interesting point is that in the first film the heart is visible to the right of the spine and in the later films is not. I think it is fair to assume with the other findings that there has been a decrease in volume of the lung during that period. These films also show a dense apparently calcified mass near the root of the right lung. It is present in most of the films taken.

This film is the first one taken after he arrived at the hospital and does not give us much additional information over the films that he already had. There is a little more penetration. It shows some of the structure of the involved area. Certainly at that time there was nothing we could interpret as cavity formation. There is moderate elevation of the diaphragm, displacement of the heart and trachea and some narrowing of the costal spaces due to a process which is apparently confined to the upper part of the right lung.

Here we have a lateral view of the chest taken. This line is due to the septum between the upper and middle lobes. The lower lobe is entirely free. The process is confined to the upper lobe.

This is the film taken after pneumothorax, showing the partially collapsed lung, a moderate amount of fluid in the chest and in that area of pneumothorax, dense adhesions—shadows which I interpret as adhesions—extending from the lung to the pleura.

This film was taken about a month after admission. You can see a definite fluid level here. You might question whether that was in the lung or pleura. This is an antero-posterior view with the patient lying on his side. It shows the fluid level.

DR. CHURCHILL. Will you commit yourself definitely as to the fluid level being in a cavity within the lung or in the pleura?

DR. HOLMES. Of course the point that Dr. Churchill just made is a very important one. My experience has been that cavities like this with fluid in them are very rare in the pleural space. Just on the chances I would put it in the lung. But in this film it looks as if the fluid level went beyond the edge of the lung. That is the edge of the collapsed lung. I think it could perfectly well be in the lung. It hardly seems likely, that with the pleural space involved it would be possible to have as much collapse as that or such a fluid shift as you get here. I think you can say he has a cavity in the lung.

DR. CHURCHILL. Is this mediastinal shadow the aorta?

DR HOLMES I think so. One represents the ascending portion, the other the descending. I would not expect to find anything particularly wrong with the heart or aorta. I do not believe there is anything more. I think this calcified gland would influence me somewhat in the interpretation of the findings. We do not get calcification in tumors as a rule. Then too, I think it is rare for calcification to occur in metastatic glands. Is it not, Dr Mallory?

DR TRACY B MALLORY Yes, I should say so.

DR CHURCHILL In reviewing this first film taken on admission, there are a few points of interest. A note was made on physical examination that the left border could not be determined because of flatness in the left chest anteriorly. When it is impossible to percuss the left border of the heart, very definite evidence can be obtained about displacement of the mediastinum by palpation of the trachea. Judging from the x-ray film the trachea would have been definitely felt to the left and a clinical diagnosis then could have been made of a lesion in the lung with displacement of the mediastinum toward the affected side. The suspicion of the examiner would then be aroused that the flatness was not due to fluid but to collapsed lung.

The physical signs as given stated that there was bronchial breathing anteriorly in this portion of the collapsed lung. If that is a true observation we must postulate an open bronchus rather than a closed bronchus. On the other hand, with marked displacement of the trachea, it is quite easy in placing the stethoscope anteriorly to receive direct transmission of the tracheal breath sounds. The x-ray at this time, as Dr Holmes said, shows diffuse opacity associated with displacement of the mediastinum toward the left. There is no evidence of mass or of parenchymatous lung disease.

As to the cavity that appeared after the pneumothorax, I am uneasy about its interpretation. In the presence of pleural effusion and in the presence of effusion plus air in the pleural cavity, I think Dr Holmes is right in being conservative about definitely placing that shadow within the lung. We have had a good deal of experience in cases of empyema with shadows that look for all the world like cavitation in the lung with fluid levels, and yet the clinical courses of the patients seem to indicate that the disease is confined to the pleura. Although Dr Holmes is inclined to lean toward cavitation in the lung, I should lean toward its being a recess of the pleura with a fluid level from the effusion. The calcification at the hilum raises the question of tuberculosis. And even after the many sputum examinations I do not think that tuberculosis can be definitely ruled out in this patient. Tuberculosis in one lung, however, will rarely pro-

duce a steadily downhill course and death within fifteen months in a man of this age, particularly with a negative sputum throughout and with the slight febrile and general disturbance that he has shown.

I can see no other diagnosis on the data available than a progressive malignant lesion primary in the left lung. The fact that this was not shown by bronchoscopy does not exclude that diagnosis because bronchoscopy is limited in its ability to confirm the diagnosis of carcinoma of the lung. If it is positive it is accurate, if it is negative it may mean very little. The physical signs at the left base at the time he came in were interesting because they were those of a high diaphragm and there is no record of fluoroscopic findings which state that the diaphragm was high and limited in excursion and it was not stated whether the motion was paradoxical. Carcinoma of the lung may produce paralysis of the diaphragm by direct invasion of the phrenic nerve. This is one possible interpretation of the high diaphragm. The other interpretation is that the atelectasis increased the negative intrathoracic pressure giving a high and relatively fixed diaphragm. In conclusion, although I am not entirely willing to rule out tuberculosis, I can make no other diagnosis than a progressive primary carcinoma of the left lung.

#### CLINICAL DISCUSSION

DR DONALD S KING My reaction on this case illustrates well the danger of a new idea. I have been impressed with the frequency with which the bronchi are involved in pulmonary tuberculosis. We have seen a number of cases where the atelectasis was definitely due to stenosis of the bronchi from tuberculous infection. In this particular case I studied the early film before atelectasis had taken place and thought that the process looked more like pulmonary tuberculosis than cancer. This diagnosis was made partly because of the calcified glands which were definitely present and partly because of the mottling in the upper lobe. The atelectasis which developed later I thought was due to tuberculosis of the bronchi. I tried to sell the idea to Dr Cass but I never really convinced him that the case was not one of cancer. He examined very carefully a large number of sputum specimens and could find no tubercle bacilli, and it was on the basis of these repeatedly negative sputums that he insisted the process could not be tuberculosis. I had a faint ray of hope when the autopsy was done because in the gross there did appear to be an area of active tuberculosis in the upper lobe as well as the obvious carcinoma, but I now understand that microscopic examination has ruled out tuberculosis and that the whole process was due to carcinoma.

## CLINICAL DIAGNOSES

Pulmonary tuberculosis  
Artificial pneumothorax  
Pleural effusion

DR EDWARD D CHURCHILL'S DIAGNOSIS

Primary carcinoma of the lung

## ANATOMIC DIAGNOSES

Carcinoma, epidermoid, bronchiogenic, left upper lobe  
Pulmonary abscesses, multiple  
Pleuritis, chronic fibrous  
Empyema, left  
Emphysema, right lung

## PATHOLOGIC DISCUSSION

DR. MALLORY At autopsy we found a large tumor mass surrounding the branch of the left bronchus leading to the upper lobe. The mass seemed to be largely outside the bronchus and it was not evident in gross whether or not the mucosa was involved. I am not at all surprised that the bronchoscopist was unable to make a positive diagnosis because it was not until we had sections that we felt sure that the mucosa was involved and that the tumor was primary there. The bronchi of the upper lobe distal to the point of obstruction were dilated and filled with pus and well out in the periphery of the lobe were numerous abscess cavities. Other abscess cavities were found in the lower lobe, some of them quite definitely within the lung others lying between the lung and the pleural cavity so that it was rather difficult to know whether to classify them as empyema or as lung abscesses. My impression was that although practically all of them started as lung abscesses several of them had broken through into the pleural cavity. The pleura itself was enormously thickened at the time of autopsy. That thickening must have developed in the course of the disease, since he first came under observation because at autopsy the pleura was everywhere from five millimeters to one centimeter in thickness and was as dense as cartilage. It would have been rather difficult to get any x ray picture through it at all.

The pericardium showed a fairly fresh pericarditis just beginning to undergo organization. We were not able, as Dr King told you to find any positive evidence of tuberculosis though at first one of the cavities at the apex seemed suggestive. Histologically, however, none of them showed tuberculosis and all proved to be purulent abscesses. The lymph nodes at the hilus were markedly anthracotic and fibrous but we did not find a calcified one.

## CASE 21292

## PRESENTATION OF CASE

A thirty-two year old Canadian upholsterer entered complaining of fever and cough.

Eighteen days before entry he developed coryza and began to sweat considerably at night. Six days later he began to have an unproductive cough and he visited his physician who gave him medicine. He then developed muscular soreness and marked chilly sensations while in bed. One week before entry he began to raise pink sputum which gradually became brown and increased in quantity. Three days before entry he complained of a "tight sensation" in the left lower and right upper chests but he had no real pleural pain with the cough or on breathing. There was no previous history of cough, sputum, hemoptysis, weight loss, night sweats or poor health.

He was married and had one child who was living and well. His wife was six months pregnant. There were no miscarriages.

Ten months before entry he had a slight attack of what was called "stomach ulcers", which responded to dietary treatment.

Physical examination showed a well-developed, emaciated, cyanotic man in marked respiratory distress, sweating profusely and coughing up small amounts of greenish slightly pink flecked, tenacious sputum. There were herpes under the nose and on the lips. Several teeth were missing. There was slight pyorrhea. His throat and tonsils were slightly injected. There was slight postnasal discharge. Rales were heard throughout both lungs. At the left base posteriorly there were dullness to flatness, bronchial breathing, increased tactile fremitus and whispered and spoken voice. Similar signs were found over the area corresponding to the right middle lobe. A friction rub was also heard at the left base. One examiner found amphoric breath sounds and slight tympany high in the right axilla and over the spine of the scapula. The heart was negative. The blood pressure was 130/50.

The temperature was 104.1°, the pulse 120. The respirations were 45.

Examination of the urine was negative except for an orange test for sugar. (He had been given intravenous glucose.) The blood showed a red cell count of 4,200,000, with a hemoglobin of 60 per cent. The white cell count was 34,500. 97 per cent polymorphonuclears. The sputum was thick, mucopurulent and contained numerous pneumococci, not types I, II or III. No tubercle bacilli were found. A blood culture showed no growth. A throat culture was negative for hemolytic streptococcus. A Hinton test was negative.

X ray examination of the chest showed complete dullness of the right lung field with the

exception of an area just above the diaphragm. There was also dullness in the middle part of the left lower lung field and mottled dullness in the left upper lung field. The heart was not displaced.

The morning after admission there was evidence of complete consolidation of the left lower and right middle lobes. He was put in an oxygen tent. On the fourth day he was given two liters of ten per cent glucose. The temperature ranged between 101° and 102° and the pulse between 120 and 135. The white blood cell count ranged between 30,000 and 60,000 with 95 per cent polymorphonuclears. An x-ray film on the ninth day showed that the dullness in the right upper lobe had become less dense while that in the region of the left lower and upper lobes was increased. On the eleventh day the sputum for the first time showed numerous acid fast bacilli. He went downhill fairly rapidly and died three weeks after admission, approximately five and a half weeks after the onset of his illness.

#### DIFFERENTIAL DIAGNOSIS

DR DONALD S KING The history of the present illness is that of an acute upper respiratory infection with pneumonia.

The physical examination is that of areas of consolidation in both lungs. So far we are not getting away from an acute respiratory infection.

The main thing in the laboratory notes is the high white cell count with the high percentage of polymorphonuclears.

"X-ray examination of the chest showed complete dullness of the right lung field with the exception of an area just above the diaphragm." That is an important finding in that it rules out empyema unless it is encapsulated.

#### X-RAY INTERPRETATION

DR GEORGE W HOLMES I can state from the films in addition to what has already been said that the process is quite diffuse, involving both lungs, apparently most marked at the root and gradually spreading out into the periphery. There is very little normal lung visible. There may be some emphysema at the right apex. The heart shadow looks a little as though the auricles were dilated. The diaphragm is about normal in position. This appearance is consistent with a widespread bronchopneumonic process.

DR KING You would not call it tuberculosis?

DR HOLMES It could be a tuberculous bronchopneumonia. I do not think one can tell from x-rays alone what the etiologic factor is.

DR KING There are no definite cavities that you can see in these films?

DR HOLMES No.

#### DIFFERENTIAL DIAGNOSIS CONTINUED

DR KING So that we are again thrown back on a pneumonic process, it seems to me.

"On the eleventh day the sputum for the first time showed numerous acid fast bacilli." We cannot, therefore, doubt the presence of tubercle bacilli. We might want to. I think we have to assume that he has pulmonary tuberculosis unless by some chance there could have been a rupture of a gland into a bronchus as a terminal event and thus scatter a few "acid-fast red herring" across the trail. But I think we have to assume that it was pulmonary tuberculosis. The question is, is there a non-tuberculous pneumonia besides that? I think it is worthwhile going back over the story to see if the diagnosis of tuberculosis covers the whole picture. I do not see anything against tuberculosis in the history, although the explosive onset and the brownish sputum are more characteristic of pneumococcus infection than of an acute tuberculous process. Physical examination shows areas of consolidation throughout both lungs and these could be extensive tuberculosis. The herpes is perhaps more typical of pneumococcus infection. The "amphoric breathing" I will throw out since this is a very confusing sign. Certainly the x-ray does not show a cavity which would give amphoric breathing.

The laboratory findings are very important. I do not believe a white cell count running from 30,000 to 60,000 with 95 per cent polymorphonuclears is consistent with tuberculosis alone. I have never seen such a count in an uncomplicated tuberculosis. We have followed the blood of patients at the Channing Home for three years, running counts at least every month. The highest we have ever had is 20,000 and the polymorphonuclears do not usually run above 70 to 80 per cent. The present blood picture could be due to tuberculosis but I think it is distinctly unlikely. So that I would suggest that there is evidence here of infection other than tuberculosis and that it was a pneumonic process with tuberculosis as a complication. It is unusual for a tuberculous process to clear up on one side of the chest as this process did and spread later to the other side.

I should like to take a minute to show films on another case. The first x-ray was taken simply as a routine. Five months later the second film was taken, again as routine. The patient did not have a symptom or physical sign but the x-ray now shows a very small lesion with possible cavity. Three days later the x-ray was repeated and showed no change but again in three days there was a temperature of 101.4° and the patient had chills, malaise, and râles under the left clavicle. Four days after this there was positive sputum and definite x-ray evidence of an acute tuberculous pneumonia in the left

upper lobe I present this case to show that tuberculosis can have an explosive onset and spread rapidly

In regard to the case under consideration for diagnosis I am going to make a diagnosis of non tuberculous pneumonia. The question then arises as to what organism may be responsible for the infection. The evidence as presented is in favor of a pneumococcus infection because pneumococci were found in the sputum and streptococcus was not shown in the throat culture. Nevertheless, the clinical course is much more like that of cases which we have been calling streptococcus pneumonia. We had quite a series of these cases a year ago. It is true, however, that we never fully established the streptococcus as the etiologic factor. In two cases of empyema following these infections however, streptococcus was recovered from the pus in the chest. So that on the basis of the clinical picture I shall make a diagnosis of streptococcus pneumonia and pulmonary tuberculosis.

DR. TRACY B. MALLORY: Have you any comment, Dr. Lord?

DR. FREDERICK T. LORD: The differential diagnosis between acute pneumonia, phthisis and pneumococcus lobar pneumonia is of special interest because of the benefits to be derived from specific serum therapy in certain types of pneumococcus infection. Diffuse infiltration involving an entire lobe is rarely observed with tuberculosis. It is usually endogenous in origin and occurs in consequence of the aspiration of the contents of a tuberculous cavity.

Regarding the symptoms, it is clear from the literature, especially the series of cases reported by Fraenkel and Troye, that there are significant differences in the clinical aspects of the two diseases. Patients with acute tuberculous lobar pneumonia are likely to have had previous manifestations suggesting the presence of a tuberculous process and at times hemoptysis is an initial symptom. The symptoms of onset are likely to differ from those with typical pneumococcus lobar pneumonia. The chill may be replaced by chilliness. Pain may be absent. The sputum is usually purulent and greenish rather than rusty. Tubercle bacilli are likely to be present. The temperature is more irregular and does not subside at the expected time. So far as the problem here is concerned, the symptoms of onset are atypical for acute pneumococcus infection and consistent with a tuberculous process. The marked leucocytosis is suggestive of a complicating non tuberculous infection.

The clearing of a part of the involved lung as shown by the x ray is more rapid than one would expect with tuberculous pneumonia but it should be appreciated that tuberculous lobar pneumonia is not necessarily caseous in the whole of the involved region. Surrounding

areas of caseation there is what Laennec spoke of as gelatinous infiltration. Microscopic examination shows alveoli filled with epithelioid cells and at the periphery the alveoli contain albuminous fluid and exfoliated epithelium. The process is partly due to an allergic reaction in an already sensitized individual and it has long been known that it is capable of partial resolution.

DR. ALFRED KRANES: We saw the patient on the ward and we too were very much puzzled as to whether he had tuberculous pneumonia or pneumococcus pneumonia. We thought later on that the presence of tubercle bacilli in the sputum was purely incidental and that the chief difficulty was the pneumococcus infection, that perhaps the acute pneumococcus infection had caused a focus of tuberculosis which was not very active to flare up and spread.

#### CLINICAL DIAGNOSES

Pulmonary tuberculosis  
Lobar pneumonia

DR. DONALD S. KING'S DIAGNOSES

Streptococcus pneumonia  
Pulmonary tuberculosis

#### ANATOMIC DIAGNOSES

Pulmonary tuberculosis, acute  
Tuberculous pneumonia  
Pleuritis, chronic fibrous.  
Endocarditis acute terminal, mitral  
Gastric ulcer

#### PATHOLOGIC DISCUSSION

DR. MALLORY: The difficulty in the differential diagnosis in this case was not so clearly understood and appreciated by us at the time of autopsy as I wish it had been. We found a very extensive pneumonic process irregularly scattered throughout all five lobes. At the left apex there were two definite cavities obviously tuberculous in character. Throughout the rest of the lung there were scattered tubercles in very large numbers, the majority of them isolated, but in some areas they were so close as to be confluent. Particularly in the lower lobes the tubercles became less obvious and one had a definite pneumonic process which I think could fairly be said to be a characteristic gelatinous pneumonia.

Microscopically the picture to my mind is consistent with pure tuberculosis. We have not attempted to stain streptococci or pneumococci in the sections, as perhaps we should do in order to rule out the possibility of superimposed infection, but we could find nothing in the sections that is not consistent with pure tuberculosis so far as cellular reaction is concerned.

DR. HOLMES: Was the cavity at the left apex very large?



DR MALLORY No, only two centimeters in diameter, the second one less than one centimeter

A PHYSICIAN Was there a polymorphonuclear exudate in the alveoli?

DR MALLORY The exudate is rather characteristic in that in the center of each alveolus or each group of alveoli there is a polymorphonuclear reaction and then at the periphery a mononuclear reaction. In some places there is beginning caseation, while in other areas the process has not gone far enough yet for caseation, though always the central mass is a leukocytic one. It is identical in appearance with experimental tuberculosis produced by massive doses of organisms. It is not a reaction that one sees very often in human cases. At the periph-

ery of the lesions there is much edema and epithelialization of the alveoli as Dr Lord suggested.

DR. KRANES It is rather interesting that the diagnosis of tuberculosis was first made by the houseofficer who admitted him because of an erroneous physical finding. The amphoric breathing which he found at the right apex made him think there was a large tuberculous cavity there, in addition to a pneumococcus lobar pneumonia. The rest of us could not confirm this finding so we dismissed the possibility of tuberculosis until the bacilli were found in the sputum. At autopsy there was nothing at the right apex, but there was a cavity at the left apex.

# The New England Journal of Medicine

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## F E R A FOR PHYSICIANS

On page 130 is given an outline of a plan of the state F E R A authorities in cooperation with the Boston Department of Health, to furnish employment to indigent physicians. This plan will justify careful reading, not only by those who live in Boston, but by those residing elsewhere, inasmuch as it is the desire of the Federal government to cooperate with similar projects elsewhere if the need for them is shown.

As will be seen by studying Mr Hobbs' letter these projects are designed purely for the relief of the actually destitute. It is very unlikely that anybody, no matter how poor he may think he is, or however deeply in debt, would be considered for employment if he or any member of his immediate family has a net income of \$10.00 to \$20.00 a week. The exact limit will depend on the number of his dependents. Before being acted on favorably all applicants will have to show at an interview with the Social Service

Department of the F E R A. that they are eligible.

Some confusion may be encountered at first in relation to the place of residence of the applicant. It is understood that the applicant must reside at the time of application in the City or Town in which the project is being carried on. This is mentioned because this rule differs from the rules in regard to soldiers' aid or ordinary public relief where the "settlement" is the determining factor in deciding which government unit is responsible to a given applicant.

Inasmuch as the *Journal* is read by only a part of the physicians in Boston, those in charge of this project would appreciate it if the names of those who might be eligible were called to their attention. Whether we approve or do not approve the general proposition of Federal relief, if there are instances of such poverty among physicians in Boston it is only fair to them to have this project called to their attention.

## MORE SUPPORT FOR BIRTH CONTROL

In their meeting in Detroit on June 11, the General Federation of Women's Clubs by a vote of 493 to 17, recorded its approval of the dissemination of birth control information through scientifically regulated sources. This action was not taken hastily but was the outcome of a year of study by member clubs. The resolution as sorted "it is of utmost importance to all Americans that the population of our country be vigorous and healthy both mentally and physically, and that proper and intelligent use of scientific contraceptive methods under direction of qualified and reputable physicians is essential to these ends."

This action supports the bills now before Congress which would exempt physicians hospitals and public clinics from the restrictions of the present Federal laws. Two of these bills, H. R. 5600 and S. 600, were introduced at the request of Mrs. Sanger, and a third bill, introduced by Senator Copeland and endorsed by the National Medical Committee on Birth Control Legislation, is intended to prevent the irresponsible distribution of contraceptive devices while at the same time it exempts physicians, hospitals and medical schools from the restrictions now in force.

The general opinion among those interested in the birth control movement is that the dissemination of contraceptive knowledge should be in the hands of the medical profession. In Europe the recognition of birth control as a public health measure is widespread. It is prohibited in those countries—Germany, Italy and France—which are engaged in competition for military supremacy. The Ministry of Health in Great Britain has officially recognized birth control as a public health measure. That public senti-

ment in this country is tending more and more to favor a properly regulated dissemination of contraceptive knowledge is clearly indicated by its endorsement by many churches, religious societies, welfare groups and professional organizations, and by the recent action of the New York Medical Society and the House of Delegates of the American Medical Association

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

GALLIE W E M D University of Toronto Faculty of Medicine 1903 F A C S, F R C S (England) Professor of Surgery, University of Toronto Surgeon-in-Chief, Toronto General Hospital His subject is "Dislocations" Page 91 Address Medical Arts Building, Toronto, Canada

MILLER, D K. A B, M D Harvard University Medical School 1929 Assistant Resident Physician, Hospital of the Rockefeller Institute for Medical Research Address Hospital of the Rockefeller Institute, 66th Street at York Avenue, New York, N Y Associated with him is

RHOADS, C P A B, M D Harvard University Medical School 1924 Associate Member, Rockefeller Institute for Medical Research Address Hospital of the Rockefeller Institute, 66th Street at York Avenue, New York, N Y Their subject is "The Reticulocyte Response in Guinea Pigs Following the Oral Administration of Certain Anti-Anemic Substances" Page 99

LLOYD, MILTON S M D, C M, McGill University Faculty of Medicine, Montreal, 1924 Bronchoscopist, Flower Hospital Assistant Thoracic Surgeon, Sea View Hospital, New York City His subject is "The Early Classification and Early Diagnosis of Cancer of the Bronchus" Page 101 Address 30 Central Park South, New York, N Y

HEFFERNAN, ROY J M D Tufts College Medical School 1917 F A C S Visiting Gynecologist and Obstetrician, Carney Hospital Visiting Obstetrician, St Mary's Hospital Instructor of Gynecology Tufts College Medical School His subject is "Combined Extra-Uterine and Intra-Uterine Pregnancy" Page 120 Address 524 Commonwealth Avenue Boston

BENNETT, THEODORE M D Tufts College Medical School 1928 Assistant Physician, Pediatric Department, Boston Dispensary Assistant Instructor, Pediatric Department Tufts College Medical School His subject is "Case Report Bronchial Asthma Due to Paper Sensitivity" Page 121 Address 371 Commonwealth Avenue, Boston

### MASSACHUSETTS LEGISLATIVE NOTE

House 2245 which relates to "an investigation and study by the Commissioner of Public Health of the laws relative to public health and to the establishment and administration of a system of health insurance," which was referred to the next annual session of the House, July 9, 1935, was refused reconsideration July 11, 1935

### MISCELLANY

#### F E R A FOR PHYSICIANS IN BOSTON

A project for the employment of physicians in the City of Boston by the E R A is in the process of formation On July 7, 1935, the following letter was sent to the Boston members of the Suffolk District Society

"To Boston Members of the Suffolk District Medical Society

"The Society has been advised by representatives of the Federal Government that medical employment will be found whenever possible for those physicians who are residents of Boston and who are in urgent need of financial relief The type of employment will be limited in the main to preventive medicine and in no way offers reimbursement for private practice

"If you know of any physician who falls in the above class, kindly send in the name and address at once to the secretary

"Very sincerely yours,

"ROBERT L DeNORMANDIE, *President*"

Since then similar letters have been sent to Boston members of Middlesex South and Norfolk Societies It is the purpose of the project to employ all doctors, not necessarily members of the Societies, who meet the following qualifications They must be legal practitioners in medicine They must be residents of Boston They must be in such financial need that they are eligible for E R A aid, and they must be employable

The present project will be under the direction of Dr Wilinsky of the Boston City Department of Health and will consist of work in the various health units He will have nothing to do with the choosing of the men to work Applications should not be made to him. Applicants will be examined by the Social Service Department of the E R A., at the Boston Medical Library, by appointment Applications should be made first to the secretary of the proper District Society Dr A. A. Levi, 485 Commonwealth Avenue, for residents of Allston, Brighton and Charlestown Dr Frank S Cruickshank, 1236 Beacon Street, Brookline, for residents of Roxbury, Dorchester, Hyde Park, Roslindale and West Roxbury, and Dr Charles C Lund, 319 Longwood Avenue, Boston, for the rest of Boston

The following letter from Mr Hobbs explains the general background of this type of project and may

be of interest to those who are thinking of initiating such projects elsewhere in Massachusetts

"The first thing that we wish to impress upon you in regard to the Emergency Relief Administration is the fact that all projects should be built up around the needs of the community. Fine as a project may be in itself the E.R.A. is not officially interested unless it provides suitable work to a needy person

If there is a group of doctors in the community who are in as great need as any others then we wish to develop projects for them

Once the need has been established then the problem is to employ this group in the most profitable way possible. The project must be of economic and social value and must be for the benefit of the community at large. The E.R.A. cannot perform services for private institutions or for individuals

"Many months ago we determined that doctors and dentists should be paid \$20.00 a week for thirteen hours service. A few simple rules were prepared for dentists copy of which we enclose and which would apply with equal force to doctors

We wish to warn you that the rules which we have stated above will be modified when the E.R.A. is transferred into the W.P.A. and this will probably come within a few weeks. Under the W.P.A. technical and professional employees will be paid \$24.00 a month in Suffolk and Middlesex Counties, \$33.00 a month in Norfolk. Other counties I do not believe you are interested in at the present time

Projects in Suffolk County will be under the direction of Col. Thomas F. Sullivan 1 Beacon Street, Boston and projects in Middlesex and Norfolk Counties will be under the direction of Mr. Byrle Osborne 49 Federal Street, Boston

"This is a very brief outline of the situation and if there is any further information which you would like please let me hear from you.

Sincerely yours

"CONRAD HOBBS

By direction of Howard P. Philbrook  
Director of Work Division Federal  
Emergency Relief Administration  
of Massachusetts

49 Federal Street,  
Boston Mass

#### THE APPOINTMENT OF DR. FREDERICK F RUSSELL

Dr. Frederick F. Russell of the Rockefeller Foundation will retire September 1, 1935 to fill an appointment as Lecturer on Preventive Medicine and Hygiene and Epidemiology at the Harvard Medical School.

He was graduated from the College of Physicians and Surgeons, Columbia University with the additional title of Sc.D. from George Washington University

On December 12, 1898 he became Command 1st Lt. Asst. Surgeon U. S. A. Colonel in 1917 and re-

signed in 1920. Since 1921 he has held several positions in Washington and was in charge of the Division of Infectious Diseases and of the Laboratory Service of the Surgeon General's Office U. S. A., during the World War

Dr. Russell is a Fellow of the American College of Surgeons, American Public Health Association, the New York Academy of Medicine and a member of the American Medical Association and the Royal Medical Society of Budapest, Hungary

#### RECENT DEATHS

**DOWLING**—JOHN JOSEPH DOWLING M.D., Superintendent of the Boston City Hospital died at his home on the hospital grounds July 10, 1935 of cerebral thrombosis following an attack of pneumonia superimposed on a long illness

Dr. Dowling had recently been granted a leave of absence with the hope of recuperating from an extended period of impaired health

He was appointed Superintendent of the Hospital by Governor Curley when His Excellency was Mayor of Boston. Dr. Dowling is credited with the enlargement and modernization of the hospital while serving under a succession of Governors since his first appointment.

Dr. Dowling was born in Boston in 1870 and attended the public schools and the Boston Latin School. He graduated from the Harvard Medical School in 1894 and pursued postgraduate studies in Dublin and London. On returning to Boston he developed a large practice in Roxbury, Dorchester and the South End relinquishing this to become the superintendent of the largest municipal hospital in the country

He served in the World War as head of the Boston City Hospital Base Hospital No. 7 unit and returned to Boston with the rank of Lieutenant Colonel

Dr. Dowling was a Fellow of the Massachusetts Medical Society and the American Medical Association, the Harvard, the Clover and the Boston City Clubs

He is survived by his widow Mrs. Marcella Pugh Dowling, a daughter Miss Barbara Dowling, a son, Mark Dowling and two brothers Mark Dowling and Frank Dowling both of Boston.

**MURPHY**—JOHN JOSEPH MURPHY M.D., of 2192 Massachusetts Avenue North Cambridge, died suddenly July 8 at North Conway, New Hampshire while on a vacation with Mrs. Murphy

Dr. Murphy was born in 1886 and his early education was acquired in the Cambridge High and Latin Schools and Holy Cross College. He received his M.D. degree from the Harvard Medical School in 1913 and served an internship at the Boston City Hospital and the Boston Dispensary

He enlisted in the army in 1916, was a Lieutenant in the medical corps, was advanced to rank of captain in 1917 and served at Camp Benjamin Harri-

without also reacting to foods These were all older children

II AND III

Twenty-five cases were tested with patch tests according to the usual patch test technique, using Arlington proteins\*

In this series the proteins used were

Cat hair	Silk
Dog hair	Wool
Chicken feather	Cottonseed
Goose feather	

There were no positive reactions whatsoever

Most of Dr Peck's positive patch tests were to feathers In a series of twenty-five consecutive cases in Boston, it was found that only five slept on feather pillows Dr Peck told me that almost all of the babies coming to his Clinic slept on feather pillows This may partly account for the difference in our results, and it must be remembered that in different localities different sensitizations occur, according to what allergens the susceptible individuals are most frequently exposed Thus in New York, scratch reactions to rabbit hair are very commonly obtained, in our series of sixty tested with rabbit hair, there was only one positive reaction

Next, a series of twenty cases who gave a positive scratch test to some environmental allergen, were tested by the patch method with the same allergen, sometimes using the powdered

protein, sometimes the actual substance (table 4) There was only one slightly positive reaction, to silk This consisted of several small wheals There was no vesiculation or scaling

An investigation was then undertaken to determine whether immediate wheal reactions could be obtained on the unbroken skin In twenty-two cases which gave a positive scratch test, mostly to environmental allergens there were only three which gave a positive reaction when the protein powder to which the patient

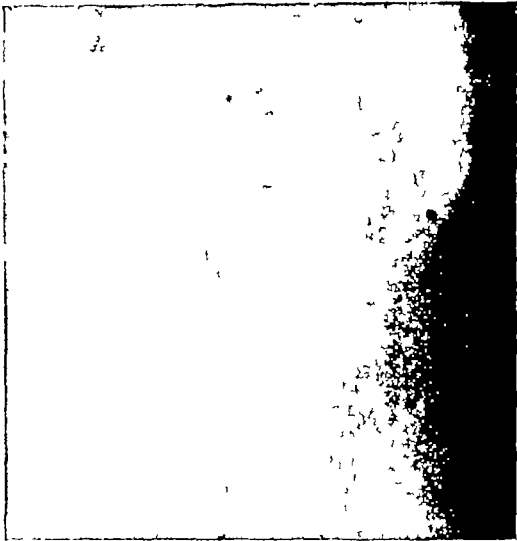


PLATE 1

Upper center scratch test to cat hair  
Lower left cat hair protein plus saline laid on intact skin (negative)  
Lower right skin gently abraded with throat stick before applying protein (positive)

TABLE 4

Age	Positive Scratch Test	Patch Test with Powdered Protein	Patch Test with Actual Substance
4 yrs	Cottonseed	Neg	
4 yrs	Silk, wool, cat hair	Neg	
16 mos	Silk, wool	Neg	
6 yrs	Cattle hair	Neg	
8 yrs	Silk, cottonseed		Neg
2 yrs	Cottonseed		Neg
22 mos	Silk	Neg	Neg
22 mos	Silk		Neg
2 yrs	Silk		Neg
2 yrs	Wool		Neg
4 yrs	Cat hair	Neg	
2½ yrs	Silk		Neg
1 yr	Silk, wool, cat hair	Neg	
5 yrs	Silk	Neg	Neg
6 mos	Silk		Positive (hives)
3 yrs	Cat hair	Neg	
2½ yrs	Chicken feather	Neg	
9 yrs	Cat hair	Neg	
3 yrs	Wool, horse dander	Neg	
8 yrs	Silk	Neg	

\*The substance to be tested with is applied to the skin and moistened with normal saline or N/10 KOH. (It was found that it made no difference which was used.) It is then covered with a small square of cellophane and this in turn covered with a square of adhesive plaster. The tests are read in forty-eight hours. A positive test is evidence by erythema or vesiculation and scaling at the place of contact. If the substance to be tested is a liquid a small piece of white blotting paper is soaked with it and applied.

TABLE 5

COMPARISON OF SCRATCH TESTS WITH SURFACE TESTS

	Scratch Test Positive	Protein Powder Plus Diluent Laid on Intact Skin
1 Egg		+
2 Wool		0
3 Cat hair		0
4 Silk		0
5 Cottonseed		0
6 Cottonseed		0
7 Cottonseed		0
8 Silk		0
9 Codfish		0
10 Silk		0
11 Egg		0
12 Egg		0
13 Silk		0
14 Silk		0
15 Silk		0
16 Silk		+
Timothy }		+
17 Wheat		+
18 Ragweed		0
19 Cat hair		0
20 Horse dander		0
21 Timothy		0
22 Silk		0

reacted by the scratch test, was applied, plus diluent, to the untraumatized skin (shown in table 5)

It was found, however, that if the epidermis was very slightly abraded with the blunt end of a throat stick, a positive reaction could always be obtained, provided the scratch test was positive. This was tried in seven cases (Shown in Plate 1)

Cases 1 and 17 are of particular interest. Case 1 was two years old with a moderate amount of eczema, and a very large scratch test to egg white. She was playing in the kitchen one day with some egg shells, and hives immediately appeared on her hands and arms. She reacted with a large wheal when egg white powder plus saline was applied to the unbroken skin. Case 17 was

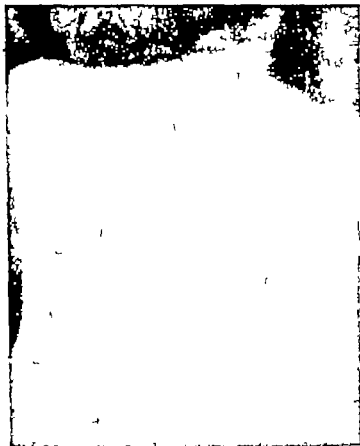


PLATE 2.

Left wheat protein powder plus diluent laid on unbroken skin.  
Right scratch test with wheat protein powder

eight months old, with a very severe eczema. Strongly positive scratch tests to wheat and lactalbumin. On a wheat and milk free diet his eczema was nearly cured. One day when he was about a year old his mother gave him a flour-sifter to play with which had considerable flour on it. He got a good deal of flour over his face and hands and the next day appeared in the Clinic with acute dermatitis of the face and upper part of the body. A large immediate wheal reaction was obtained by applying wheat protein powder plus diluent, to the unbroken skin. (Shown in plate 2)

Such cases as these two are the exception rather than the rule

In 1887, Dr James C White then professor of dermatology in the Harvard Medical School wrote a monograph which has become a classic

of dermatologic literature, entitled "Dermatitis Venenata, An Account of the Action of External Irritants Upon the Skin." In it he showed that in addition to poison ivy, there were many other plants and chemical substances which could cause intense dermatitis, and brought out particularly the fact that many of these substances were harmless to the ordinary person, and that their deleterious action was dependent upon a special idiosyncrasy of the individual

In the succeeding years the importance and frequency of these eruptions began to be more generally recognized, particularly in industrial workers, who were exposed to all sorts of substances during the course of their work. It was not, however, until the younger Jadassohn and Bloch, less than ten years ago demonstrated that these eruptions were of an allergic nature and more extensively employed the patch test, which had first been used by the elder Jadassohn in 1895, that their true significance was understood

They believed that in most cases of eczema in adults the sensitization is of the epidermal type that the dermatitis is due to external contact with innumerable substances usually of non protein nature and their school confines the terms "eczema" to this type of eruption, which is the same as the older "dermatitis venenata." Their teachings were introduced into America by their pupils (Sulzberger Peck and others) a very few years ago and have been of great value in explaining many obscure eruptions

Sulzberger and Coca have pointed out, however in several publications, that there are two sorts of skin sensitization one the "eczema" of Bloch and Jadassohn where the sensitization is epidermal to some non protein substance, tested for by means of the patch test, with no reactions demonstrable in the blood, no history of hereditary transmission, and no association with asthma and hay fever. The other type of skin sensitization is not of the epidermis but of the deeper layers of the skin and is tested for by means of the scratch or intracutaneous test. The sensitization here is to proteins or protein like substances, is often hereditary, and often associated with asthma and hay fever

For this symptom complex, which in some cases may have almost the aspect of a distinct disease entity, Coca suggested the word "atopy", and most American dermatologists call the first type of sensitization "contact dermatitis." Coca and Sulzberger have repeatedly insisted that the two conditions, although both coming under the head of allergy are different in their mechanism and that the patch test is suitable for contact dermatitis but not for atopy. Peck has said, however, that there is no essential difference between the two and that the eczema of infants differs in no way from the 'contact dermatitis' of adults

There seems to be no question whatever that there are these two types of allergic skin sensitization which have, possibly, certain similarities in their basic nature, but are dissimilar enough in actual practice to warrant separate classification. Most dermatologists have accepted these conceptions.

The question is how much do they overlap? Do protein atopens commonly cause skin symptoms by simple contact with the epidermis? Do infants and young children have the non-atopic contact dermatitis, with sensitization to non-protein allergens, and if so, how common is it?

From our own work it seems that protein allergens *can* act on the intact epidermis (cases 1, 16, 17), but that this is unusual, and that the element of rubbing, or some slight trauma to the outer layer of the skin, is usually necessary before the allergen can come into contact with the sensitized cells, which lie below the epidermis. For this reason the patch test is quite unsuitable for use in most infants and children with eczema, who usually have the atopic type of sensitization. The situation is different with adults in whom the epidermal type of sensitization to non-protein allergens is more common.

Piness, Sulzberger and Vaughan, and Figley and Parkhurst, have also clearly pointed out that environmental atopens such as silk, horse dander and pollens, when inhaled, can easily reach the sensitized cuticular cells through the blood stream, and cause skin symptoms in this way. It seems likely that they most often work in this way, but some allergens, particularly silk, wool, and cat hair (in fur collars) may often cause symptoms by contact. The contact, however, is usually not *simple* contact, and the element of rubbing may be necessary.

In order to avoid confusion, it is well, however, not to call any eruption caused by protein allergens "contact dermatitis", but rather "atopic dermatitis" or "atopic eczema".

The question of true contact dermatitis to non-protein allergens in infants and young children, is practically an unexplored field. It is certain that it can occur (primrose, poison ivy), and we have seen recently one case due to turpentine sensitization, and one to the dye in a dark blue "snow suit", both in young children.

The infant and young child, however, come into contact with relatively few of the substances which cause this type of eruption in the adult, and when contact dermatitis does occur in infants and young children there is likely to be an obvious cause and effect relationship between some definite irritant and the eruption. With the adult, who may be exposed to so many possible irritants, this is not so likely to be the case.

It seemed worth while to do routine patch

tests with some of the more common possibly eczematogenous substances to which infants and young children might be exposed, in order to determine the frequency of this type of sensitization.

A series of twenty cases were tested by means of the patch tests with the following substances

*Soap 1	Mercuric chloride
Soap 2	Olive oil
Soap 3	Cottonseed oil
Soap 4	Rose geranium oil
Soap 5	
Paraphenylenediamine	

Paraphenylenediamine or "ursol" is a derivative of aniline, and is the base of certain dyes, particularly those used for dyeing fur. This and mercuric chloride were used because they give so many positive reactions in adults. Rose geranium oil is used as a scent for many soaps and powders. In adults sensitization to such essential oil is common.

In this series of twenty patients there were fourteen under one year of age and six over one year. One patient, aged three months, gave delayed reactions to olive oil, mercuric chloride and paraphenylenediamine. It could not be shown, however, that any of these had anything to do with the eczema. In the other nineteen patients there were no positive tests whatever.

The few cases of contact dermatitis that we have seen have been acute, occurring suddenly on previously healthy skin, usually on the exposed surfaces, such as the back of the neck, the face, or the legs, and have been vesicular in character, similar in every way to a poison ivy eruption. If such eruptions occur it is worth while to do patch tests with any suspected substances to which the child has been exposed, but in most cases of eczema in the young, patch tests are not desirable or necessary as a routine measure.

#### IV

It is clear that positive scratch tests to environmental protein allergens are occasionally obtained in eczematous infants, and often in older children. These allergens should therefore be used as a routine in testing, just as they are in asthma, and must be taken into account in any consideration of etiology and treatment, but it is not always possible to prove that they are causing the eczema, for there is almost always sensitization to foods as well. The situation is by no means so clear as it is in hay fever, where there is likely to be sensitization to one very definite pollen group, and a definite cause and effect relationship between symptoms and exposure. To illustrate this the following case reports, some very doubtful, some clean cut, are of interest, and show some of the

\*These are all common soaps used either to wash the baby or the clothes and linen with which he comes into contact. It is thought best not to give their trade names.

difficulties involved, if one is critical, in arriving at accurate conclusions

**CASE 1** Aged six months His father and four aunts have hay fever He has had facial eczema for two months For the last two weeks the mother had noticed that about noontime each day shortly after eating his face became much redder than usual and small hives appeared on his neck, arms and legs These would last about half an hour and then disappear It was thought by the mother that various articles of food which he ate for his dinner were responsible for the hives and some of these were omitted but the hives persisted A complete set of skin tests was done, with positive reactions only to egg and silk (he had never eaten eggs) It was found on questioning that after his dinner his mother always held him and that at this time she always wore a silk wrapper against which he rubbed his arms and face

The silk wrapper was omitted and he had no more hives The facial eczema did not improve however in spite of great care in removing silk from the environment. It is certain that the hives were caused by silk It cannot be concluded however that the facial eczema was

**CASE 2** A child twenty-seven months old with a severe chronic eczema of the disseminated neurodermatitis type

His tests were positive to egg white peas and horse dander He ate peas occasionally and although he did not eat eggs it is probable that he ate egg-containing food

When asked if the child ever came into contact with horses, the mother said "He has never even seen a horse," but on closer questioning it was found that his older sister rode horseback and that the patient was in the habit of spending a good deal of time in her closet where she kept her riding clothes playing with her riding boots

Egg-containing food and peas were omitted from his diet and he was kept out of the closet His eczema was considerably improved in a month but by no means cured.

This case is suggestive but not entirely conclusive

**CASE 3** A boy two and a half years old whose mother had hay fever had had eczema since the age of two months He gave strongly positive scratch tests to dog hair silk codfish lactalbumin wheat, and oats As far as could be ascertained he did not come into contact with dog hair or silk

The foods to which he was sensitive were omitted from his diet, with very good results and in about two months his eczema was cured This case proves nothing for although he had marked reactions to silk and dog hair he was apparently not exposed to them (although he might have been inhaling silk) and he was sensitive to two very important foods (wheat and milk)

**CASE 4** A boy four and a half years old had had eczema ever since the age of six months At the time of examination he had a moderate amount of chronic eczema back of the knees There was a positive reaction to horse dander and to nothing else On questioning the mother said that one horse was occasionally pastured in a field near their house and that the boy had on several occasions patted the horse but came into contact with horses or with anything pertaining to horses in no other way He was told to keep away from the horse, and was given two x-ray exposures to the areas of eczema on his legs Although there was no food sensitization in this case, and there was definite horse dander sensitization, the conclusion is not warranted that the

horse dander sensitization was the cause of his skin symptoms, on account of the infrequent and slight exposure and it is very likely that the x-ray treatments cured his eczema

**CASE 5** A boy twenty-two months old had had a severe eczema since the age of six months Skin tests were positive to silk cottonseed kapok egg white egg yolk asparagus potato and beef The foods to which he was sensitive were omitted from his diet and he was given a hair mattress instead of the kapok one which he had had before Also local x-ray treatment Very satisfactory results In this case there was very definite continuous exposure to kapok and although there was sensitization to foods and other environmental allergens as well it seemed that kapok sensitization had a good deal to do with his eczema, as he was continually exposed to it

**CASE 6** A boy twelve years old whose father was asthmatic had had eczema continually since he was eighteen months old It was so bad that the parents had about given up hope of its ever improving The boy himself knew that he was exquisitely sensitive to cats for several times after exposure he had had mild attacks of asthma and flare-ups of his eczema As far as he knew he was sensitive to nothing else

Skin tests had marked reactions to cat hair and rabbit hair all others were negative He had been having rabbit hair exposure from a coat of his sister's He was kept away from cats and the rabbit fur coat was laid away His eczema was almost entirely cured in about six weeks Although this boy was also given local treatment it seemed reasonably certain that sensitization to rabbit hair and cat hair was very definitely the cause of his eczema

#### SUMMARY

Scratch tests to environmental allergens were positive in ten per cent of thirty-eight eczematous infants under one year of age, in thirty seven per cent of fourteen infants between one and two years of age, and in fifty per cent of forty nine children between two and twelve years of age

In a series of twenty five cases tested by means of the patch test with protein environmental allergens, there were no positive reactions

Twenty-one cases which gave positive scratch tests to an environmental allergen were tested by means of the patch test, with the same allergen There was only one positive test This was manifested by whealing and not by the usual vesiculation and scaling ordinarily seen in positive patch tests with non protein substances.

In twenty two cases which gave positive scratch tests, application of the reacting protein to the unbroken skin caused an immediate wheal reaction in only three cases but when the skin was gently abraded with the end of a throat stick before applying the protein a reaction invariably followed. (Seven cases tested)

Twenty cases were tested with ten common environmental non protein substances by means of the patch test. There were positive reactions in only one patient.



## CONCLUSIONS

1 The animal epidermals and other so-called environmental allergens should be taken into consideration, as well as foods, in any attempt to discover the etiology of eczema in infants and children. Their importance is not great during the first year of life. After the second year they are equally as important as foods.

2 The patch test is not the correct test to use in testing with protein allergens.

3 Protein allergens can act on the untrau-

matized epidermis, but this is unusual. Certain of them probably often act by contact if there is prolonged rubbing or slight trauma. They also act by inhalation.

4 Contact dermatitis caused by non-protein allergens is not common in infants and young children.

## REFERENCES

- 1 Peck Samuel M and Salomon Gustav Eczema of infancy and childhood Am J Dis Child 46 1308 (Dec.) 1933
- 2 Stuart Harold C and Farnham Marynia Acquisition and loss of hypersensitiveness in early life Am J Dis Child 32 341 (Sept.) 1926

RÉSUMÉ OF COMMUNICABLE DISEASES  
IN MASSACHUSETTS FOR JUNE, 1935

Disease	June, 1935	June, 1934	5 Yr Aver age*
Anterior Poliomyelitis.....	6	5	6
Chicken Pox .....	1051	1149	1017
Diphtheria .....	36	41	113
Dog Bite .....	1327	1262	868
Epidemic Cerebrospinal Meningitis	2	5	8
German Measles.....	5898	92	282
Gonorrhea .....	526	566	600
Lobar Pneumonia.....	272	241	218
Measles .....	1486	3380	3252
Mumps .....	406	467	607
Scarlet Fever.....	742	731	930
Syphilis .....	418	426	388
Tuberculosis Pulmonary.....	331	333	360
Tuberculosis Other Forms.....	30	41	46
Typhoid Fever .....	6	4	13
Undulant Fever .....	3	2	
Whooping Cough .....	361	970	729

\*Based on the figures for the preceding 5 years

## RARE DISEASES

*Anterior poliomyelitis* was reported from Boston, 1, Chicopee 1, Everett, 1, Lawrence, 1, Manchester, 1, Swampscott, 1, total, 6

*Dysentery (bacillary)* was reported from Malden, 1

*Malaria* was reported from Belmont, 1, Springfield, 1, total, 2

*Cerebrospinal meningitis* was reported from Lynn, 1, Malden, 1, total, 2

*Paratyphoid fever (B)* was reported from Boston, 1

*Pellagra* was reported from Cambridge, 1

*Septic sore throat* was reported from Auburn, 1, Boston, 3, Bridgewater, 1, Cambridge, 1, Fall River, 1, Lexington, 2, Lynn, 1, Medford, 1, Montague, 1, Northbridge, 1, Springfield, 1, Topsfield, 2, Waltham, 1, total, 17

*Tetanus* was reported from New Bedford, 1

*Trachoma* was reported from Chelsea, 1, Lawrence, 1, total, 2

*Trichinosis* was reported from Brookline, 1

*Undulant fever* was reported from Brookline, 1, Danvers, 1, Wellesley, 1, total, 3

Diphtheria shows a decrease of 33 per cent for the

first six months of the year as compared with the same interval in 1934

Infantile paralysis and epidemic cerebrospinal meningitis are being reported in normal figures to date

German measles, although still epidemic, had its peak in May

Reported tuberculosis morbidity remained well below the five year average

Lobar pneumonia and typhoid fever are running slightly higher than in 1934, while scarlet fever, mumps, whooping cough and measles are being reported in lower figures than the preceding year

Chicken pox and tuberculosis other forms show nothing remarkable

## HAY FEVER AND COLDS

That people who suffer from hay fever in summer are more susceptible than others to common colds in winter, but if treated with pollen extract for hay fever they show greater immunity to colds later, was stated in New York, on July 15, as a result of observations made over a period of six years at Beth Israel Hospital

In a report published in the July 15 issue of the *New York State Journal of Medicine*, Dr Louis Sternberg, who made the study among patients at the hospital, says "The author has reviewed the histories of 200 treated cases of hay fever observed from 1 to 6 years, and finds that 53 gave a previous history of frequent colds usually in winter. After their first seasonal or perennial course of treatment with pollen extract, 36 of the 53 stated that they had been relieved of head colds throughout the winter months following their treatments. Of this total number, 25 were sensitive to ragweed, 8 to timothy, and 3 to both ragweed and timothy. The 17 cases not relieved of winter colds did not have much relief from the pollen injections.

"The reason," states Dr Sternberg, "for this apparent immunity to the infection known as the common cold is not now known. It is presented as a clinical fact that remains to be explained. That those suffering from hay fever or asthma are generally more subject to upper respiratory infections than other individuals is a well-known fact, but few among the numerous publications on the 'common cold' have ever mentioned how these colds are influenced by pollen treatment in hay fever subjects."

# The Massachusetts Medical Society

## PROCEEDINGS OF THE COUNCIL

Annual Meeting, June 1, 1935

**T**HE annual meeting of the Council was held in the Georgian Room of the Hotel Statler Boston, Mass., on Tuesday, June 4, 1935, at 12 o'clock, noon. The President, Dr. William H. Robey, Suffolk, was in the chair and the following 227 Councilors were present:

### BARNSTABLE

P. P. Henson  
W. D. Kinney

### BESKSHIRE

H. J. Downey  
W. T. Frawley  
G. P. Hunt  
T. H. Nelligan

### BRISTOL NORTH

W. H. Allen  
A. R. Crandell  
F. V. Murphy

### BRISTOL SOUTH

E. L. Merritt  
J. A. Barre  
G. W. Blood  
R. B. Butler  
E. F. Cody  
E. D. Gardner  
I. N. Tilden

### ESSEX NORTH

C. F. Warren  
E. S. Bagnall  
R. V. Baketel  
J. F. Burnham  
H. F. Dearborn  
A. P. George  
T. R. Healy  
F. W. Snow  
L. T. Stokes  
R. L. Toppan  
W. D. Walker

### ESSEX SOUTH

Hanford Carvell  
N. P. Breed  
J. F. Donaldson  
R. E. Foss  
C. L. Hoitt  
J. F. Jordan  
A. E. Parkhurst  
O. S. Pettingill  
C. H. Phillips  
W. G. Phippen  
R. E. Stone  
J. W. Trask

### FRANKLIN

H. B. Marble  
H. M. Kemp  
H. G. Stetson  
A. H. Wright

### HAMPDEN

F. H. Allen  
E. P. Bagg Jr.  
J. M. Birnie  
J. J. Carroll

### W. A. R. Chapin

J. L. Chereskin  
A. J. Douglas  
P. E. Gear  
G. D. Henderson  
E. A. Knowlton  
M. W. Pearson  
A. G. Rice  
G. L. Schadt  
H. L. Smith  
G. L. Steele

### HAMPSHIRE

A. J. Bonneville  
J. G. Hanson

### MIDDLESEX EAST

J. H. Blaisdell  
Richard Dutton  
J. H. Fay  
E. M. Halligan  
K. L. MacLachlan  
R. R. Stratton

### MIDDLESEX NORTH

E. O. Tabor  
M. L. Ailling  
A. R. Gardner  
F. R. Mahony  
T. A. Stamas  
M. A. Tighe

### MIDDLESEX SOUTH

S. H. Remick  
C. F. Atwood  
E. W. Barron  
C. F. K. Bean  
E. H. Bigelow  
G. F. H. Bowers  
F. R. Clark  
W. H. Crosby  
D. F. Cummings  
J. E. Dodd  
D. C. Dow  
A. W. Dudley  
H. Q. Gallupe  
W. G. Grandison  
N. M. Hunter  
C. M. Hutchinson  
L. H. Jack  
A. M. Jackson  
Josephine D. Kable  
A. A. Levi  
F. P. Lowry  
L. W. McGuire  
J. A. McLean  
Edward Mellus  
C. E. Mongan  
F. L. Morse  
J. P. Nelligan  
E. J. O'Brien, Jr.

### Dwight O'Hara

C. T. Porter  
W. D. Reid  
E. F. Sewall  
F. G. Smith  
C. H. Staples  
H. P. Stevens  
H. W. Thayer  
Fresenius Van Nuy  
H. J. Walcott

### NORFOLK

L. F. Johnson  
H. L. Babcock  
K. R. Bailey  
Henry Baker  
F. G. Balch  
H. G. Batchelder  
A. S. Begg  
D. N. Blakely  
H. K. Boutwell  
F. S. Cruickshank  
D. G. Eldridge  
I. A. Finkelstein  
J. E. Fish  
C. S. Francis  
Maurice Gerstein  
Alice M. Gray  
W. A. Griffin  
J. B. Hall  
G. W. Kean  
O. J. Kichham  
M. M. Knudson  
H. M. Landesman  
W. A. Lane  
J. S. H. Leard  
J. S. May  
F. P. McCarthy  
L. T. McCready  
S. F. McKeon  
Benjamin Parvey  
Cadis Phipps  
E. P. Ruggles  
Victor Safford  
D. D. Scannell  
A. J. Shadman  
H. F. R. Watts

### NORFOLK SOUTH

T. B. Alexander  
C. S. Adams  
W. G. Curtis  
G. V. Higgins  
F. E. Jones

### PLYMOUTH

W. T. Hanson  
L. A. Alley  
P. H. Leavitt  
T. H. McCarthy  
J. J. McNamara  
G. A. Moore  
A. C. Smith

### SUFFOLK

R. L. DeNormandie  
A. W. Allen  
Horace Blinney  
Gerald Blake

W. B. Breed  
W. J. Brickley  
J. E. Briggs  
C. S. Butler  
David Cheever  
R. O. Cochran  
F. H. Colby  
F. J. Cotton  
W. P. Cross  
Lincoln Davis  
G. P. Denny  
Reginald Fitz

Channing Frothingham  
Joseph Garland  
G. L. Gately  
R. B. Greenough  
John Homans  
H. T. Hutchins  
E. P. Joslin  
R. I. Lee  
G. A. Leland, Jr.  
C. C. Lund  
G. B. Magrath  
J. H. Means  
J. P. O'Hare  
A. K. Paine  
F. W. Palfrey  
W. S. Parker  
W. F. Regan  
G. P. Reynolds  
W. H. Robey  
G. C. Shattuck  
W. R. Sisson  
Louisa Paine Tingley  
G. L. Tobey Jr.  
J. R. Torbert  
H. P. Towle  
Shields Warren  
F. A. Washburn  
Conrad Wesselhoeft

### WORCESTER

J. C. Austin  
W. P. Bowers  
L. R. Bragg  
C. J. Delahanty  
G. A. Dix  
E. B. Emerson  
G. E. Emery  
M. F. Fallon  
J. J. Goodwin  
David Harrower  
E. L. Hunt  
E. R. Leib  
A. W. Marsh  
E. C. Miller  
J. W. O'Connor  
E. H. Trowbridge  
F. H. Washburn  
R. P. Watkins  
S. B. Woodward

### WORCESTER NORTH

G. P. Norton  
T. R. Donovan  
B. H. Hopkins  
A. F. Lowell  
F. M. McMurray  
H. R. Nye  
W. F. Sawyer

After calling the Council to order President Robey announced that Councilors only were supposed to be at the meeting and stated that if there were any representatives of the press in the room, he would ask them to retire and that any information which was to be released could be obtained when the meeting was over. He then called upon the Acting Secretary who read in abstract the report of the last meeting. There being no errors or corrections the President declared it approved.

President Robey next read the obituaries of two Councilors who have died during the year.

DR. GEORGE HOYT BIGELOW of Milton, Massachusetts, died December 3, 1934. He was born in 1890 the son of Dr. E. H. Bigelow and Mrs. Agnes Elizabeth (Cutter) Bigelow, graduated from Harvard College in 1912 and from the Harvard Medical School in 1916. After an internship at the Massachusetts General Hospital, he joined the medical corps of the United States Army, serving at the Rockefeller Institute, Fort Sam Houston, base hospital at Spartanburg and overseas at Allercy. On returning to this country in 1919, he engaged in the study of frambesia in Santo Domingo, later returning to the Harvard School of Public Health, graduating therefrom in 1921. He accepted a position in Antioch College in the department of industrial medicine and later Cornell Medical College as director of the clinic.

In 1924 Dr. Bigelow became Director of the Division of Communicable Diseases in the Massachusetts Department of Public Health rising to the position of Commissioner of Public Health in less than two years. In 1933 he resigned and was appointed Director of the Massachusetts General Hospital to occupy the position made vacant by the resignation of Dr. F. A. Washburn.

His administration of the Department of Public Health was marked by notable contributions to sanitation and extension of service in many other ways. The Massachusetts cancer program with the hospital at Pondville will stand as one of the important contributions to progress in this Commonwealth which led to his election as President of the American Society for the Control of Cancer.

Dr. Bigelow was a Fellow of the Massachusetts Medical Society, the American Medical Association, and a member of many national and local societies.

He is survived by his widow Mrs. Margaret (Wesselhoeft) Bigelow, two children, a daughter of sixteen and a son of fourteen years, his father and mother, Dr. and Mrs. Enos H. Bigelow of Framingham, and two brothers.

DR. HARRY WINFRED GOODALL of Boston, Massachusetts, died April 17, 1935, after an illness of several months. He was born at Wells, Maine, in 1876, the son of George B. and Isabel M. (Norton) Goodall.

His premedical education was acquired at Berwick (Maine) Academy and at Dartmouth College, taking his A.B. degree in 1898 with honors. He graduated from the Harvard Medical School, summa cum laude, in 1902, and served an internship at the Massachusetts General Hospital, and later at the Boston Lying In Hospital. He was also assistant resident physician at the Massachusetts General Hospital. He studied at the University of Tübingen, Germany, in 1908. He lectured on digestive diseases at the Dartmouth Medical School and was instructor in Chemistry at the Harvard Medical School for a time.

His hospital associations were with the Boston Dispensary, New England Baptist, Peter Bent Brigham, Phillips House, New England Deaconess, Palm

er Memorial, Chelsea Memorial, Burbank Hospital, Fitchburg, Symmes Hospital, Arlington, Sturdy Hospital, Attleboro, Framingham Hospital, and Home for Aged Couples, Roxbury, in several of which he acted as chief.

Dr. Goodall began his military service as major in the Army Medical Corps in 1917. After serving at Camp Greene, N. C., and Camp Wheeler, Ga., he went overseas in August 1918. He was commissioned Lieutenant Colonel, August 9, 1918. He served as commanding officer of the gas hospital at Toul, France, and chief of the medical service at a base hospital until the close of the war. He was cited for meritorious and distinguished service.

He was the author of several important contributions to medical publications.

Dr. Goodall joined the Massachusetts Medical Society in 1904 and was a member of the Council. His other Society memberships include the American Medical Association and the American College of Physicians.

The Council rose for a period of silence in respect to the memory of these men.

The Acting Secretary then called the roll of the Nominating Councilors and the following responded to their names and retired to prepare a list of nominations.

W. D. Kinney, *Barnstable*, H. J. Downey, *Berkshire*, W. H. Allen, *Bristol North*, E. F. Cody, *Bristol South*, J. F. Burnham, *Essex North*, C. L. Hoitt, *Essex South*, H. M. Kemp, *Franklin*, G. L. Schadt, *Hampden*, J. G. Hanson, *Hampshire*, R. R. Stratton, *Middlesex East*, F. R. Mahony, *Middlesex North*, A. W. Dudley, *Middlesex South*, W. A. Griffin, *Norfolk*, C. A. Sullivan, *Norfolk South*, T. H. McCarthy, *Plymouth*, Lincoln Davis, *Suffolk*, David Harrower, *Worcester* and H. R. Nye, *Worcester North*.

The business of the meeting then proceeded with the presentation of the report of the Committee on Membership and Finance by the Chairman, Dr. D. N. Blakely of Norfolk. This report was accepted and its recommendations adopted. (See Appendix No. 1.)

The Acting Secretary next presented the following petitions for restoration to membership. Each was recommended by the committee chosen and, under the usual conditions, was accepted by vote.

(1) Abraham Burack, Brockton (Committee J. J. McNamara, A. C. Smith and Thomas H. McCarthy)

(2) Alfred W. Butler, Watertown (Committee H. Q. Gallupe, Dwight O'Hara and H. F. Day)

(3) C. A. C. Richardson, Somerville (Committee F. L. Morse, C. L. McCrossan and E. F. Sewall)

The President then nominated and the Council appointed the following committees to consider the designated petitions for restoration to membership.

For Charles McGinley, Lynn

C. L. Hoitt, W. L. Fraser and O. C. Blair

For Mario J Cariani Springfield  
J M Birnie, M F Hosmer and T S Bacon

For Henry Ritter Springfield  
G L Steele, E E W Walker and M J Stoddard

The President then called upon the Treasurer for a report and Dr C S Butler of Suffolk stated that, while it was his impression that the Treasurer's report should be given at the Annual Meeting of the Society and therefore did not have the written report with him, he thought he could give an outline of what it contained. The report was accepted (See Appendix No 2)

The President then called for a report of the Committee on Ethics and Discipline which was read by the Chairman, Dr David Cheever of Suffolk. The report was accepted (See Appendix No 3)

Dr Roger I Lee of Suffolk, Chairman of the Committee on Publications, stated that there was no formal report. He thought that the *Journal* spoke for itself. He stated that the only activities of the Committee on Publications were the moral supervision of the *Journal* and the election of the Shattuck Lecturer. He said 'We had the Shattuck Lecture last night and we got the *Journal* every week'

The report of the Committee on Medical Education and Medical Diplomas was presented by Dr Reginald Fitz of Suffolk. The report was accepted (See Appendix No 4)

The report of the Committee on State and National Legislation was presented by the Acting Secretary. This report was accepted (See Appendix No 5)

Dr Dwight O'Hara of Middlesex South then presented the report of the Committee on Public Health which was duly accepted (See Appendix No 6)

Dr Franklin G Balch of Norfolk then presented the report of the Committee on Malpractice Defense which was duly accepted (See Appendix No 7)

Dr Robert B Greenough of Suffolk stated that the Committee on Permanent Home had no new matter to add to the report which it gave at the meeting of the Council in February and suggested that with the Council's approval he would submit this report, as written to the Secretary (See Appendix No 8)

In the absence of Dr George R Minot, Dr Walter Bauer of Suffolk was given the privilege of the floor to present the report of the Committee Appointed to Consider the Situation Regarding Rheumatism and Allied Diseases in Massachusetts (See Appendix No 9)

Considerable discussion followed the reading of this report. Dr Francis P McCarthy of Norfolk felt that the Society should go slowly in placing one more medical matter under state control. He stated that he believed more study

was needed and he therefore moved that the matter be laid on the table

Dr George C Shattuck of Suffolk stated that because of the large number of cases of chronic rheumatism in the state the matter was so serious and the solution offered of such obvious value that he believed the state should undertake to handle the problem

Dr George P Reynolds of Suffolk agreed with Dr Shattuck and brought in before the meeting a large chart which showed that rheumatism is the greatest cause of chronic disease in Massachusetts. He referred to the number of individuals involved and gave some statistics from the European experience

Dr James H Means of Suffolk felt that the matter should be settled and should be discussed from the point of view of what is best for arthritis. He did not feel disturbed over Dr McCarthy's suggestions that this will mean more state medicine. He referred to the cancer situation and the work done at Pondville. He stated that he believes the cancer situation in the state is better than ever before

Dr Shields Warren of Suffolk spoke as a pathologist rather than a practitioner of medicine. He reminded the Council that there is no disease 'rheumatism' as such, but that rheumatism is made up of a vast number of symptoms which arise from a variety of pathological processes and that in approaching the problem of rheumatism the entire problem of degenerative diseases must be given consideration. He felt that it was unwise to establish a large hospital on so nebulous a basis and suggested that we make better use of those agencies already existing. He referred to the work being done at the Massachusetts General Hospital and the Robert Brigham Hospital. He stated that he would like to see the Society place itself on record as favoring an investigation of the problem of rheumatism and of working out some satisfactory means of handling it rather than to place itself on record as favoring the addition of two hundred and fifty beds to an already over institutionalized state

Dr E P Joslin of Suffolk stated that he had been in conversation with Dr McCarthy who was apparently agreeable to the acceptance of the proposed plan provided the word 'public' was omitted. He stated that in his own case at the present time he would rather see the work proceed under private auspices

Dr McCarthy of Norfolk stated that he believed that we already have adequate facilities in the state to take care of the rheumatism problem and reaffirmed his motion to lay the matter on the table

Dr H. M. Landesman of Norfolk felt that it would be a bad precedent to ask for the establishment of such a hospital. He likewise re-

ferred to the existing facilities which were not being used to the fullest extent

The President then put the question and, after calling for a rising vote, decided that the motion was carried and that the report of the Committee would therefore be placed upon the table

The Nominating Committee next presented its list of candidates for the ensuing year which was as follows

For President Charles E Mongan, Somerville  
For Vice President Channing Frothingham, Boston  
For Secretary Alexander S Begg, West Roxbury  
For Treasurer Charles S Butler, Boston.  
For Orator Reginald Fitz, Boston.

Upon motion of Dr W A Lane of Norfolk, it was unanimously voted to instruct the Secretary to cast one ballot for the candidates named above Under the instruction of the above motion the Acting Secretary cast the ballot as directed President Robey therefore declared the gentlemen duly elected At his request Dr Mongan came forward to sit upon the platform

The meeting then adjourned at 1 15 P M for luncheon

The President called the meeting to order at 2 00 P M There being no report from the Committee on Physical Therapy, Dr Balch presented the report of the Committee on Cancer which was accepted (See Appendix No 10)

Dr Dwight O'Hara of Middlesex South stated that there was no special report from the Committee on Public Education as it is included in the report of the Committee on Public Health

The Acting Secretary presented the report of the Committee on Postgraduate Instruction which was accepted (See Appendix No 11)

The President announced that the work of the Public Relations Committee had been divided among five subcommittees and then proceeded to call upon the Chairmen of the several Subcommittees for a report of their activities

Dr Ernest L Hunt of Worcester presented the report of the Subcommittee on the Adequacy of Medical Care which was accepted (See Appendix No 12)

Dr Channing Frothingham of Suffolk presented the report of the Subcommittee on Public Health and Practitioner and Public Information The report was accepted. (See Appendix No 13) Dr Frothingham then moved that the Council adopt the recommendations contained in the report There was some discussion regarding the wording of the recommendation concerning Public Information and it was finally voted to alter the original phraseology to read as now printed in the report

Dr F H Allen of Hampden asked to be informed concerning the recommendation regarding the care of the indigent sick He desired

to know if local physicians are to give free care to patients recommended to them by local boards of health or referred to them by local health organizations, or does it have some reference to the plan adopted in Franklin County whereby all indigent sick are treated at a reduced fee rate by any physician they wish to call

Dr Frothingham believed it to be the idea of the committee that it would be desirable to have the indigent sick cared for by individual physicians rather than by salaried city physicians or whatever title such persons should be given, and that the welfare department should work out a plan with the doctors so that the fees would go to the individual physicians rather than to some one on salary The recommendations were then approved as altered

Dr Tighe of Middlesex North submitted the report of the Subcommittee on Social Legislation and Insurance which was duly accepted (See Appendix No 14)

Dr Blaisdell of Middlesex East then presented the report of the Subcommittee on Hospital Relations (See Appendix No 15) This was duly accepted

Dr Dunbar of Bristol North stated that the Subcommittee on Medical Education and Licensure had no report to render at this time

At the request of President Robey, Dr Walter P Bowers of Worcester stated that the New England Medical Council had suspended operations since the Medical Society of Rhode Island was no longer able and willing to contribute its proportionate share of the expenses of the Council This report was accepted

Dr Hunt of Worcester asked for the privilege of making a brief reference to the report of his Subcommittee on the Adequacy of Medical Care He stated that it is important to know if the Society is willing to furnish the committee with financial backing for the necessary investigation in the event that the Federal Emergency Relief Administration will not supply funds He therefore made the motion that the Society authorize the Subcommittee to draw upon the Treasury to the extent of \$5,000 if such an amount be needed

Dr Mellus of Middlesex South referred to the fact that a budget was made last year and said that if this motion passed, the budget would be practically doubled He felt that the Council could carefully consider the matter before taking action.

Dr. Burnham of Essex North stated that he did not feel that the Council was working under satisfactory conditions He was sure that some of the men in the rear of the room could not hear what was being said and, as members of the Council, they were asked to vote without knowing the details From what he as one Councilor could get, it appeared that a house-to-

house survey was contemplated. He stated that it had already been done in a number of cities in the state by the State Department of Public Health. He said that Winchester and Lawrence had been selected among other communities and that the data are now available from the State Department of Public Health. It appeared that he was not in favor of spending \$5,000 for the work until he was more familiar with what it was intended to accomplish.

Dr Tighe of Middlesex North did not believe that the Society could go before the public with an honest criticism of compulsory sickness insurance unless it was able to show that it was trying to find out what was wrong and that it intended to offer a remedy if one is needed. He stated that he regarded this campaign of education against compulsory sickness insurance as being tied up intimately with the investigation contemplated by Dr Hunt's Subcommittee.

Dr Hunt of Worcester answered Dr Burnham's objection by stating that Dr Lombard of the State Department of Public Health is working with the Subcommittee as adviser and statistician. Dr Hunt said that if the State Department of Public Health had already made such a survey, Dr Lombard would certainly have known about it and would have been guided by it in rendering advice. It appears that the survey which was made did not concern itself with the adequacy of medical care but was made in connection with another problem and that it would not serve the purpose of the Subcommittee.

Dr Burnham was still inclined to feel that the amount asked for was excessive.

Dr Mongan of Middlesex South stated that the survey is a serious thing and is the only way in which we can get reliable information. It is to be conducted under the supervision of the Society and it will cost money. He pointed out that California had spent \$25,000, Michigan had sent three men to England to study compulsory health insurance and that it cost the Society \$15,000. Is the Council willing to back its own proposition? If not, it can be stopped. No doctors will be paid for their part in the survey. They are giving their time and are offering their services without any thought of recompense. The profession desires to tell the people of Massachusetts what kind of medical service is obtainable here. He believes that the Society is fully able to spend the necessary funds.

Dr Birnie of Hampden asked if in case the \$5,000 were voted would it not automatically go to the Committee on Membership and Finance. President Robey believed that it should go there but no provision had been made for it. Dr Birnie thought that such a reference would be automatic and that the Council could not vote

any money unless the Committee on Membership and Finance had approved.

Dr Butler asked Dr Mongan if the State of California spent \$25,000 and the State of Michigan \$15,000, or if the State Medical Societies in these states spent such sums.

Dr Mongan replied that the State Medical Societies spent the money and that, in addition to the \$25,000 spent in California by the Medical Society, one of the Federal organizations spent an additional \$60,000.

Dr Burnham commented on the fact that it might be interesting to know the results of the money spent in the two states. California apparently spent \$25,000 and yet that is the only state in the forty-eight which has voted for compulsory health insurance. Michigan sent men abroad to make a study and spent money as indicated but the action of these men apparently did not bear the approval of the House of Delegates.

Dr Butler spoke once more regarding appropriations by the Council. He stated that according to his understanding appropriations made by the Council are first submitted to the Committee on Membership and Finance for recommendation. In the past the practice also has been almost without exception that the various committees have been approached by the Chairman of the Committee on Membership and Finance asking for estimates of appropriations for the ensuing year. Based upon these inquiries the Committee on Membership and Finance has reported to the Council its recommendations for appropriations for the coming year. It seemed to him that at this time, when the budget has already been made out and appropriations have been properly made it is the Council's duty to keep within that budget. Additional appropriations of thousands of dollars would seriously disrupt the budgetary system of the Society.

President Robey then read Section 9 of Chapter IV of the By-Laws as follows:

"The Council shall vote the salaries of its officers, the appropriations for its officers and committees and such other appropriations as it may deem suitable except that every request for an extraordinary appropriation shall be first submitted to the Committee on Membership and Finance for a recommendation. The President shall decide what constitutes an extraordinary appropriation. The Council shall determine the amount of the annual assessment both for resident and for non resident Fellows."

He stated that the chair can easily rule that this is an extraordinary appropriation which must then be submitted to the Committee. Therefore, the chair rules that this is an extraordinary appropriation and that it must be referred to the Committee on Membership and Finance.

Dr Bagnall of Essex North stated that if the Committee feels that this work should be done this summer and that if the money is needed, the Council may avail itself of the appropriation by authorizing the expenditure in case it meets with the approval of the Committee on Membership and Finance. He stated that if there is no motion before the house he would move that the Council take such action.

Dr Hunt withdrew his previous motion in view of Dr Bagnall's motion. Dr Bagnall's motion was duly seconded and was passed.

Dr Phippen of Essex South then presented the report of the special committee which had been appointed to consider the selection of a suitable person to assist the President and Secretary of the Society and the Editor of the *Journal*. (See Appendix No 16.) He then made the following motion:

"Moved that the President of the Massachusetts Medical Society be and hereby is empowered to appoint an Advisory Committee to consist of the President, Vice-President, Secretary, Treasurer, Managing Editor of the *Journal* and the Chairmen of the following committees: Committee of Arrangements, Committee on Publications, Committee on Membership and Finance, Committee on Ethics and Discipline, Committee on Medical Education and Medical Diplomas, Committee on State and National Legislation, Committee on Public Health, Committee on Malpractice Defense and the Committee on Permanent Home. This Committee shall meet at the call of the President or at such regular intervals as he shall designate."

Dr Birnie of Hampden asked if it was the desire of the Committee to include some other person from the Committee on State and National Legislation inasmuch as the Chairman of that Committee is the President of the Society.

Dr Phippen stated that the Committee had considered this matter and decided to leave the motion as it stands. The motion was duly seconded and was regularly passed.

Dr Phippen then presented a second motion as follows:

"Moved that the President be authorized to appoint, with the advice and consent of the Advisory Committee, an Executive Officer, who shall be employed upon a full time basis. He shall be under the jurisdiction jointly of the President, Secretary and Managing Editor of the *Journal* who shall also determine his duties."

This motion was duly seconded and passed.

Dr Phippen then moved that the report of the Committee be accepted and that the Committee be discharged. It was so voted.

There was no report from the Massachusetts Central Health Council.

Dr Bowers of Worcester commented on the authority which had been given for the employment of a general executive officer stating that no provision had been made for remuneration. He felt that this person should be brought into the organization as soon as possible, certainly this summer, and it would be advisable to give the Committee power to pay the necessary salary. Otherwise it would be necessary to defer action until the Council meets again.

Dr D N Blakely of Norfolk stated that according to his recollection some years ago the Council voted that the President be authorized, when he felt it advisable, to employ and direct the services of an assistant, and an appropriation has been made year by year since that time for such a salary. During the past year the Committee on Membership and Finance, in making up its recommendations for the budget, included the usual appropriation for the assistant to the President and in addition to that a contingent fund. Therefore, it appears that the salary was taken care of by the adoption of the budget last February. In case the amount provided for the assistant was not sufficient to employ a full-time person, adjustments might be made through the contingent fund.

Dr Lane of Norfolk asked for additional information from Dr Phippen. It was Dr Lane's understanding that the sum now paid from the appropriation for an executive assistant to the President and the advertising solicitor would be sufficient to cover the salary of the new executive. Dr Lane suggested that perhaps Dr Phippen would report the Committee's opinion on the approximate sum that would be involved.

Dr Phippen stated that the Committee did not go into the detail of the salary but that it believed that the appropriation for the President's assistant plus what could be saved in connection with the soliciting of advertising for the *Journal* would be sufficient.

The Acting Secretary stated that there might be a danger in setting a definite amount at this time since there would be a feeling that the maximum amount must be spent. He stated that at the time the Officers of the Society were the guests of the Committee, the matter was discussed but that it was felt that when a suitable person was found there would probably be enough in the budget to cover his salary. He felt that the type of person selected would naturally have a bearing upon the amount of salary to be paid. He suggested that since the Committee on Membership and Finance had carried an appropriation, the Officers and members of this Advisory Committee would be authorized to negotiate a proper salary with the individual they sought to appoint. Then the

Committee on Membership and Finance might be authorized to pay such a salary.

Dr. Blakely said that he would put the matter a little differently. He believed that for the balance of the year the budget adopted would be adequate and that he agreed with the Acting Secretary that we have not yet gone far enough to know what will eventually be necessary. Since there is only a half year left and the appropriations were made for the full year including the contingent fund, there will be no trouble in meeting the salary when the proper individual is found.

Dr. Lincoln Davis of Suffolk spoke for the Joint Committee Appointed From the Boston Medical Library and the Massachusetts Medical Society and stated that it would not be ready to report to the Council until the next meeting.

The President then announced that the Fellows in Springfield had offered the Society the opportunity of holding the next Annual Meeting in that city next June. It is the 300th anniversary of the settlement of Springfield, and the question was put as to whether the Society should accept the invitation. On motion of Dr. Mongan and duly seconded, it was unanimously voted to hold the next Annual Meeting in Springfield.

The President then announced the Standing Committees for the coming year which were as follows:

#### COMMITTEE OF ARRANGEMENTS

W. R. Morrison *Chairman* Horatio Rogers W. S. Burrage, R. P. Stetson Augustus Thorndike, Jr.

#### COMMITTEE ON PUBLICATIONS

H. I. Lee *Chairman* Homer Gage R. B. Osgood  
R. M. Smith F. H. Lehey

#### COMMITTEE ON MEMBERSHIP AND FINANCE

D. N. Blakely *Chairman* G. C. Caner J. E. Fish, H. F. Newton H. Q. Gallup.

#### COMMITTEE ON ETHICS AND DISCIPLINE

David Cheever *Chairman* W. D. Ruston S. F. McKeen A. C. Smith, R. L. DeNormandie.

#### COMMITTEE ON MEDICAL EDUCATION AND MEDICAL DIPLOMAS

Reginald Fitz, *Chairman* C. H. Lawrence C. A. Sparrow E. S. Calderwood A. S. Begg

#### COMMITTEE ON STATE AND NATIONAL LEGISLATION

Charles E. Mongan, *Chairman* F. E. Jones A. W. Marsh, A. S. Begg D. L. Lionberger

#### COMMITTEE ON PUBLIC HEALTH

Dwight O'Hara, *Chairman* G. N. Hoefel G. D. Henderson S. C. Dalrymple, H. L. Lombard

#### COMMITTEE ON MALPRACTICE DEFENSE

F. G. Balch *Chairman* E. D. Gardner, F. B. Sweet, R. P. Watkins A. W. Allen.

#### COMMITTEE ON PERMANENT HOME

R. B. Greenough *Chairman* C. G. Mixer J. M. Birnie, C. S. Butler E. C. Miller

The President stated that the Special Committees, except those whose duties have terminated, will be continued as committees of progress.

Dr. Lane of Norfolk pointed out that a recommendation had been made by a committee and accepted by the Council to the effect that there should be a representative of the Massachusetts Medical Society who for all practical purposes would act as the press representative of the Society. Since no one had been appointed he nominated Dr. David Cheever. The motion was duly seconded and passed.

Dr. DeNormandie of Suffolk then asked permission to read a resolution before the Council (See Appendix No. 17). After an extended discussion it was finally voted on motion of Dr. Walcott of Middlesex South that the resolution be laid on the table.

Dr. Conrad Wesselhoft of Suffolk presented a resolution which was duly seconded and passed after considerable favorable comment (See Appendix No. 18).

The Acting Secretary announced that the District Public Relations Committees were asked to attend a meeting at 5:00 o'clock in the Salle Moderne.

There being no other business, the meeting adjourned at 3:53 P.M.

ALEXANDER S. BEGG,  
*Acting Secretary*

## APPENDIX TO THE PROCEEDINGS OF THE COUNCIL

### APPENDIX NO. 1

#### REPORT OF THE COMMITTEE ON MEMBERSHIP AND FINANCE

This Committee recommends

1. That the following named eight Fellows be allowed to retire under the provisions of Chapter I, Section 6 of the By-Laws

1. Bailey George Guy Ipswich.
2. Cobb, Albert Crocker Marion
3. Griemard George Auguste Fitchburg with remission of dues, 1935
4. Herrick, Joseph Thomas, Springfield with remission of dues, 1935
5. Morris George Patrick, South Boston, with remission of dues 1935
6. Norton Eben Carver North Chatham with remission of dues, 1935
7. Perkins Archie Elmer Fitchburg, with remission of dues, 1935
8. Stowell Fred Austin Newburyport.

2. That the dues of the following named four Fellows be remitted under the provisions of Chapter I Section 6 of the By-Laws

1. De Wolfe, Henry Charles Mitchell Malden, 1934
2. Dubois, Eoline Church, Springfield 1932 1933 1934 1935



3 Kushner, Israel Louis, Somerville, 1931, 1932, 1933

4 Ryan, Sylvester Edward, Longmeadow, 1932, 1933 in part

3 That the following named five Fellows be allowed to resign under the provisions of Chapter I, Section 7, of the By Laws

1. Allen, George Edgar, Montpelier, Vt, with remission of dues, 1935

2 Boynton, Lyman Crowell, Rochester, N Y with remission of dues, 1935

3 Canzanelli Attilio, Medford, with remission of dues, 1935

4 Smith, Clara Lottman, Providence, R. I, with remission of dues, 1935

5 Streeter, John Frank, Springfield

4 That the following named five Fellows be deprived of the privileges of Fellowship under the provisions of Chapter I, Section 8, Clause (a) of the By Laws

1 Gilbert, Meyer Manus, Lynn

2 Lilyestrom, Sanfrey Matthew, Worcester

3 Nolen, Walter Freeman, Walpole

4 Savage, Ross Elliot, Sharon

5 Sinclitico, Joseph A, Lawrence

5 That the following named six Fellows be allowed to change their membership from one District Society to another without change of legal residence, under the provisions of Chapter III, Section 3, of the By Laws

One from Middlesex North to Middlesex East

1 Sims, Frederick Robertson, Bedford

One from Norfolk to Essex South

1 Tadgell, Henry Allen, Wrentham

Three from Norfolk to Suffolk.

1 Marble, Alexander, Brookline

2 Walcott, Charles Folsom Brookline

3 Zollinger, Robert Milton, Brookline

One from Norfolk South to Suffolk

1 Howe, Henry Furbush, Cohasset

DAVID N BLAKELY, *Chairman*

June 4 1935

## APPENDIX NO 2

### REPORT OF THE TREASURER

As the fiscal year of the Society is from January 1st to December 31st, the full years report of the Treasurer was offered to the Council at its February meeting. At this time therefore, the Treasurer offers an interim report, to June, 1935

Receipts of annual dues by District Treasurers, and forwarded to the Treasurer of the Society, are \$1500 greater than were received in the corresponding period of 1934. This is a very encouraging result, because, if you will recall, the total of annual dues received in all of 1934 was the largest such amount ever received by the Society.

Income from securities in "General Fund" is, however, slightly less than in 1934 for the corresponding period. This is not because of defaults in interest on securities held, but due rather to the low income rates to be obtained now from purchases of high grade bonds in which funds of the Society are invested. In general the market prices of our bond securities, during this year, have been well maintained. Some prices have slightly decreased, some, increased. But many of our securities are selling at their highest prices during the past thirty years.

The Treasurer has invested part of the excess cash in short term bonds, to bring in some income.

Expenses of the Society, now that Committees have widened their activities and increased their interest in work as well as in results, are greater this year than for the corresponding period of 1934. No extraordinary expense has thus far occurred.

The amount of routine work going through the Treasurer's office, during the past year, has increased considerably. This is the result of greater activities of Committees, as well as the natural result of the needs of the growing Fellowship of our Society.

CHARLES S BUTLER *Treasurer*

June 4, 1935

## APPENDIX NO 3

### REPORT OF THE COMMITTEE ON ETHICS AND DISCIPLINE

Like poverty and taxes, the problems of ethical behavior arising among the members of a great professional organization are always with us, and do not vary much in kind from year to year. Your committee has held six formal and many informal meetings, and the Chairman has had numberless personal conferences with individuals and groups. Formal hearings have been accorded to four Fellows. The actual discipline invoked has included reference of one offense to a Board of Trial, a demand for resignation from the Society for falsification of financial accounts and withholding from a brother practitioner a fee collected for him, a deprivation of privileges of Fellowship (in conjunction with the Committee on Membership and Finance, under Chapter I, Section 8—Clause C of the By Laws) for complicity in an abortion, of which the accused was found guilty in a court of law, a recommendation to the President of a severe admonition for a Fellow who had been disciplined by the Board of Registration for an offense which for certain reasons it was impossible for the Committee itself to investigate.

The Board of Trial was called by the President on request of the Committee to try a Fellow on a charge of conspiracy to defraud an insurance company. This matter was referred for consideration by the Society at the annual meeting the following day.

The Committee, without intending to take cognizance of alleged exorbitant fees, supervision of which is not expressly provided for in the Code of Ethics, believes that it is expedient at times to give some consideration to the numerous complaints which it receives. The Committee is of the opinion that the charging of very large fees which seem to the patient very disproportionate to the services rendered is one of the factors which incline the public mind more and more toward State or Socialized Medicine. It believes that in very few instances is it for the best interests of either doctor or profession for a collection agency to attach the bank account, tools of trade or other personal effects of a debtor patient. It believes that often this is done without the knowledge or consent of the physician. It believes that a fee so obtained is too dearly won. It has tried through the exercise of good offices to compromise and adjust some of these disputes, with reasonable satisfaction to both parties, it must be admitted that no brilliant success has crowned its efforts.

Publicity, which advertises the professional doings and alleged attainments of physicians in the lay press, on the air and in the market place, continues to be a sore, annoying and controversial point. The members of the Council are too familiar with the situation to require an extended discussion of it here.

The recent cases of our Vice-President, who in no way personally responsible saw a successful surgical operation broadcast and blazoned forth over the world in newspaper and film to an extent which it is reliably estimated would have cost five and one-half million dollars if paid for at advertising rates is an example in point. In these cases it is usually the policy of the Committee to tell the Fellow involved that the publicity attaching to him has caused criticism to receive from him the assurance that he was in no way responsible for it and if the occasion seems to require it, to ask him to make a statement to that effect in the *Journal* at the same time testifying to his sympathy with the accepted standards of the Society. Usually an incident of this kind is followed by letters to the Committee, about equally divided between scornful censure of our feeble attitude and warm praise for our broadminded tolerance and judgment. Evidently one cannot please all the people all the time.

As in former years the Committee feels that any usefulness which it may have is as a permanent body which exists to interpret the accepted standards of ethical behavior of the Society to younger members.

DAVID CHEEVER, *Chairman*

#### APPENDIX NO 4

##### REPORT OF THE COMMITTEE ON MEDICAL EDUCATION AND MEDICAL DIPLOMAS

During the past year the Committee on Medical Education and Medical Diplomas has held several meetings. In accordance with directions from the Council the Committee has chiefly occupied itself with assisting at the introducing of a Bill before the Legislature to improve the Massachusetts Medical Licensure Act. In this undertaking the Committee has been materially helped by the devotion of President Robey and Acting Secretary Beggs. The upshot of the matter has been that House Bill 156 our original bill was given leave to withdraw and in its place was substituted House Bill 2054 which advocates the appointment of an unpaid special commission to study the question of medical educational conditions in the Commonwealth and to report the results of this study to the General Court before the first of December. The fate of the bill is still pending.

The Committee has examined a larger number of candidates from unrecognized Medical Colleges than in previous years. The problem as to whether such candidates tend to make desirable members or not remains unsolved.

From the point of view of our Committee the situation has become complicated during the past year not only by the laxness of the present Medical Licensure Act of Massachusetts but also by the fact that many hospitals in order to maintain recognition as hospitals and particularly as hospitals qualified to train interns have tightened up on their Staff appointments and have made it increasingly difficult for men not members of the Massachusetts Medical Society to obtain hospital privileges. On this account considerable pressure has been placed on our Committee to recognize the diplomas of men who desire to become members solely because in so doing they can be made staff members of various hospitals. The correct attitude for the Society to adopt on the matter is a difficult one to decide. It seems to us that if the Massachusetts Medical Society becomes less strict in its qualifications for membership this will reflect upon the hospital situation in Massachusetts. While hospitals may legitimately increase their staff membership yet unless rigid standards are upheld a situation may easily arise that is detrimental to the public welfare. On

the other hand our Committee does not wish to keep out of the Society any doctors who might make useful members.

We badly need guidance on these matters. At the February meeting of the Council our Committee asked the President to appoint a sub-committee to study these problems. We await the results of their deliberations with great eagerness.

During the past year 244 new members were admitted as Fellows of the Society. Of these nine per cent were graduates of unrecognized schools a slightly lower proportion than for several years.

Through the generosity of the Society an annual prize of fifty dollars has been offered for the best case report by any intern holding a rotating internship in any of the Massachusetts hospitals approved for intern training by the American Medical Association. From the papers submitted this year the prize was awarded to Dr Joseph C. Edwards of the Springfield Hospital for his report dealing with an unusual case of bronchiogenic carcinoma. The Committee hopes that an annual competition of this sort will act as a stimulus toward improving the work of interns who are being educated in Massachusetts.

The Committee has continued with its studies of intern training and hopes eventually to be so informed as to have an authoritative opinion regarding the kind of intern training that is available in this state and how our internships may be improved.

Finally the Committee has sponsored an "Educational Number" of The *New England Journal of Medicine* in conjunction with the Editorial Staff of that *Journal*. This number will soon be forthcoming and will include a group of papers dealing with various educational problems that confront the Society. It is hoped that an annual number of this character may stimulate and interest all doctors who are seriously concerned with improving medical education in Massachusetts whether in their capacities as teachers in Medical Schools as Staff Members of Hospitals which train interns or as readers of papers before local medical societies.

Respectfully submitted

C H LAWRENCE,  
C A SPARROW  
E S CALDERWOOD  
A S BEGG

REGINALD FITZ, *Chairman*

#### APPENDIX NO 5

##### REPORT OF THE COMMITTEE ON STATE AND NATIONAL LEGISLATION

The legislative work this year has been extremely heavy. We began in December by studying a considerable number of bills that had already been filed at the State House and the delay in the organization of the Senate gave us a chance to study many more that were filed just about the closing date. Altogether somewhere in the neighborhood of 100 bills were studied but the list was reduced by elimination and finally we had about 40 bills under consideration. After some further reduction the members of the Society were notified from time to time concerning the status of these bills. In the Legislature at the present time there are two bills that are of particular concern to the profession.

House Bill 1157 has been brought to your attention through the medium of cards that were handed out to you at the time of registration. This is the chiropractor bill, which was reported favorably by the Committee on Public Health. Someone said today that that was reported unanimously. This is not true. There were five members dissenting from favorable

report, and I think you ought to know who those dissenters are. The Chairman, Senator Cole, Senator Miles, Representative Theberge, Representative Ashe, and Representative Murphy, five out of approximately 15 on the Committee reporting adversely. But the bill has been introduced into the House and has been referred to the Committee on Ways and Means acting jointly with the similar Committee of the Senate. Every effort naturally should be made to defeat this bill. There will be an interesting editorial in the next issue of the *Journal* which deals with this subject. Those of you who saw the recent editorial in the *Herald* will have some idea of how some of the laity feel about this matter. The same points should be emphasized in connection with it, that the enactment of such a bill would tend to reduce the single standard by which we now operate and would be contrary to the public interest.

The other bill on which we are still working is House 2054, a resolution substituted for House 756, which was given leave to withdraw. This resolution, as Dr. Fitz has pointed out, calls for a study during the recess by an unpaid commission, which is to report with recommendations at the next annual meeting of the Great and General Court. The commission is described in the bill, and those of you who are interested may obtain at the registration desk a copy of the bill with the editorial that was published in the *Journal* about two weeks ago. This is an important bill and should be supported. The cards ask you to see, phone or write your State Senator and Representative at once and get your friends to do likewise.

The Committee's work has been pretty extensive. We have attended many hearings at the State House and there has been a great deal of correspondence. We have made free use of different organizations throughout the State. We have bothered the members of the Public Relations Committee. They can never tell when they will be waked up and a night letter thrust into their hands, something more to do in an approach to the Legislature. It is hoped that we may be able to complete our organization during the coming year, since we have discovered as we worked at the State House this year that other groups are definitely organized, and it appears that to be effective our Society must do likewise.

A. S. BEGG, *Acting Secretary*

#### APPENDIX NO 6

##### REPORT OF THE COMMITTEE ON PUBLIC HEALTH

The Committee on Public Health, with its Subcommittee on Public Education, has continued to cooperate with the State Department of Public Health in the broadcasting of popular medicine. This cooperation was initiated by vote of the Council five years ago. In order to secure the broadcasting facilities it has been necessary to mention the names of the broadcasters. Thus there has been granted a sanction for radio publicity which has never been granted to the press. We have repeatedly pointed out that this constitutes what might be called discrimination in our choice of publicity mediums.

Whether this is in fact discrimination, or a compromise necessitated by divided opinion on the whole subject, is hard to say. Five years ago the introduction of a broadcaster by name was considered the limit to which the Medical Society should go in publicizing its individual Fellows. Today a medical meeting seems to have become sufficient reason for hiring a publicity agent to arrange for broadcasts, photographers, and the release of copy to the press.

Last fall many of us were startled to find ourselves entertaining a group whose publicity had preceded them into every Middlesex village and farm.

The charge given to us five years ago was "to procure the preparation of material for the daily press and for radio broadcasts on medical subjects, and to assume responsibility therefor in the name of the Massachusetts Medical Society." If the Society wishes them to do so, this Committee and the State Department of Health can drive six white horses as well as anybody else. We have felt, however, that conservatism would more appropriately represent our Puritan ancestry. Perhaps it was in our blood to have published a Communication entitled "The Hazards of Publicity." This appeared in the *New England Journal of Medicine* of March 21, 1935, and was distributed to the Council at its last meeting. It was called a Communication, not a Report, in order that it might not imply opinion or action beyond that of the Committee itself. Shortly thereafter Dr. Jago Galdston, Executive Secretary of the Medical Information Bureau of the New York Academy of Medicine, submitted some Comments which were published, at the suggestion of the Committee, in the *Journal* of May 2, 1935. Reprints of these Comments are being distributed to the members of the Council today.

The Committee earnestly hopes that our Fellows are giving thought to these trends of medical publicity. Although it has largely refrained from announcing the discovery of new cures, sera and anesthetics, it would be as happy to follow the Joneses as anyone else provided they are members of the Massachusetts Medical Society in good standing.

Respectfully submitted,

DWIGHT O'HARA, *Chairman*

#### APPENDIX NO 7

##### REPORT OF THE COMMITTEE ON MALPRACTICE DEFENSE

The Malpractice Defense Committee has had a very uneventful year. There were pending in the hands of Palmer, Dodge, Barstow, Wilkins and Davis at our last report eleven cases. During the year, we turned over three more. Two of our cases were disposed of, one being dismissed under a rule of the court for lack of prosecution and in the other the plaintiff was non-suited after the case had been sent out to a session for trial. There are at the present time twelve cases pending.

One new law has been passed by the Legislature which concerns malpractice suits, House Bill No. 595. This is an act to provide for the advancement of cases for speedy trial in the superior court. It provides that in all actions of contract or tort for malpractice error, or mistake against physicians, surgeons, etc., pending in the superior court now or at any time, the court shall at the request of any party to the proceeding advance the same so that it may be heard and determined with as little delay as possible.

This does away with the long delay in malpractice defence suits and ought to be a great relief to the situation. The bill was not pushed by your Committee, nor did I hear of it until it had been passed.

FRANKLIN G. BALOH, *Chairman*,  
ARTHUR W. ALLEN, *Secretary*

May 23, 1935

#### APPENDIX NO 8

##### REPORT OF THE COMMITTEE ON PERMANENT HOME

The Committee on Permanent Home of the Massachusetts Medical Society made a report at the spe-

cial meeting of the Council in April in regard to the renewal of the note of the Boston Medical Library which came due on April 1 1935

In conference with the Treasurer of the Massachusetts Medical Society and the officers of the Library, this note was renewed for a period of one year from April 1 1935 at 4% per cent and a payment on the capital was made of \$203.00 reducing the note to \$24,500 00

It is understood that the Library will be in a position to reduce the principal materially on or before April 1 1936

Respectfully submitted

Committee on Permanent Home

S B WOODWARD  
J M BIRNIE,  
C G MITTER,  
R. B. GREENOUGH *Chairman*

#### APPENDIX NO 3

##### REPORT OF THE COMMITTEE FOR THE STUDY OF RHEUMATISM AND ALLIED DISEASES IN MASSACHUSETTS

The following is the report of the first meeting of the Committee for the Study of Rheumatism and Allied Diseases in Massachusetts. The members present unanimously agreed to the following

I. The Committee is convinced that the problem of chronic rheumatism demands solution

II. The Committee can visualize no method of beginning to meet this need which does not provide a hospital of approximately two hundred and fifty beds suitably equipped and staffed to care for patients with chronic rheumatism. Such an institution must be either privately endowed or under the supervision of the State Department of Public Health

III. Such an institution might be expected to serve the physicians and people of the State of Massachusetts by making possible

A. A complete and correct diagnosis

B. The discovery of the probable underlying cause of the particular type of chronic rheumatism existing

C. The initiation of the necessary appropriate hospital treatment.

D. The planning of a future régime and follow-up

E. The return of all patients to their private physicians it being understood that all patients are sent to such an institution by the local physician. It is hoped that the physicians will feel free to return any or all of their patients for subsequent periods of observation treatment and further suggestions

IV. Such an institution should serve as an educative clinic where both physicians and patients might obtain information as to the best methods of controlling chronic rheumatism.

WALTER BAUER, *Secretary*

#### APPENDIX NO 10

##### REPORT OF THE COMMITTEE ON CANCER

The Committee on Cancer of the Massachusetts Medical Society has lost two of its five members during the past year by the death of Dr George F. Martin and Dr George H. Bigelow

At the meeting of the Council in February Dr E. M. Daland was appointed to take the place of Dr Martin.

On May 22 1934 this Committee assumed the responsibility for arrangement of a clinic on cancer for the members of the staffs of the state-aided cancer clinics in Massachusetts. This clinic was given in the morning at the Massachusetts General Hospital and in the afternoon at the Palmer Memorial Hospital with an attendance of about forty five members of the Society

Respectfully submitted

Committee on Cancer

FRANKLIN G. BALCH  
PHILEMON E. TRUESDALE,  
ERNEST M. DALAND  
ROBERT B. GREENOUGH *Chairman*

#### APPENDIX NO 11

##### REPORT OF THE COMMITTEE ON POSTGRADUATE INSTRUCTION

The Committee on Postgraduate Instruction wishes to report that the second annual series of extension courses was completed on May 31 1935. The Committee wishes to acknowledge the splendid coöperation from all the districts and especially wishes to thank the district chairmen for the great amount of detailed work which they have handled to make possible the success of the courses in their respective districts

The extension courses were given in the following places

District	Attendance
<i>Barnstable</i>	
Hyannis	3
<i>Berkshire</i>	
Pittsfield	5
<i>Bristol North</i>	
Attleboro	
Taunton	
<i>Bristol South</i>	
Fall River	1
New Bedford	
<i>Essex North</i>	
Haverhill	
<i>Essex South</i>	
Salem	
<i>Franklin</i>	
Greenfield	
<i>Hampden</i>	
Springfield	1
Holyoke	
<i>Hampshire</i>	
Northampton	
<i>Middlesex East</i>	
Melrose	
<i>Middlesex North</i>	
Lowell	
<i>Middlesex South</i>	
Cambridge	
<i>Norfolk</i>	
Faulkner Hospital	
Norwood	
<i>Norfolk South</i>	
Quincy	
<i>Plymouth</i>	
Brockton	
<i>Suffolk</i>	
Boston	
<i>Worcester</i>	
Milford	
Worcester	

**Worcester North**

Ayer	16
Fitchburg	29

Total No Sessions—240 Total Attendance—834

There were one hundred and thirty six instructors on the faculty. The following list gives the names of the instructors with their respective subjects. The Committee wishes to express the thanks of the Society to this devoted group of instructors who have given freely of their time to make the course a success.

On May 22 the General Committee met and voted to continue the course next year. A program has been prepared and was presented to the district chairmen at a meeting held in Boston yesterday. As soon as the courses have been chosen the faculty will be assigned for each district. This will give the district chairmen ample time to advertise the course before autumn.

Respectfully submitted,

FRANK R. OBER, *Chairman*,  
LEROY E. PARKINS, *Secretary*

June 4, 1935

**FACULTY—1934-1935 SESSION*****Amebiasis and Parasite Diseases Common in New England***

Dr Chester S Keefer	Dr Wesley Spink
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***Cardiovascular Disease***

Dr F Dennette Adams	Dr Sylvester McGinn
Dr Edward F Bland	Dr W Richard Ohler
Dr William B Breed	Dr Francis W Palfrey
Dr Robert W Buck	Dr Robert S Palmer
Dr Clifford L Derick	Dr Cadis Phipps
Dr Laurence B Ellis	Dr Joseph H Pratt
Dr James M Faulkner	Dr Samuel H Proger
Dr Marshall N Fulton	Dr William D Reid
Dr Bernard I Goldberg	Dr Howard B Sprague
Dr Ashton Graviel	Dr Oliver H Stansfield
Dr Burton E Hamilton	Dr Paul D White
Dr T Duckett Jones	Dr Louis Wolf
Dr Samuel A Levine	

***Dermatology and Syphilis***

Dr John Adams, Jr	Dr George M Crawford
Dr Bernard Appel	Dr Arthur M Greenwood
Dr J Harper Blaisdell	Dr C Guy Lane
Dr William P Boardman	Dr E Lawrence Oliver
Dr Austin W Cheever	Dr Jacob H Swartz

***Endocrinology***

Dr Fuller Albright	Dr Frank H Lahey
Dr Frank N Allan	Dr Charles H. Lawrence
Dr Joseph C Aub	Dr Jacob Lerman
Dr Walter Bauer	Dr James H Means
Dr Oliver Cope	Dr Joe V Meigs
Dr Gilbert Horrax	Dr W Richard Ohler
Dr Lewis M Hurxthal	Dr John Rock
Dr Everett D Kiefer	

***Industrial Medicine***

Dr Joseph C Aub	Dr C Guy Lane
Dr W Irving Clark	Dr Henry C Marble
Mr Charles Horan	Dr Alton S Pope

***Laboratory Procedures Useful in Office Practice and Home Treatment Medical Economics***

Dr Channing Frothingham (Medical Economics)
Dr W Richard Ohler (Laboratory Procedures, etc)

***Nutrition in Health and Disease***

Dr Frank N Allan	Dr W Richard Ohler
Dr E Stanley Emery	Dr Howard F Root
Dr Albert A Hornor	Dr Dwight L Siscoe
Dr Chester S Keefer	Dr John Talbot
Dr William P Murphy	

***Obstetrics and Gynecology***

Dr Carmi R. Alden	Dr Edward L Kickham
Dr Benedict F Boland	Dr Frederick J Lynch
Dr Max Davis	Dr William J McDonald
Dr Emilio D'Errico	Dr Joseph W O'Connor
Dr Christopher J Duncan	Dr Alonzo K. Paine
Dr Thomas R Goethals	Dr Frank A. Pemberton
Dr Frederick L Good	Dr Loufs E Phaneuf
Dr Roy J Heffernan	Dr C Weslev Sewall
Dr James C Janney	

***Pediatrics***

Dr James M Baty	Dr John Lovett Morse
Dr Stewart H Clifford	Dr Lyman Richards
Dr Eli Friedman	Dr Warren R Sisson
Dr Lewis W Hill	Dr Philip H Sylvester
Dr Francis C McDonald	Dr Harold G Tobey
Dr Charles F McKhann, Jr	

***Psychiatry The Common Neuroses and Their Treatment in Private Practice The Psychoses—Early Diagnosis***

Dr Karl M Bowman	Dr Harry C Solomon
Dr Maxwell E Macdonald	Dr Morris Yorshis
Dr Oscar J Raeder	

***Surgery***

Dr Franklin G Balch, Jr	Dr George A. Marks
Dr Joseph S Barr	Dr Gordon M Morrison
Dr Marshall K. Bartlett	Dr William R Morrison
Dr Albert H. Brewster	Dr Frank R Ober
Dr William E Browne	Dr Charles F Painter
Dr Joseph H Burnett	Dr Langdon Parsons
Dr Richard B Cattell	Dr Thomas H Peterson
Dr Edwin F Cave	Dr André W Reggio
Dr David Cheever	Dr Thomas K Richards
Dr Howard M Clute	Dr Sumner M Roberts
Dr Frederic J Cotton	Dr Mark H Rogers
Dr Henry H Faxon	Dr James W Sevel
Dr Jacob Fine	Dr Joseph H Shortell
Dr Gilbert E Haggart	Dr Horace K Sowles
Dr Torr W Harmer	Dr Joseph Stanton
Dr Otto J Hermann	Dr Horace P Stevens
Dr Alonzo G Howard	Dr Augustus Thorndike,
Dr Charles T Howard	Jr
Dr Francis T Jantzen	Dr George W Van Gorder
Dr Stephen G Jones	Dr Lester R Whitaker
Dr Charles C Lund	Dr Edward L Young, Jr.

**APPENDIX NO 12****COMMITTEE ON PUBLIC RELATIONS****REPORT OF THE SUB COMMITTEE ON ADEQUACY OF MEDICAL CARE**

To this sub-committee was delegated the task of determining whether the population of Massachusetts is being adequately served by the medical profession, and to what extent medical charity is abused by hospitals and other agencies. The methods for pursuing this task were prescribed by the committee and were three in number, as follows: (1) A questionnaire to be sent to all members of the Society; (2) Hearings to be held in the various districts of the state, conducted by the adjunct Public Relations Committees in each district society under the direction of the member of the State Committee from the particular district; (3) A survey of a cross section of the population through a house to house canvass by paid workers, to glean unbiased information from the people themselves as to whether there is lack of adequate medical care.

The work of preparation has been very considerable and progress hampered by our lack of experience in the conduct of such researches, the necessity for committee agreement, and finally a lack of funds to defray the costs of such a program.

This last difficulty was alleviated in part by vote of the Council at the February meeting at which time one thousand dollars was appropriated for the purpose of the survey.

The first phase of the work has been accomplished so far as this sub-committee's function goes. The results are available in detail herewith and will be summarized presently.

The second phase was deferred because of objections on the part of some of the local Public Relations Committees that they did not feel competent for the task, and doubt as to how much basic and reliable information could be secured by the method at this stage in the organization of the local committees.

The third phase has been carefully planned the cooperation of the State Department of Public Health secured and that of the Federal Emergency Relief Administration asked. The reasons for seeking help from the State Department of Public Health were two. We thereby secured (a) the technical advice and help of Dr. Herbert L. Lombard, statistician extraordinary, and (b) the influence of affiliation with a state department to bear upon the F.E.R.A. The reasons for seeking aid from the F.E.R.A. were (1) that a calculation of the cost of an efficient canvass of 1 per cent of the population figured about \$7000 whereas our appropriation was \$1000. (2) Inasmuch as it is a part of the duty of the F.E.R.A. to provide employment for certain white-collar workers it was thought to be a legitimate and proper means to an end of value to the public quite as much as to the doctors.

A copy of the plan submitted is available herewith. It has been filed with the F.E.R.A. administration at Worcester after an encouraging interview with Mr. Conrad Hobbs of the Boston office. The reply has not yet been received. An alternate plan should be available if the project is not approved by F.E.R.A. It can be done by employing medical and other students during the summer if the society will appropriate the necessary funds for use if and as needed.

Reverting now to the returns from the Questionnaire I will briefly summarize and interpret the information gained. Of 4600 blanks sent to the members through the district societies 1121 were returned up to April 26, 1935, 21 of which were not filled out for reasons which were courteously explained leaving 1100 replies available for analysis. Why seventy-five per cent of our membership failed to cooperate in this effort in behalf of their own interests is a question of psychology upon which I need not now dwell. To the 1100 who painstakingly filled out and returned their blanks the committee wishes to express its hearty appreciation and thanks.

Section I of the Questionnaire deals with adequacy of medical care and is subdivided into its technical adequacy and its economic availability.

#### SECTION I

A1 Of 1053 answers only six admitted any lack of doctors and thirty-four said there were too many.

A2 Of 1083 answers regarding hospital facilities only twenty-four admitted lack of five of whom qualified their answers to the effect that the facilities were economically inaccessible while twenty-seven felt that there was an over supply.

A3 As to the availability of specialists the replies were similar although on this question there were more blanks, one hundred and eighty-two as to the first clause and 137 as to the second. According to 872 there are plenty, seven, there are too many, eleven that they are sometimes economically inaccessible, twenty

two think there are not enough, certain specialties being less available than others. Nine hundred and twenty-eight report no loss of time in securing the service of specialists while fifteen find that such loss exists.

A4 The situation as to nursing service is similar although a bit more emphatic as to no lack of either visiting or private nurses. Lack of so-called domestic nurses and limitations due to the cost of nursing service are suggested. Eleven hundred and one find plenty of visiting nurses as against sixteen that do not. Fifteen think there is an oversupply of visiting and seventy-five think the same of private nurses.

In the section calling for remarks there is little elaboration of the answers bearing upon number and distribution of doctors shown above. Several point out the present tendency toward an over-supply of doctors especially those from sub-standard schools who by reason of stricter laws in other states gravitate to Massachusetts and become a menace to ethical as well as technical standards of service. Too many doctors in cities and an excess of specialists in relation to the number of people who can afford to pay the specialists' prices is suggested but not sustained by figures. As to economic inaccessibility of hospitals and specialists it is pointed out that people do not appreciate the provisions of hospitals for free service to the poor nor the willingness of specialists to mitigate their charges for deserving patients of the low income groups. The duty of correcting the over-supply of both doctors and nurses is placed upon the schools by one respondent.

But one instance each of suffering from lack of medical hospital and nursing care is reported.

#### Section B

B1 This section deals with the lack of purchasing power as a reason for inadequate medical care. Doctors were asked to estimate the percentage of inadequacy of medical and hospital care because of inability to pay. One hundred and twelve attempted to do so and the mean of their estimates is twenty per cent. One hundred and eighty-nine answer "YES" to the question "Is there a considerable group of people in your community which has failed to receive adequate medical attention because of inability to pay the doctor's and hospital charges?" Five admit the possibility while 804 reply "No" twenty-eight of whom qualify their answers by showing that other causes than lack of purchasing power explain much of the failure to receive adequate care. Ignorance, carelessness and procrastination on the part of patients and parents are most prevalent. Twenty-three per cent of the replies show inadequacy of care on this account.

B-1-a. Sub-section deals with the untoward results of delay in seeking medical aid because of inability to pay. One hundred and fifty-six have knowledge of such cases and fifty-four think such exist but are rare. Eight hundred and thirty-four know of no such cases and nineteen say "NO" but qualify it.

Among the comments delay in obtaining aid for acute appendicitis, other specialist services and procrastination in minor cases are mentioned. Several express the opinion that the poor and the rich do not need to delay while the self-respecting middle class suffers most. Twenty per cent of the replies show inadequacy on this count.

B-1-b Sub-section touches on neglect of treat

ment or continuing care Thirteen plus per cent find that it exists

B1-c Sub-section regards retardation of recovery by lack of diet, drugs or appliances Thirty think there is such retardation

B1-d Sub-section refers to suffering or retardation of recovery from lack of nursing care Twenty four per cent of those who replied indicated an opinion that varying degrees of suffering and retardation exist.

#### SUMMARY OF SECTION I

*It is shown that while there is practically no recognized lack of available doctors and specialists, hospitals and nurses, it is the opinion of 22.8 per cent of the respondents that suffering does exist because people neglect to obtain available service by reason of economic disability*

#### SECTION II—ABUSES OF MEDICAL CHARITY

There is nearly universal recognition of encroachments by institutions, societies, health departments, private commercial enterprises and nursing associations Four hundred and eighty six replies particularize 1013 times as to ways in which medical charity is exploited Ability to draw the line between coöperation with and exploitation of the medical profession is generally lacking All, as essential parts of health service, naturally overlap when 100 per cent good will exists With commercial incentive in many of these organizations and with practice on a competitive rather than a cooperative basis, such overstepping of one upon the interests of the other seems inherent in the system

#### ANALYSIS OF REPLIES TO SECTION II

##### A—Abuses by the People

1 To what extent are you the victim of persons who can afford to pay but neglect to do so or who misrepresent their economic situation in order to receive free or low rate service?

Nine hundred and twenty three admit varying degrees of this type of abuse, 316 estimate it in terms of percentage, of which the mean estimate is forty-four per cent, 254 say "SMALL" or "MODERATE" while 250 say "LARGE", 103 say "YES" without qualification

2 Do people who are not fit subjects for charity use hospital facilities which rightfully belong to the less fortunate? Seven hundred and forty-three reply in the affirmative, 119 in the negative, 170 qualify their affirmative opinion, sixty eight do not answer or are non-committal

Among the qualifications, appreciation is not lacking of the difficulty encountered by hospitals in eliminating those who improperly seek medical charity Some consider this the real cause of the economic plight of the doctors City employees, especially in Boston, are named as particular offenders in this respect Adequate social service with credit bureaus as maintained by department stores is suggested as a remedy

Persons able to pay know that free patients in hospitals have good doctors, good food and nursing service They cannot understand why they should not benefit by a service which they help to maintain by taxes

##### B—Abuses by Hospitals

B1-a Sub-section deals with abuse by permitting patients able to pay to be treated on free service wards Two hundred and eighty-four reply in the negative that hospitals give no such

permission Thirty-six qualify negative answers. Five hundred and eighty-seven reply in the affirmative, forty two qualify it as rare and forty two qualify it otherwise One hundred and nine give no information

B1-b Discrimination by permitting private nursing care for persons who do not pay the doctor This is admitted by 437, denied by 353, minimized by forty, denied with qualifications by fifty-two and admitted with qualifications by sixty-one One hundred and fifty-six give no information

B2-a Detrimental interference with work of physicians? Such is denied by 457, denied with qualifications by sixteen It is affirmed by 449, thought rare by thirty nine, and qualified in the affirmative by forty four No information is given in ninety four replies

B2-b Detrimental to patients? Only 104 replied specifically to this item, seventeen of which were affirmative Because both items were included in one question, the unqualified answers in B2-a must be interpreted as relating to both physicians and patients

B-3 Other ways in which medical charity is exploited? Two hundred and eighty-four were disinclined to answer Eighteen did not know, 308 answered "NO" to the question as against fourteen answering "YES" Four hundred and eighty six were in the affirmative and particularized their meanings to the extent of 1013 specifications These specifications relate to

(a) Private enterprises Clinics of many types, hospitals in ways mentioned in 4a above and twelve other counts, nursing, district, Red Cross, community and industrial, social workers, and miscellaneous charity and character building organizations

(b) Public enterprises Health department activities relating to clinics, hospitals and prophylactic organizations, municipal welfare activities, especially work of city physicians and hospitals under political domination and medical care under ERA.

(c) Outside Agencies Dealing in advice, remedies, insurance coöperative societies, contract services, free and low rate laboratory services (x-ray), advice from doctors not registered in Massachusetts, etc

(d) Within Medical Profession Monopoly by influential leaders in the profession, referred work unpaid, assistants not allowed to collect for services and specialist fees

#### REMEDIES SUGGESTED

In formulating remedies it is well that we keep clearly in mind the distinction between civic agencies and institutions organized for general welfare, appreciative of the part played by medical service therein, and those other agencies operated for profit which tend to reduce the medical profession to a plane of dependency of which Industrial Accident Insurers are outstanding examples

There are numerous suggestions as to what can be done by the Medical Society in relation to these abuses Elimination of unfair practises among doctors themselves, promotion of better business methods and education of the people to regard the employment of a physician as a business transaction are suggested Many feel that we could compel hospitals to weed out more effectively the clinic patients who might pay reasonable fees to private practitioners and also help the physicians by greater care as to who is admitted to the wards on free service These many criticisms and suggestions bring

up the question "Is the Massachusetts Medical Society ready to define conditions under which its members may do charity work in hospitals and compel their observance under penalty of loss of fellowship?"

Your committee is not now prefaced to recommend such a cause

Pay for staff doctors in publicly maintained hospitals and clinics is suggested by several. Your committee feels that were such a plan adopted the hospitals would no longer be under any ethical restraints but would frankly compete with the practitioners and have every advantage on their side.

Further consideration and study of abuses of medical charity so far as it relates to hospitals is now a function of the Sub-Committee on Hospital Relations

### SECTION III—THE DOCTOR'S BURDEN

#### A. Service Rendered Individuals

A.1. Without pay Of the 100 who replied but fifty two do not render such service forty-nine did not answer fourteen do not know and five are not in active practice. The remaining 980 or ninety per cent, render service to individuals without pay. Two hundred and forty-two estimate the amount in general terms large moderate, small while 599 express it in terms of percentage of which twenty-five per cent is the mean.

A.2. At reduced rates Here the figures are much the same. Nine hundred and thirty or eighty-five per cent, give services at reduced rates and of 537 who estimate in terms of percentage, the mean is thirty-five per cent. Some give special reasons for reductions such as the known ability of patients to pay discounts on large bills, patients of long standing who are in reduced circumstances and other professional persons.

#### B. Unpaid Service to Hospitals and Clinics

B.1. As to amount of time given Two hundred and eighty-five give none ninety-three do not answer five do not know how much time ten are on consulting staffs part pay jobs etc leaving 717 sixty-five per cent, who give such services. Five hundred and sixty-five give a total amount of 153,246 hours per year or an average of 399 hours each. Seventy estimate time given in terms of percentage of which the mean is forty per cent. The balance (72) express it in general terms large small variable.

B.2. Number of patients treated Only 557 or fifty-six per cent attempt to estimate of whom 129 express themselves in general terms while 428 state numbers of patients specifically

### SECTION IV

#### SHARE OF BURDEN BORNE BY COMMUNITIES COOPERATION BY COMMUNITIES IN CARE OF SICK

A. By paying doctors on fee basis. Sixteen report that their communities give full pay eleven report a rare fee twenty-eight receive pay from lodges and 141 do not specify the source of pay given.

B. By contract. Five hundred and eighty-eight report community cooperation by contracts from various sources

C. From work in free clinics in which doctors are paid, payment by public agencies is known by 246 doctors. Payment by private agencies is known by 185

D. Cooperation by furnishing nursing service. Five hundred and seventy-four acknowledge such help. Many speak of the cooperation of district nurses in highest terms

### SECTION V

#### PATIENTS OF REDUCED INCOME BUT NOT YET INDIGENT ARE VARIOUSLY AIDED

A. Source. Seven hundred and fifty-one give no answer or do not know. One hundred count them as part of the doctors' burden, forty-one the doctors' burden plus free agencies. Nine think they get no aid and fifty-five think that public and private welfare agencies help them.

B. Community help to medical care. Four hundred and seventy-one are unable to answer. Five think no care is received while 258 hold that both the indigent and near indigent are helped. Three hundred and thirty-four say that only the indigent are aided.

#### COMMENT ON SECTIONS III, IV & V

The contribution of physicians in time, effort and substance toward carrying the burden of medical care for the indigent in hospitals and the near indigent in office and home has been enormous. (Eleven hundred doctors give the amounts shown above. What would have been the figures if the other 3500 had replied to the questionnaire?) The communities have been backward in recognizing the unfairness of this situation and in most instances have failed to include adequate medical care in their provisions for relief. Slow to realize the wisdom of investment in preventive effort, Welfare Boards have generally made reduction to the plane of indigency the essential for relief.

A system whereby the costs of medical care for the victims of the depression are spread upon the community without breaking the relation of families to their physicians should be universal and uniform throughout the State. Doctors can be relied upon to meet the communities half way as has been shown in certain parts of the state where this enlightened plan has been tried. It is recommended that the Society concern itself in extending the plan now in effect in Franklin County to the rest of the State.

### SECTION VI

#### DOCTORS' INCOMES IN 1934 AS COMPARED WITH 1930?

Eighty-two reported small to considerable increases which are explained by change from general practice to specialties or young men who have started since 1930.

Seventy-five report no change and include salaried men and those whose work has increased without corresponding increases in earnings. The mean of increases is sixty-two per cent.

Six hundred and seventy-two or sixty-one per cent report decreases some of which are specifically mentioned and vary from \$100 to \$15,000 per year. Five hundred and sixty-two report in terms of percentage of which the mean decrease is 35 per cent.

### SECTION VII

Approval or disapproval of a plan of insurance for low income groups sponsored by the Massachusetts Medical Society in which the relationship between patient and physician may be maintained? Six hundred and seven approve. Forty-four approve emphatically. One hundred and eighteen approve with qualifications. One hundred and sixty-nine disapprove. Nine are emphatic, eleven qualify. This disapproval. Total disapproval, seventeen per cent. Ninety-seven (nine per cent) are indefinite undecided or doubtful. Forty-nine (four per cent) do not answer. Seventy per cent approve this principle if a workable plan can be evolved.



## COMMENT ON SECTIONS VI AND VII

Any plan of health insurance likely to receive support of the membership must be formulated and controlled by the Society. This phase of the Public Relations Committee's studies is now transferred to the Sub-Committee on Social Legislation and Insurance.

## SECTION VIII

## GENERAL INFORMATION AS TO SOURCES OF REPLIES

## A Type of Community

Urban	551
Suburban	196
Rural	64
Mixed	121
No answer	168

## B Type of Practice

General	496
Special	481
Mixed	104
No answer	17
Not in practice	2

Populations and number of doctors practicing generally not computed or referred to directory

## SECTION IX

Knowledge of doctors on public welfare lists. Forty three replied "YES," 904, "NO," "Qualified," "YES," nineteen, qualified "NO," eighty-nine. These referred to doctors helped by sources other than welfare living on private incomes, other than professional, receiving medical care in public wards, in debt, etc.

## SECTION X—REMARKS

Seven hundred and eighty-two left this space blank. Three hundred and eighteen made a total of 353 comments. One hundred and eighty one expressed various causes of dissatisfaction with conditions of practice. Sixty nine of these specified Massachusetts Medical Society and medical conditions in Massachusetts. Expressing interest in insurance with variable suggestions as to type were sixty, of which two were for outright state medicine. Distrust of the trend to socialism was expressed by twenty eight, two urge employment of legislative counsel to protect the interests of the medical profession. Fifteen comment favorably or disparagingly on the questionnaire.

Although the number of physicians upon whom the depression has borne to the point of actual need is happily small, it is sufficient to justify the adoption of an emergency plan for a welfare committee and the upbuilding by appropriation and (or) assessment of a welfare fund wherewith to relieve the pressing needs of such of our fellowship as have met serious economic adversity. It is recommended that the Society concern itself in relief to such of its members as are now in need.

Respectfully submitted,

HALBERT G STETSON,  
PATRICK J SULLIVAN,  
ERNEST L HUNT, *Chairman*

## APPENDIX NO 13

## COMMITTEE ON PUBLIC RELATIONS

REPORT OF SUB-COMMITTEE ON PUBLIC HEALTH AND PRACTITIONER—PUBLIC INFORMATION PRESENTED TO THE COMMITTEE ON PUBLIC RELATIONS ON MAY 22, 1935

The following report has been approved by the Committee on Public Relations and as Chairman of the sub-committee which prepared this report I have been asked to present it to the Council for the Committee on Public Relations.

As a result of its activities since it was formed, the Sub Committee on Public Health and Practitioner, and Public Information of the Committee on Public Relations of the Massachusetts Medical Society has reached certain conclusions on the subject suggested by the title of the committee. The sub committee has several recommendations to make which it herewith presents to the General Committee in the form of motions. It will first deal with the subject Public Health and Practitioner, and then deal with the subject Public Information.

## Public Health and Practitioner

In the first place the sub-committee considers that the most intimate relations should exist between the practicing physicians and the officers of the State Department of Public Health and the Local Departments of Health throughout the Commonwealth. The committee feels that the Massachusetts Medical Society should express itself definitely in regard to what it considers reasonable activities of the State Department of Public Health and the Local Health Boards throughout the Commonwealth. To crystallize these thoughts it is moved that the Committee on Public Relations recommend that the Massachusetts Medical Society approve

1 That the prime function of a Health Department is the exercise of the police power of the State for the control of communicable disease and the promotion of sanitation.

2 That all the health agencies throughout the Commonwealth should be an active force in the education of the public in regard to good hygiene and the elimination of preventable disease.

3 That the State Department of Public Health and the Local Health Boards throughout the Commonwealth should eliminate from their activities the treatment of disease, except in so far as is provided by existing mandatory statutes.

4 That the indigent sick in any community in the Commonwealth should be cared for by the individual physician through the proper authorities.

It is realized by the committee that, if these general principles are subscribed to by the medical profession and are approved by the health authorities, it will be necessary to make some definite changes in the programs of Local Health Boards and the Department of Public Health of the Commonwealth.

It is felt that some of these could be put into effect at once. The accomplishment of others of the changes would require considerable thought and change of program. These changes in program include changes both for the various Departments of Health and for the practitioners of medicine. In order to accomplish some of this program it is moved that the Committee on Public Relations recommend that the Massachusetts Medical Society urge

1 That the State Department of Public Health and the Local Health Boards refrain from establishing clinics and doing immunization work for people who are able to pay for this work, except in cases of emergency.

2 That the practitioners of medicine

organize for immunization work and preventive medicine clinics at an appropriate cost to the public and stimulate the public to have this work done and attend these clinics.

3 That the postgraduate courses conducted by the Massachusetts Medical Society include courses which will bring the practitioners up to date on preventive medicine problems.

4 That efforts to eliminate poorly trained individuals from being eligible for admission to examination before the Board of Registration in Medicine be continued by the Society

5 That every effort be made to preserve in Massachusetts only one Board of Registration for license to practice for any group or groups who wish to care for the sick.

6 That the program of educating the legislators in medical problems be kept up and elaborated by the various district societies.

It has been brought out that privately supported health agencies such as Visiting Nurse Associations are often in need of wise advice in matters of medical policy and in some instances are seeking this advice. Such advice could well be given by the Public Relations Committee of the different district medical societies, and therefore it is moved

That the Committee on Public Relations recommends that the Massachusetts Medical Society urge the District Medical Societies through their Public Relations Committees to furnish on request advisory assistance to local health agencies

#### Public Information

The committee feels that the Society should have closer affiliation with the associated press and to accomplish this purpose it recommends

That the Massachusetts Medical Society appoint one of its members as a press representative and that efforts be made to have the authorized press agencies as such contact with this representative in regard to any medical matters which the associated press wishes to have appear in the newspapers

CHANNING FROTHINGHAM *Chairman*  
MERRILL E. CHAMPION  
WILLIAM G. CURTIS

#### APPENDIX NO 14

#### COMMITTEE ON PUBLIC RELATIONS

##### SUB-COMMITTEE ON SOCIAL LEGISLATION AND INSURANCE

I think it is very gratifying to this Council to know that it has so thoroughly and completely interpreted the wishes of the membership of The Massachusetts Medical Society as evidenced by the report which Dr. Hunt made here today. He has made it perfectly clear to you that while probably only a fourth of the membership of the Society answered the questionnaire this

fourth may be taken as a fair cross-section of the whole Society and seventy per cent of those declared in opposition to the principle of compulsory sickness insurance. At your last Council meeting you went on record as declaring that compulsory sickness insurance was not a matter which you could support that it was a matter which you would not only oppose but would actively oppose and you instructed the Public Relations Committee to proceed with the plan of public education picturing the evils of compulsory sickness insurance

The Public Relations Committee, through its Subcommittee on Social Legislation and Insurance, thought that the best way to put over this program would be to encourage the formation and organization of district public relations groups. It felt that this was the first step that must be accomplished before the program could be formally started and I am happy to say that, in the short interval between April 3 and the present day sixteen out of the eighteen districts have been organized and there has been placed in the hands of those sixteen district public relations groups the literature from which their educational programs may be drawn.

It was thought that each district public relations group would be in a much better position than any State group to contact the citizens in that individual district so it was decided the part that the State committee should play would be one of an advisory nature. They should be concerned with organization and they should be concerned with the supplying of literature to the various districts and then say to the districts "Go to it."

The plan was outlined in the resolution that was adopted at the last meeting and that plan seeks to influence public opinion in the matter of compulsory sickness insurance. There was no intent upon the part of this committee and no intent upon the part of the Society to repudiate the principles of sickness insurance. We may find as the result of our survey that is being so adequately conducted by Dr. Hunt's committee that some change may be necessary. The Society believes however that it can never countenance any change which places a political or commercial intermediary between the patient and doctor. The Society and the committee feel that it would be a sad commentary on our mentality if we could not find something better than that.

The plan calls for the district committees to appoint from among their numbers, or from among the members of their districts, doctors and particularly doctors of influence to study this literature which we have supplied and will supply to anybody in addition who requests it, so that by the second week in September those districts may be able to send a speaker to a service club to a women's club to a men's club to a parent teachers association,—in fact, to any group with which they may be able to make a contact,—to the end that we may thereby create in the minds of the people a true picture as to the details of compulsory sickness insurance

It is hoped that the men who will receive this literature will study it during the summer so that about the middle of September when everybody is back from vacation, these talks may start simultaneously around the State. The Committee on Public Relations reserves only the right to emphasize certain important things certain important principles which we believe are very important, namely—

(1) That the speaker announce at the opening of his address that he is not speaking as an individual but as a member of The Massachusetts Medical Society and representing The Massachusetts Medical Society

## TRAUMATIC CHONDROMALACIA OF THE PATELLA\*

## Report of Two Cases

BY FRANK A SLOWICK, M D †

**T**he place of chondromalacia of the patella or fissural degeneration of the patellar cartilage as a definite entity among internal derangements of the knee has been satisfactorily established. The work of Budinger<sup>1</sup>, König<sup>2</sup>, Lawen<sup>3</sup>, and Kulowski<sup>4</sup> places it unquestionably among the obscure lesions of the knee joint. Kulowski, in reporting three cases from Steindler's Clinic, the only ones to be found reported in the English literature, stresses the association of this lesion with chronic arthritis. He feels that small repeated injuries are the etiologic factors.

In some of the cases reported it is not possible to determine whether the condition is a manifestation of chronic arthritis or whether the arthritis follows as the result of trauma and chronic irritation of the joint lining. Key<sup>5</sup> has recently described two cases of a degenerative lesion of the condyles of the femur, traumatic in nature, which has been followed by an arthritis of the knee joint, the type which is often described as a traumatic arthritis. That this degenerative lesion of the patella may occur as the result of an injury without a previous history of joint disease is demonstrated by the following cases.

**CASE 1** E J O M (B C H No 732067), a female aged twenty seven, was first seen at the Boston City Hospital in November, 1933. She complained of pain and disability in the left knee joint. Four months before, she fell on the kitchen floor at home striking her left knee. The joint swelled and she had considerable pain. After a short rest in bed she was able to be up and about. She was treated by strapping with adhesive and physiotherapy. The swelling subsided but the pain persisted. This was present when she was up and about and also when resting. She could not sleep well because of the constant dull pain in the region of the patella and in the front of the joint on both sides of the patellar tendon.

She had no trouble with the knee before her injury, worked steadily as a domestic, and had had no serious illnesses.

The general physical examination was negative, there were no demonstrable foci of infection. She walked with a slight limp on the left side.

Locally, the left knee joint appeared slightly larger than the right. There was a small amount of fluid, and no increase in local temperature as compared with the right side. There was tenderness on lateral compression of the patella and on percussion. Crepitus was present in the infrapatellar region on motion. The motions were slightly limited by voluntary spasm, but the joint could be put through the normal range. There was a complaint of pain in the region of the patella on flexing the knee be-

yond 90 degrees. Aspiration of the joint showed about 5 cc of a yellow, clear and gelatinous fluid. A smear of this fluid showed no cells.

X-ray examination showed a mottling of the patella in antero posterior view, and the lateral view (fig 1) showed an area of diminished density and ir-



**FIGURE 1** Case 1. Lateral view of the left knee four months after injury showing an area of diminished density and irregular mottling on the inner surface of the patella in the subchondral region.

regular mottling on the inner surface in the subchondral region.

**Subsequent Course** At this time it was thought best to continue conservative treatment, and a plaster cylinder was applied to the left lower extremity extending from the groin to the ankle. She was allowed to remain up and about walking in this plaster casing. At the end of a month there appeared to be no diminution of the symptoms, and an operation was advised.

In view of Kulowski's report of cases, a pre-operative diagnosis of chondromalacia of the patella was made, and this was confirmed at operation. Using the medial parapatellar incision, the joint was entered and a small amount of yellow viscous fluid was encountered. The patella was everted and the entire anterior part of the joint was thus exposed. Some congestion of the synovial membrane was found, and the infrapatellar fat pad was hypertrophied. The semilunar cartilages were intact.

The cartilage of the patella was of a bluish gray color, and was covered with a thin film of fibrinoid material, giving the surface a dull appearance in contrast to the white glistening cartilage of the condyles of the femur. The patellar cartilage appeared edematous, and pressure with the handle of a scalpel caused a depression in its surface which would spring out on release of the pressure. In the center was an area of degeneration about one half inch in diameter from which radiated small fissures toward the periphery.

A photograph was taken of the exposed joint, but this proved unsatisfactory. Later a sketch was made which gives a fair idea of the changes as they occurred on the inner surface of the patella (fig 2).

The treatment consisted of an excision of the cartilage, leaving only a very thin layer covering the subjacent bone. The hypertrophied infrapatellar fat pad was also excised, and the joint was closed.

The pathologists' report (B C H No 4246) on the excised cartilage was as follows: "Some degeneration of cartilage, vascularization and ossification in the region of provisional calcification."

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The patient made an uneventful recovery after the operation, and six months later she was free of pain and had flexion of the knee to an angle of 70 degrees. An x-ray examination at this time showed

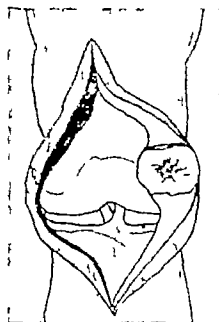


FIGURE 3. Case 1. Sketch of the everted patella at operation showing cartilage degeneration in the center with the res radiating toward the periphery.

that the area of diminished density on the inner surface of the patella had disappeared and the bone was of normal consistency (fig 3).



FIGURE 4. Case 1. Lateral view of the left knee 6 months after operation showing normal consistency of the bone of the patella in the sub-chondral region.

The second case reported here is incomplete, but is of interest from the point of view of diagnosis. After the diagnosis was made and operative treatment advised, the patient refused and did not return to the Clinic.

**CASE 2.** P. D., a boy aged eighteen, was seen in the Fracture Clinic of the Boston City Hospital on September 7, 1934. He complained of pain in the left knee of three weeks duration. Three weeks before he fell striking his left knee. He had no treatment. He was able to be about, but had a constant pain in the knee.

Examination showed some fluid in the joint. There was tenderness in the patella on pressure. There were no signs of an acute infection. A tentative diagnosis of traumatic synovitis was made and an x-ray examination was advised. This film (OPD No. 14500) in the lateral view showed an area of diminished density in the center of the subchondral

area. In this area there was what appeared to be a small sequestrum (fig 4).

In view of these findings a diagnosis of traumatic chondromalacia of the patella was made. Since

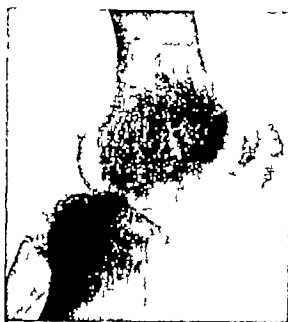


FIGURE 4. Case 2. Lateral view of the left knee 6 weeks after injury showing an area of diminished density and erosion in the center of the sub-chondral area of the patella.

treatment was refused the subsequent course in this case is unknown.

**Comment.** Histologically these cases show principally a fibrillation and degeneration of the cartilage in the central area of the patella. The bone beneath the cartilage is found decalcified and often it is shown to be eroded (Case 2, fig 4). It is interesting to note that it is in this region that the circulation of the patella is poorest. Thus erosion of the bone in the subchondral area occasionally requires curettage and an arthroplastic toilet as in the first case reported by Kulowski.

The secondary changes which were found in Case 1 in this series consisted of thickening and congestion of the synovial membrane and hypertrophy of the infrapatellar fat pad. Since there were no joint symptoms previous to the injury, it may well be assumed that these changes appear as a result of the trauma.

**Summary.** Two cases of a patellar lesion which followed definite injuries are here reported. This condition termed variously as chondromalacia of the patella, traumatic chondropathy of the patella and fissural cartilage degeneration has become recognized as a definite entity. The clinical and laboratory findings indicate a lesion which has developed from an interruption of the circulation in the subchondral bony structure of the patella.

#### REFERENCES

1. Böhlinger, K. Loosening of joint tissues and resulting phenomena. *Deutsche Zeitsch. f. Chir.* 84:311, 1904.
2. Böhlinger, K. Traumatic cartilage fissuring in the knee joint. *Deutsche Zeitsch. f. Chir.* 12: 519, 1908.
3. Kohnle, G. Arthritis deformans and surgery. *München. med. Wochenschr.* 75: 3, 1928.
4. Lawen, A. Cartilage resection after fissuring and degeneration of the cartilage of the patella. *Beitr. z. Klin. Chir.* 124: 465, 1925.
5. Kulowski, J. Chondromalacia of the patella. *J. A. M. A.* 100: 1237 (June 16), 1932.
6. Key, J. A. Contusion of cartilage as an etiological factor in chronic arthritis. *B. ex. Gynec. and Obst.* 23:165 (Feb.) 1934.

## RECENT ADVANCES IN THE TREATMENT OF RECTAL DISEASES BY INJECTION METHODS IN AMBULATORY PATIENTS\*

### I The Use of Gabriel's Modified Solution in the Treatment of Fissure-in-Ano

BY NAAMAN STEINBERG, M D †

**D**ISEASES of the rectum are still largely neglected and patients continue to have symptoms for long periods of time before seeking medical advice. This is due in part to a conventional modesty which restrains the patient from submitting to a local examination, and in part to a false impression that the examination is painful and the treatment more so. At least the latter is to be deplored for during the past few years notable advances in the field of proctology have been made and several conditions can now be treated with little or no pain while the patient remains ambulatory. The purpose of the present paper is to present results with the use of Gabriel's modified solution<sup>1</sup> and compare them with those obtained with "Benacol"<sup>2</sup> (a mixture of equal parts of para amino benzoyl-benzoate and pheno-methylol in 90 parts of rectified sweet almond oil), and Gabriel's original A B A. solution<sup>3</sup>.

Fissure-in-ano comprises approximately twenty per cent of all anorectal diseases<sup>4</sup>. Owing to its location the lesion causes great pain even when the fissures are minute. For the purpose of treatment it is important to distinguish the so-called true fissures from the false. The latter are the superficial lesions that do not irritate the sphincter muscle and cause spasm. They respond quickly to topical applications of silver nitrate (5 per cent), Ichthyol (10 per cent), or Balsam of Peru (20 per cent) combined with some lubricant such as mineral oil taken orally. True fissures on the other hand have their bases on the sphincter muscle and cause irritation and spasm with resulting pain. Topical applications to the sphincter muscle may cause further irritation with spasm and pain, and therefore are contraindicated. True fissures may be divided into three groups (1) acute, non-indurated with clean, sharply defined edges, (2) chronic or indurated, with thickened borders and often associated with a sentinel pile, and (3) those complicated with infection and showing a seropurulent discharge, induration, and often sinuses or pus pockets that penetrate the mucosa or skin. Lesions of the last type regularly require excision and drainage.

The present study is concerned with fissures of the first and second varieties uncomplicated

by infection. For the past ten years these lesions have been treated with the infiltration of certain medicinal solutions. In 1926, Graham<sup>5</sup> reported 128 cases treated by injection of a five per cent solution of quinine and urea hydrochloride underneath the lesion. Thirty-eight were acute, ninety were chronic, some of the latter being associated with a sentinel pile and hypertrophied papillae. Immediate relief was obtained in seventy-seven per cent of these cases. The remaining patients required one or two additional injections over a period of one to four months before obtaining significant relief. In 1929 Yeomans, Gorsch and Mathesheimer<sup>2</sup> reported similar results with the use of "Benacol". In 1929 Gabriel<sup>1</sup> reported his experience with a solution that he called A B A (anesthesin 3 per cent, benzyl-alcohol 5 per cent, ether 10 per cent in sterilized oil). Both solutions gave excellent end results but frequently there was considerable pain during the few hours following the injection. This was often severe enough to necessitate the use of morphine, the pain usually starting approximately one-half hour after injection and persisting in varying degree from one to twelve hours. This was my experience until two years ago when I began to use the modified solution of Gabriel (nupercaine base  $\frac{1}{2}$  per cent—benzyl-alcohol 10 per cent—phenol 1 per cent in 5 cc of sterilized oil of sweet almond). Nupercaine (Percaïne) is a well-known anesthetic whose action in watery solution usually lasts from four to six hours. The action of nupercaine base lasts even longer. The phenol is added to intensify the anesthetic power of the latter. The solution in oil, however, is responsible for the more prolonged anesthetic effect, which generally persists for ten days, and in some instances as long as six weeks. As a result of the prolonged local anesthesia thus induced, the sphincter muscle in the injected quadrant is paralyzed and healing can take place more readily. Frankfeldt<sup>6</sup> reported his experience with the use of this solution and found that the pain and discomfort frequently following the use of other solutions did not occur. My own experience has been the same, and after the use of Gabriel's modified solution, sedatives and analgesics are seldom necessary.

Table 1 gives the comparative results of treatment with Gabriel's A B A solution (cases 1 to 15), Benacol (cases 16 to 30) and nupercaine solution. It will be noted that after the use of

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TABLE 1

A. B. A. (Cases 1-15)			BENACOL (Cases 16-30)			NUPERCARINE (Cases 31-60)		
	After Pain		Medication			After Pain		Medication
	Degree	Duration	Required			Degree	Duration	Required
1	Severe	4 hrs	Morphine	31	None			None
2	Moderate	2 hrs	Allonal	32	None			None
3	None		None	33	None			None
4	Slight	2 hrs.	None	34	Moderate	3 hrs		Allonal
5	None		None	35	Moderate	3 hrs		Allonal
6	Slight	2 hrs	Allonal	36	None			None
7	Moderate	2 hrs	None	37	Slight			None
8	Slight	3 hrs	None	38	None			None
9	Severe	12 hrs	Morphine	39	None			None
10	Slight	2 hrs	None	40	Slight	1 hr		None
11	Moderate	3-4 hrs	Allonal	41	None			None
12	Moderate	4 hrs	Allonal	42	None			None
13	Moderate	6 hrs	Allonal	43	None			None
14	None		None	44	None			None
15	Slight	3 hrs	Allonal	45	None			None
16	Moderate	2 hrs	Allonal	46	None			None
17	None		None	47	Slight	2 hrs		None
18	Slight	1 hr	None	48	Slight	2 hrs		Allonal
19	Severe	1 hr	Morphine	49	None			None
20	Slight	3 hrs	None	50	Slight	2 hrs		None
21	Severe	12 hrs.	Morphine	51	None			None
22	Slight	2 hrs	Allonal	52	Slight	3 hrs		Pyramidon
23	Moderate	5-6 hrs	Morphine	53	Slight	3 hrs		None
24	Moderate	2 hrs	Allonal	54	None			None
25	Severe	2 hrs	Morphine	55	None			None
26	None		None	56	None			None
27	Severe	24 hrs	Morphine	57	None			None
28	None		None	58	None			None
29	Moderate	4 hrs	Allonal	59	None			None
30	Slight	2 hrs	None	60	None			None

nupercaine not one patient had severe after pain and only in four instances was it necessary to administer mild analgesics. This is in contrast with the occurrence of severe pain in six, and moderate pain in nine patients following the use of Benacol or the A.B.A. solution. After the use of the latter solutions morphine was necessary in seven instances.

#### TECHNIQUE

My personal preference for posterior fissure in-ano is the right Sims position and for an anterior fissure-in-ano, the left Sims position. The skin about the anus is cleansed and painted with Scott's solution (mercurochrome 2 parts, distilled water 35 parts, acetone 10 parts alcohol 55 parts). One ampule of Nupercaine, Phenol Benzyl Alcohol in oil which has been slightly warmed to facilitate the flow of oil, is drawn into a 5 cc sterile glass syringe through a large caliber needle. The needle is then changed to one of gauge 20 one and one-half inches long. This needle is introduced into the skin one-half inch from the fissure. With the left lubricated finger inserted into the anal canal to guide it and prevent perforation of the mucosa, one cc is then injected under the bed of the fissure, care being taken, if induration is present, not to inject the indurated tissue. The needle is now withdrawn approximately half way, and 1½ cc. is injected into the sphincter muscle and adjacent tissue on either side of the fissure. The remaining solution is finally in-

jected well behind the lesion, care being taken that the solution used should not be injected intradermally or too superficially beneath the mucosa, as sloughing may result. The tissues are then gently massaged for about one minute with the left index finger in the anal canal, and the right finger on the perianal skin. The sphincter in the injected quadrant relaxes almost immediately and the fissure becomes plainly visible. If a sentinel pile is present it is removed with a pair of scissors after the injection. Supplementary anesthesia is unnecessary. Topical applications may now be used to facilitate healing. Pure ichthyol or silver nitrate solution (10 per cent) may be applied to the fissure without pain or discomfort.

When the patient is examined the day after the infiltration the sphincter is found to be relaxed and the finger can be introduced into the anal canal without pain or discomfort. The patient's only complaint is numbness in the injected area. Rarely there is an inability to control flatus. Complete healing usually takes place seven to twenty-one days after initial treatment. It is unnecessary to make any changes in the diet. Mineral oil is regularly prescribed to facilitate easy movements.

Serious complications have not been observed after this treatment.<sup>1,2,3,4,5,6,7</sup> In the present series there were four chemical abscesses, two of which resulted in small fistulae. The abscesses healed spontaneously and the fistulae were excised under Nupercaine (1 to 1000). There

were also two instances of superficial sloughing which healed spontaneously. When sloughing occurred it caused slight discomfort for several days, and healing took place within one to three weeks.

### CONCLUSION

The comparative merits of the Nupercaine Phenol solution in the treatment of fissure-in-ano was studied in thirty patients. Little or no discomfort followed the use of this solution in contrast to the occurrence of severe pain after the use of Benacol or Gabriel's original solution. Significant complications did not oc-

cur. Fissure-in-ano, uncomplicated by infection, can be treated successfully in ambulatory patients without inconvenience or loss of time.

### REFERENCES

- 1 Gabriel W B. The treatment of pruritus ani and anal fissure. *Brit. M. J.* 2 311 1930
- 2 Leomans F C, Gorsch R V and Mathesheimer J L. Benacol in the treatment of pruritus ani. *Trans. Am. Proctology Soc.* P 24 1927
- 3 Gabriel W B. The treatment of pruritus ani and anal fissure. *Brit. M. J.* 2 1070 1929
- 4 Gant S G. Diseases of the Rectum, Anus and Colon. Philadelphia W B Saunders Company. P 227 1923
- 5 Graham Alois B. The use of quinine and urea hydrochloride in the treatment of fissure in ano. *Trans. Am. Proctology Soc.* P 43 1926
- 6 Frankfeldt F M. The use of Gabriel's formula in proctology. *Internat. J. Med. & Surg.* 47 113 1924
- 7 Gorsch R V. Oil soluble anesthetics in proctology. *Med. Rec.* 139 35 (Jan 3) 1934

## THE ETIOLOGY OF CONGENITAL AND HEREDITARY DEFORMITIES\*

BY SETH M. FITCHET, M.D.†

WE, as surgeons, are not greatly interested in the problems and researches of the geneticists. Yet very possibly it is in this field that the solution of the problem of congenital and hereditary malformations lies. Perhaps it is not the surgeon's function to know or care about the etiological factors in malformations for it may be that his chief function is that of a mechanic striving to correct the deformities as they are presented to him.

Perhaps it is safe to say that the explanation of congenital deformities lies in the field of genetics but that the treatment of them lies in the field of surgery, and that the prevention of congenital deformities may become a joint problem of the geneticist and the surgeon, with the help of the physiologist and the biochemist.

Explanations or attempts at explanation of congenital and hereditary anomalies are many and varied ranging from the superstitious and fantastic to the pseudoscientific for the range and variety proclaim our almost complete ignorance of the problem.

In this paper an attempt is made to point out some facts which may add to our concept of the etiological factors in congenital deformities.

We know that the individual develops from an ovum. We know that normally the ovum is activated by fertilization by union with the sperm. We know that experimentally an egg can be made to develop and produce its kind without the aid of the sperm that shaking mechanically, pricking with a needle temporary sudden change of temperature, hyper- and hypotonic solutions any change of surface tension chemical stimulation by the salts and acids may provoke cleavage and development.

We know, for instance, that if we treat the sperm of the Triton (Salamander) by exposing

it to the B and Y rays and then inseminate the ovum of the Triton that that ovum will cleave and develop but the development will be substandard and malformations will be present.

Every ovum and every sperm has its own allotment of particles in its nucleus. The diploid chromosome number is 24 in the fertilized Triton ovum. The diploid chromosome number is 12 in the ovum inseminated with the radiated sperm. Cleavage takes place and development goes on but there is a definite lack in the inseminated egg as compared with the fertilized ovum.

Gregor Mendel (1822-1884) offered proof three generations ago that genetic units determine the inheritance of characteristics.

Otto Butschli, professor of zoology at the University of Heidelberg in his studies of the constitution of protoplasm and the structure of the nucleus and methods of cell division demonstrated the existence of these genetic units, the chromosomes.

Thomas Hunt Morgan went one step farther and gave us the concept of the gene as the genetic unit.

August Weismann (1834-1914) professor of zoology at Freiberg University following the publication of "The Origin of Species" accepted the evolution theory and forcefully defended its thesis and became the leader of the Neo-Darwinian school. Weismann materially emphasized the present theory that heredity has a physical basis. He modernized the old preformation theory, for he believed that every peculiarity of the adult organism was represented by a special carrier of heredity, a determinant which is present in the germ-plasm. This primordial rudiment was not the organ or part itself, but that there was for every organ and for each of its special parts a definite particle of protoplasm which represented the particular structure or part of an organ. The

earlier chromosome theory regarded the individual chromosomes as being aggregates, more or less closely bound, of a large number of corpuscular genes. Weismann's theory is that the gene, joined in groups called *ids* corresponds directly to each character and each differentiation of the complete individual and that this gene exists as a discrete particle of substance in a particular chromosome of the germ cell nucleus.

Weismann's theories have been criticized as superscientific speculations and assumptions yet, in 1933 Professor T S Painter of the University of Texas, working with giant chromosomes found in the salivary gland cells of the fruit-fly larvae (seventy times the size of ordinary chromosomes), demonstrated on them numerous cross bandings, which always had the same sizes and spacing on comparable chromosomes. Painter also found that with particular groups of these bands groups of known genes could be related.

In September, 1934 Calvin B Bridges announced a further step based on the brilliant work of Painter.

Dr Bridges went to work with Professor Painter's results before him and demonstrated that the chromatin was not the important part of the chromosome, but was the matrix or outside wrapping of it. He demonstrated that the bandings observed by Painter were in reality the edges of solid disks that ran clear through the chromosome, strung together much like beads of Indian wampum. He also saw that each *gene locus* corresponded with some special size or shape of bead, always in the same relative position and always the same in all chromosomes examined.

Each disk proved to be subdivisible also not unlike thin slices from a huge telephone cable, each wire of the cable in cross section visible as a minute dot on the face of the disk. Like the cable, before slicing there is a continuity from disk to disk, between these rods or wires. So small are these subunits that many of them are hardly larger than single molecules of one of the more complex proteins. They may, indeed, be single molecules, or they may be small groups of molecules acting together.

Whether these tiny units are genes themselves, or only the genophores or gene bearers is not of course known, but it is interesting to see how these very recent findings fit in with the much criticized Weismannian theory that the "gene exists as a discrete particle of substance in a particular chromosome of the nucleus of the germ cell."

Now, if the nucleus of the sperm of the Triton can be modified and destroyed by exposure to B and Y rays so that the ovum inseminated with this sperm produces a deformed adult Triton is it not possible or even probable that the explanation of the multiplicity of deformities encountered may be found in some chemical mechani-

cal, thermal or nutritional alternation or damage to the gene or disk, or disk content of the chromosome? And if therein lies an explanation for the congenital deformities we may truly expect to find therein the explanation, based on Mendel's formula of the *hereditary* deformities.

Hugo de Vries in experimental work with plants has demonstrated that abnormal characteristics appear spontaneously and are transmitted to offspring, and eventually disappear by cross-breeding—the mutation theory as an explanation of the etiology of congenital and hereditary deformities. It will be noted that the mutation theory is not at variance with the Weismannian theory and the observations of Painter and Bridges.

Murk Jansen (Levden, Holland) has given considerable thought to the problem and has an intriguing explanation for many of the skeletal deformities, an explanation, however, which cannot be accepted. He states that we must look for mechanical malformations due to pressure which has acted upon the fetus: that variations in the size of the amnion and differences in hydrostatic pressure interfere through pressure or through nutrition with fetal life and development—a quantitative alteration of normal growth.

In November 1934 Professor H J Muller of the University of Texas, and Dr A. A. Prokofyeva of the Soviet Academy of Sciences Institute of Genetics, working together with bits of chromosome material having a diameter of sixteen millionths of an inch, have demonstrated that somewhere on this wee bit of stuff there was room for several genes.

By bombarding bits of chromosome material, they could produce "translocations" of particles, i.e. a dislodgment of bits of chromosomes carrying a few genes which would find their way to an entirely new place in the arrangement within the chromosome. These translocated bits of chromosomes, carrying genes with them, would interact with the genes already in place and produce mutations in the resulting organism. This suggests that the position of the gene or gene group its interaction with its neighbors its "position effect" may be of real importance.

The work of Professor Muller also indicates that it is possible for genes to be entirely divorced from the chromosome without killing the individual but the gene-deficient individual will show abnormalities.

In December, 1934, Dr C W Metz and Miss E H Gay members of the research staff of the Carnegie Institution of Washington working in the laboratories of Johns Hopkins University, using slightly different methods, found a net-like or honeycombed structure within or between the band like disks of which Painter, Bridges, and others have recently shown the chromosomes to consist.



These disk-like structures have been likened to "temples of destiny" on the "streets" of heredity which are the chromosomes. If this analogy is carried farther, "the inter-disk cavities found by Dr Metz and Miss Gay might be called the rooms within the temples. But, as yet, nobody has actually seen the powerful, controlling goddesses who dwell in these rooms the modern Fates, otherwise the Genes."

In the light of the above, the work of Halsey J Boggs becomes most interesting and suggestive. Boggs exposed mice to x-ray and eventually produced a race of club-footed mice. Perhaps we might reason that following the bombardment with x-ray, as in the case of Professor Muller's experiments, there was a translocation of chromosome particles carrying genes, and that the interaction of the translocated genes with their neighbors produced the anomaly of club feet and that in breeding carried this anomaly through hundreds of mice.

The club foot lent itself well to observation as would any other external deformity. The race of mice developed had deformities of viscera which did not lend themselves so well to study and observation.

Boggs observed through the transparent, pregnant uterine wall that there was an apparent arrest of embryonic development associated with an observed stripping up of cutaneous epithelium by clear, lymph-like fluid arising from perivascular lymph channels. Into this bleb-like structure he observed an extravasation of

blood, and, later, a firm hematoma. This hematoma became absorbed prior to birth. The extent and location of the bleb-hematoma on the extremity determined the degree of deformity—club foot, hypodactylism, syndactylism, or "congenital amputation", etc.

In order to be certain that the observed intra-uterine anomalies were the same as those that were later seen in the litters, it was found that the intrauterine embryo could be marked by pulling its tail through the thin, transparent uterine wall, nipping off the tail, and thus when born the mouse could be indisputably identified.

From these suggestive and instructive data and observations, it is fair, I think, to state that definite advance has been made in the search for the etiological factors involved in congenital-hereditary deformities. Should this factor prove to be a damaged or translocated gene of a complex chromosome, we might confidently expect to find the damaging or translocating agent—perhaps infection, metabolic deficiency, mechanical injury, thermal or chemical factors, or some as yet unthought of substance. The intensive work now going on in the genetic laboratories of the world should be watched with keen interest by the surgeon interested in congenital-hereditary deformities, for soon they may determine for us the long-sought-for etiological factors. With this information at hand, the prevention of congenital hereditary deformities need no longer be the chimerical dream that it now seems to be.

## THE 'PHTHALEIN TEST OF KIDNEY FUNCTION IN ANEMIA\*

BY EARLE M. CHAPMAN, M.D.†

AN occasional criticism of the phenolsulphonophthalein test of kidney function has been that the excretion of the dye may be decreased in the presence of anemia.<sup>1</sup> Christian<sup>2</sup> found that the output of dye was decreased in six of fourteen patients with severe pernicious anemia, however in three of these there was a very slight albuminuria. One may assume that a diminished blood volume decreases the carrying capacity for the dye, however Marshall<sup>3</sup> has already pointed out that 'phthalein in the blood is contained only in the plasma and not in the red corpuscles. Therefore one would not expect a diminution in the number of red cells alone to alter dye excretion.

The constancy of the volume of blood plasma has proved to be a surprising feature of anemia. In pernicious anemia Bock<sup>4</sup> has shown that the plasma volume is usually normal while in chronic secondary anemias Keith<sup>5</sup> has found

the plasma volume normal or increased. In blood loss due to hemorrhage there is an immediate diminution in plasma volume but, in the absence of shock, this is speedily adjusted to normal if the fluid reserves are adequate. Even in nephritis<sup>6</sup> with or without edema the plasma volumes are normal. Thus the constancy of the volume of blood plasma in anemia maintains the carrying capacity for phenolsulphonophthalein and in view of this we would not expect a significant change in the dye excretion.

To investigate the validity of such a criticism from the practical standpoint we have studied eleven cases of severe anemia who showed no signs of cardiovascular or renal disease. The urine in each case was normal. A fractional 'phthalein test of kidney function was done on each patient, the technique has been described in a previous communication<sup>7</sup> and consists briefly in the following: The patient emptied the bladder, drank 400 cc of water and one half hour later 10 cc of phenolsulphonophthalein was injected intravenously. Specimens of urine

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were then obtained fifteen, thirty, sixty and one hundred and twenty minutes after the injection. The first two collections are the most important as they show the high initial output of dye which is the significant feature of 'phthalein excretion

## REFERENCES

1. Rosenthal, H. O., and Lewis, D. S. A comparative study of tests for renal function. *J. A. M. A.* 67:933 (Sept. 22) 1914.
2. Christian, H. A. Renal function in pernicious anemia. *Arch. Int. Med.* 18:429 1918.
3. Marshall, R. K., Jr. The secretion of phenol red by the mammalian kidney. *Am. J. Phys.* 92:77 1921.
4. Beck, A. V. The constancy of the volume of the blood plasma. *Arch. Int. Med.* 27:183 1921.

TABLE 1

Subject	Diagnosis	Red Blood Cells	HB Per Cent Sahli	Oxygen Capacity	Fractional 'Phthalein Per Cent Dye Excreted				
					Minutes				
					15	30	60	120	2 Hour
M. G.	Pernicious Anemia	950 000		5.25	30	17	15	5	67
S. G.		1,800 000		10.30	35	15	15	7	72
M. J. S.		1,870 000		8.86	27	18	15	7	68
N. O.		2,390 000		14.50	30	15	—	—	—
E. S.	"	2,690 000		14.85	30	17	15	12	74
J. L.	"	1,450 000		11.50	30	15	10	—	—
M. K.	Hypochromic Anemia	2,410 000	22		35	20	18	13	86
G. M.		3,900 000	35		45	5	10	—	—
W. K.	Duodenal Ulcer (recent hemorrhage)	3,010 000	55		30	20	15	10	75
E. M.		3,300 000	50		32	15	—	—	—
M. D.	Carcinoma Stomach	3,800 000	60		35	18	18	10	81

From the table one notes that the curve of elimination of dye was normal in each case. The variations of the normal by this method have been determined by Shaw\* and Chapman and Halsted†

## CONCLUSION

Anemia alone does not affect the excretion of phenolsulphonephthalein by the kidneys

- \* Keith, N. M.: The total circulating volume of blood and plasma in cases of chronic anemia and leukemia. *Am. J. M. Sc.* 165:174 1917.
- † Linder, O. C., Lundsgaard, C., Van Slyke, D. D., and Stillman, E.: Changes in the volume of plasma and absolute amount of plasma proteins in nephritis. *J. Exp. Med.* 29:921 1924.
- Chapman, E. M., and Halsted, J. A.: The fractional phenol sulphonephthalein test in Bright's disease. *Am. J. M. Sc.* 116:323 1923.
- Shaw, E. C.: A study of the curve of elimination of phenolsulphonephthalein by the normal and diseased kidneys. *J. Urol.* 12:576 1916.

## JACOB ZAHALON, AND HIS BOOK, "THE TREASURE OF LIFE"

BY HARRY A. SAVITZ, M.D.†

BY 1630, when Jacob Zahalon was born in Rome, six years before Harvard College was founded, the Jews already had a long tradition of medical scientific literature. Not to mention medical references in the Bible and the Talmud, scientific medical literature begins with the Tenth Century with Isaac Judaeus (832-930) in Egypt, and with Shabbethai Donnolo (915-982) in Italy.

Jewish medical men were primarily dominant in Arabic speaking countries in the East. Then we find them in Europe in Mohammedan Spain, and later in the same country when it came under Christian rulers. But what is primarily of interest to us is Italy. In Italy from Donnolo to Zahalon there was a continuous uninterrupted tradition of Hebrew scientific medical literature for seven centuries.

The Jewish physicians were not only medical practitioners, but also authors. They wrote original works as well as translations from other languages. For example, to mention only a few,

Isaac Judaeus' famous treatise on fever, Donnolo's work on *Materia Medica*, Maimonides' numerous works, Nathan ha Meati, who translated the Canon of Avicenna (1279) and Hillel ben Samuel of Verona (1220-1295) who translated Bruno's work on Surgery.

These Jewish medical men not only practiced among their own people but among Christians and Mohammedans as well. Their services were often engaged by Kings, Princes, and Popes, as, for instance, Isaac physician to Pope Boniface VII, Manuele and Angelus, Manuele, physician to Boniface IX, Jacob of Capua, court physician to Charles II, and Isaac, Court Physician to King Robert of Anjou.

These Jewish physicians were also connected with institutions of learning. In Salerno, the leading medical school in the Occident, as early as 848, Joseph taught there and in 855 Joshua, both Jewish physicians. In the eleventh century lectures are said to have been delivered there in Greek, Arabic, Hebrew and Latin. The same was true of the medical school at Montpellier, where Jacob ha Katon was dean of the medical faculty and Jacob ben Machin ibn Tibbon,

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called Profatius Judaeus, dean of the medical faculty about 1306

Like most Jewish scholars of the Middle Ages, a great many of these Jewish physicians were also Rabbis

Jacob ben Isaac Zahalon was born in 1630. He was a descendant of the noble Zahalon family of Spanish origin, whose members after exile from Spain settled in Italy and in the Orient and distinguished themselves as rabbis and scholars. Jacob received the traditional education in Hebrew literature. He also acquired a medical education at the University of Rome, where he received his degree of Doctor of Medicine. Acquiring early a high reputation both as physician and Talmudist, he was called to the rabbinate of Ferrara, where he served both as Rabbi and physician until his death in 1693.

Zahalon was a prolific writer. He wrote a book called, "Ma'galhyot Tobot", an abridgment of the "Hobot ha-Lebabot" of Bahys ben Joseph ibn Pakuda. This is divided into thirty chapters corresponding to the number of days of the month, each chapter being followed by prayers for various occasions. In its preface, Jacob enumerates several works he left in manuscript, on Maimonides, commentaries on some books of the Bible, on theology and philosophy. His medical work, the "Ozar ha-Hayim" was published in Venice in 1683. This book is Part III of a work called "Ozar ha-Hochmath". It is divided into thirteen parts, the last of which on mental disease, remained unpublished for lack of funds.

The age of Zahalon was not a period of numerous medical specialties. Therefore, his book is encyclopedic in character, beginning as it does with general hygiene and ending with mental diseases, it covers practically every branch of medicine. The thirteen divisions of the book are as follows:

- 1 On General Hygiene
- 2 On Fevers and their Cures
- 3 On the Pulse, Urine, and the Tongue
- 4 On Poisons and their Antidotes
- 5 On Signs and Causes of Disease
- 6 On Remedies Simple and Compounded
- 7 On Disease of the Head, and Treatment
- 8 On Disease of the Chest, its Treatment and Cure
- 9 On Abdominal Disease and Treatment
- 10 External Diseases, Surgery
- 11 Women's Diseases and Treatment.
- 12 Children's Diseases and Treatment.
- 13 Lecture on Mental Diseases which are like Physical Diseases (This part not published)

In his introduction he discusses the Rabbinic attitude toward medicine, quoting the Bible, Talmud and Maimonides. He outlines the contents of his book and says, "At the end of each chapter, I shall illustrate by a successful case of mine or some other physician, in order to encourage patients." Zahalon was devoted to med-

icine and had the patient's concerns close to his heart. He stressed the ethical side of medicine. He next enumerates the admirable aphorisms of medical conduct, 77 in number, which had been published by the learned physician, Abraham Zacuto Lusitano (1576-1642, great grandson of Zacuto, the historian and astronomer), of blessed memory, in his voluminous work, "De Medicorum Principium Historia." Translated from the Hebrew, they are as follows:

- 1 A physician shall be God fearing
- 2 He shall be well dressed
- 3 He shall not indulge in unprofitable chatter
- 4 A physician shall not be miserly and niggardly
- 5 He shall not be primarily interested in fees
- 6 He shall not be envious
- 7 He shall not be haughty and snobbish
- 8 He shall not be stubborn in his judgment of the opinions of others superior to him in knowledge
- 9 He shall admit his mistakes if he has erred
- 10 He shall accept joyfully and gracefully rebuke from one greater than himself
- 11 He shall be even tempered
- 12 He shall be by nature wise and intelligent
- 13 The physician shall constantly be guided by intelligence
- 14 He shall possess few and good medical reference books
- 15 He shall make use of books by expert scholars
- 16 He shall not take upon himself to cure those who are beyond his skill
- 17 He shall refrain from testifying and promising anything that is not the truth
- 18 He shall endeavor to treat minor illnesses as if they were major ones
- 19 He shall not minimize a severe illness
- 20 He shall cultivate the habit of discussing and consulting about his patients with other physicians
- 21 He shall limit his practice so as to devote sufficient time to his patients so that he may not err
- 22 He shall not burden himself with technical terminology of the different diseases, but shall know the nature of these diseases and their cures
- 23 A physician shall not ignore the slightest fact for it may prove a beneficent sign in the diagnosis
- 24 He shall not delay too long the treatment of the patient.
- 25 He shall not do anything unless he has a good reason for it
- 26 He shall be careful not to make promises
- 27 (Text obscure)
- 28 He shall do everything according to the art of medicine
- 29 He shall make use of both experience and theory
- 30 He shall be diligent and speedy in his acts without any indolence in time of necessity
- 31 A physician shall have regard for the value of human life
- 32 His main purpose shall be the healing of the patient
- 33 He shall take into consideration the difficulty and the danger involved in each treatment
- 34 He shall take a firm stand against popular prejudices

- 35 At times it is necessary to cheer up the patient with soft, kind words
- 36 He shall try to cure the patient with speed and with confidence.
- 37 He shall not regret rational practice even if it should not be in accordance with standard treatment
- 38 He shall observe carefully the matter of secretions
- 39 Whatever he does shall depend on the rules of medicine and he shall study carefully what nature does with regard to the particular illness
- 40 If nature does not act then let the physician use medication.
- 41 But if nature acts properly then let him not interfere
- 42 If it is the cause of nature to act in a definite time let the physician not interfere
- 43 Let him be careful to give medication in the proper day and hour
- 44 He shall be careful in giving strong expectorants if not urgent merely because the milder ones did not act.
- 45 Before prescribing an expectorant he shall treat the secretions that the patient may find it easy to expel them
- 46 In dispensing medication let him start with milder ones
- 47 The physician shall choose the proper time for prescribing laxatives for example in April and September but if necessary even on hot days but a mild one
- 48 The physician shall take into account various astrological signs as to which days are good or bad for prescribing laxatives
- 49 In case of venesection he shall take into consideration the condition and temperament of the patient.
- 50 He shall take cognizance of the patient's temperament in determining whether he can bear a strong purgative
- 51 He shall also take into consideration the patient's habits
- 52 He shall determine the condition of the secretions which need to be expelled
- 53 He shall pay attention to the movements of the secretions
- 54 Let him determine at which point he wishes to withdraw the secretions whether from above or below whether by sweating etc.
- 55 Let him not treat every patient with medication for sometimes mere diet will do if the illness be mild and the patient weak
- 56 A body given to extremes of temperament shall be treated with medications correspondingly opposite of nature a body not given to extremes should be treated with medications of a correspondingly similar nature
- 57 An abnormal excretion shall not be directed through a channel in the head or through any weakened or diseased channel.
- 58 A prolonged illness may often be cured by change of place and environment
- 59 Let him always help nature for that is the primary factor in health
- 60 Let him observe the strength of the patient and particularly his mental condition
- 61 Let him ascertain the seat of the injury
- 62 Let him ascertain the primary cause and which are the sequelae
- 63 If he cannot diagnose the case let him be satisfied by merely prescribing a diet.
- 64 Let him observe what is useful and what is harmful
- 65 Let him observe the effect of change of place and climate for treatment will change accordingly
- 66 It is of prime importance to observe what is the most endangering factor and focus his treatment toward that.
- 67 He should not prescribe a powerful expectorant in the early stages of the ailment before the secretions are softened
- 68 The physician shall keep his wits when he observes complications during the state of illness for then is his responsibility the greatest
- 69 The physician shall alleviate first pain before the other symptoms for pain weakens the strength a great deal
- 70 He shall correct first either coma or insomnia.
- 71 Before prescribing any expectorant the physician shall first of all purge the patient's bowels
72. In prescribing the physician shall keep in mind the difference in temperament, the hot and strong of a man and the weak and cold in a woman and prescribe accordingly
- 73 He shall be careful in prescribing to the very young and the old for they are weak
- 74 He shall be cautious in prescribing to infants
- 75 The physician should be familiar with anatomy
- 76 A physician should also be acquainted with surgery
- 77 He shall study the properties and composition of drugs

Then Zahalon adds some general advice of his own to the physician

"It is advisable that the physician before beginning his practice should for a long time accompany a skilled physician in his visits to the sick. What he hears his teacher say concerning the treatment he should make note of as soon as he comes home and he should also study carefully the medical books on the subject of the disease. If he is in doubt about anything he should inquire from other physicians or from other books in order to clear up the points in doubt. Even if the disease is serious, the physician should speak encouraging words to the patient. If he is told about a cure on the authority of another physician, he should not scorn it. If another physician is with him (in the case) he should not disregard his opinions if they are good and if they are not he should not state it openly to others, but privately to his colleague. When the patient is cured, the physician should not prolong his visits when there is no necessity.

He should give direction how the patient should conduct himself so that the disease should not return and that he give praises to the Holy One, blessed be He, the merciful physician who cured him. The physician should not sell the drugs himself, but the patient should send to the druggist. And before he prescribes he should seek God to instruct him what is proper for a sick man. Should he find that the patient is dangerously ill he should inform his relatives, so that if he dies, they do not

slander him, but also that they make every effort to cure and that they do not raise objections to the expense. When the physician visits women he should be modest, and should not follow the evil thoughts of his heart. And he should not accept a fee from the poor nor from relatives and close friends, and should not accept a fee for his services on holidays and Sabbaths. Others permit this to be done by including it in the general charge for the week days. If he sees that a friend desires to remunerate him daily in order not to be obliged to give him an expensive present at the end or in order that he may be at liberty to call him again, he may take a fee. Although the physician who visits the sick is performing a religious duty and it is not fitting that he receive pay for this, nevertheless, the Rabbis permitted it as remuneration for the time spent just as they permitted teachers who teach the Torah to receive pay in order that they may be able to live by their profession."

In conclusion Zahalon urges that "the physician should recite at least once a week the 'Physicians' Prayer', which he composed and published in the 'Sepher Margaliyyot Tobot'", printed in Venice in 1665

#### THE PHYSICIANS' PRAYER

"Lord of the Universe! Thou, alone has made the Heavens and the Heavens of Heavens and all their hosts, the earth and all that is upon it, the seas and all that is within them. Thou givest life to all and sustenance to all. The hosts of Heaven bow to Thee and there is neither among those on high nor among those underneath anyone who would tell Thee what to do. Thou has formed man from the dust of the ground. Thou has breathed the spirit of life within his nostrils. Thou hast caused him to rule over the words of Thy hand. Everything Thou has placed under his feet. For his sake thou has created all. If he meritoriously performs the will of his Master, his hand ruleth over all things, if not, the hand of all is upon him.

"Thou dost punish him with afflictions and ailments. He is chastened also with pain on his bed and all his bones grow stiff. His flesh is consumed away that it cannot be seen and his bones corrode to unsightliness. His soul draweth near unto the pit and his life to the destroyers (Job 19, 21, 22, 33). But if he repents completely before Thee, Thou art pleased with him and Thou wilt cure him as it is written 'He sent His word and healed them and delivered them from their graves' (Ps 107 20). For Thou art the merciful and faithful healer, as it is written 'I have wounded and I heal' (Deut 32 39), in order to make known to all the denizens of the world that Thou art the healer

and unto Thee is the power and the glory. From Thy established habitation Thou lookest down upon all the inhabitants of the earth. For their special benefit, hast Thou created in Thy world many drugs by which to cure the sons of man and in Thy wisdom Thou has commanded them to cure one another by means of these medicines, as it is written 'He shall cause him to be thoroughly healed' (Ex 21 19).

"Since, therefore, Thou hast favored me with kindness and has crowned me with honor and glory and Thou hast made me worthy of knowing a bit of the science of medicine, therefore I wish to perform Thy desire, O Lord. I am minded to busy myself with the practice of medicine in Thy Holy Name and through Thy assistance, 'that Thou mayest be justified when Thou speakest and be in right when Thou judgest' (Ps 51 6), for Thou art the physician, not I. I am but as the clay in the potter's hand, in the hand of the creator of all things and as the instrument through which Thou curest Thy creatures. I do not rely upon my wisdom, nor do I place my trust in the drugs and herbs and medicaments which Thou hast created, for they are but the means to fulfill Thy will and to proclaim Thy greatness and Thy providence. Since the practice of medicine is fraught with perils, and as I am a man of folly and of no understanding, fearing lest I grope at noonday as the blind grope in the dark, therefore do I cling to the fringes of Thy kindness and do follow Thee, in the light of Thy countenance will I walk and in Thy light will I behold light, 'for Thou dost light my lamp, Lord my God doth lighten my darkness' (Ps 18 29). Therefore, may it be Thy will, O Lord my God and God of my fathers, to endow me with good understanding and to bestow upon me knowledge and insight and to cause the eyes of my understanding to shine so that I may discern and diagnose the ailment of the body thoroughly and correctly in all the cases that come to me, instruct me as to the drugs suitable to each one in accordance with his needs and in accordance with proper time when they are fit, so that I may not err in my acts or in my words, 'lest my enemies see and rejoice' (Prov 24 17). Support me that I do not stumble and that no mishap occurs through my hand. Recompense me with Thy many kindnesses for to do kindnesses have I entered into the profession of medicine, to save the lives of Thy people Israel. Assist me and protect me from insult and shame.

If there come to me any patient whose allotted time is about to end and whose affliction is heavy, may it be Thy will that I cause not the hastening of his death (God forbid) even by one second. Teach me to administer drugs so as to retain his soul with him until his fated hour arrives. And if he die may it be Thy will that his friends, his companions and the mem-

bers of his family do not accuse me and that they do not suspect me of being the cause of his death, but that they accept it as the just decree of God, of the King in Whose hand is the life of all living and the spirit of all flesh. But if his appointed time has not arrived and Thou art casting him down with pain because of Thy mercy in order that he repent completely before Thee for Thou hast 'no pleasure in the death of the wicked, but that the wicked turn from his way and Live' (Ex 33 11), may it then be Thy will that Thou causest this merit to fall to my lot and that Thou instructest me what I shall say in order to bring him to repentance and to accept his affliction with love for Thee so that it may be an atonement for all his transgressions, and that through me Thou sendest forth Thy command and cure and that thereby I shall be beloved on high and honored below.

"Save me from hate and strife. Let me not be envious of others, and may others not envy me. Establish between me and other physicians love, brotherhood, peace and good fellowship. Let me not be put to shame nor disgrace before them, but let me be respected by them. Make me wiser than my enemies. May my wisdom and the knowledge which my lips utter clearly so that there are none to utter an evil word against me or my deeds, and if perchance such evil word be spoken let no one give it credence. Let not my colleagues err and permit me to rejoice. If, however, they do evil in their work, may it be Thy will to place a muzzle to my mouth and let me not reveal their wrongdoing, but may I have the merit to repair what they have injured. Let me find grace and favor and kindness in Thy eyes and in the eyes of all who see me and hear me so that they do what I order for a patient if the treatment is proper, but if the treatment is not proper then harden their hearts that do not do it, but let them not make it widely known lest (God forbid) I be disgraced O Lord, God of the spirit of all flesh!

'I ask one favor of Thee, that Thou give strength to my memory so that when I go to visit a patient, Thou make known to me at once which cure will benefit him whether I have studied it or not, I supplicate Thee, Cause of all Causes, that Thou cause the chain of circumstances to act in such manner that Thou bringest into my hands the medical book in which I may study his treatment or that I may listen to an argument between physicians that will teach me to know his cure, For Thou art the one who brings about the succession of causes in Thy Universe, as it is written 'And they are turned around about His guidance, that they may do whatsoever He commandeth them upon the face of the habitable world' (Job 37 12.) I pray Thee, O Lord, that Thou bring upon me merit in this world and not demerit. (May God

forbid!) Do not cause that any evil thing be found in my hand. Let no corruption come from me, so that I should cause any man's death nor even the loss of his limbs, neither willingly with intent nor unwillingly without intent, let me not be included in the category of the 'best physicians are fit for Gehenna' (Mishna Kiddushin IV 14.) 'Gather not my soul with sinners, nor my life with men of blood' (Ps 26 9)

"But for the merit which Thou mayest bring to me in that I may preserve lives of Israel, Thy people, whom Thou wilt save from death through me, grant that I may deserve to walk about this world in the pleasure of beholding the good of Thy chosen ones, rejoicing in the joy of Thy people of glorifying in Thy inheritance. May my eyes see Jerusalem, the peaceful habitation. May I walk before the Lord in the land of the living. Let not Satan attach himself to the work of my hand, for to purify and to cleanse have I come!

"My God, deliver me from the hand of the wicked, from the palm of the perverter and oppressor and place me not in his hand even for one moment lest he entice me to practice wantonness (God forbid!) to administer a poison or drug to injure some man or some pregnant woman (God forbid!) If he try to entice me, meet him, humiliate him, deliver my soul from him. 'O Lord, I am oppressed, be Thou my surety! (Isaiah 38 14) for Thou art my hope, O Lord God, my trust since my youth. Cleanse my mind and purify my thoughts that I think no evil about any woman, whether virgin or wife, when I visit her that do not go about my own heart and my own eyes.' (Num 15 39) Save me from all injury, disease and infirmity. 'May the sun not smite me by day nor the moon by night' (Ps 121 6)

"I pray, O Thou Master of kindness and mercy, open my eyes that I may discover the secrets of Thy wonderful deeds and that I may know the peculiar curative powers which Thou has placed in herbs and minerals, in seeds and flowers, in roots and leaves, in wood and fruit, in wines and oils, in waters and in other liquids, in living organisms which are in the heavens above and in the waters under the earth, in simple and composite structures and that through them I shall tell of Thy might to all generations to whom Thy greatness shall come. May it be Thy will to give Thy blessing to all the works of my hand and to recompense which is given me against my will so that I may look upon it as an omen of good and that I may apply it to good and righteous purposes before Thee, and to magnify and glorify Thy law. And may my sustenance and that of my children and children's children come from Thy hands and not from the hands of men of flesh and blood and may it be in abundance so that

I be not forced to take anything from the poor and sick but, on the contrary, that I may be able to give unto them what Thou hast bestowed upon me, for from Thee come all things and from Thy hands I return to Thee. Endow me well that I succeed and prosper in all that I do, and especially in the work of healing do Thou magnify Thy kindness so that patients call me to whom cure is possible and who may be cured completely through me. And let those not call me who are incurable and whose illness is fatal because Thou hast decreed that they may not be cured. 'Let my soul not come unto their council, unto their assembly let my glory not be united' (Gen 49 6). If people consult me because of my knowledge let not the foot of pride overtake me, but let my soul be 'like a weaned child with his mother' (Ps 131 2). May no evil desire nor vile eye have power over me. Let me not be brought into temptation or shame. Save me from the reflection of sin, and transgression and iniquity now and forever, and clothe my soul with glorious raiment, the crown of glory of good morals as is becoming to one who finds grace in Thy eyes. Lend strength to all my senses so that they may tell the truth in everything which is brought before them that I may not be mistaken in any one of them neither in taste, smell, sight, hearing nor touch, let them tell me concerning what is positive that it is positive, what is negative, negative, what is bitter, bitter, what is sweet, sweet, so that no injury result to any of my patients because of the weakness of my perceptions. Strengthen likewise the power of speech of the patient and the vigor of his understanding and his memory so that he tell me the truth as to the causes of his ailment and no falsehood in regard to them lest I also, be led into error and thus fail to understand the causes of his disease from his words and from the symptoms of his disease, let me be fit and learn to prognosticate correctly to the patient in order that my words and warnings may be verified and my injunctions observed. 'Uphold me according unto Thy word that I may live, and put me not to shame in my hope' (Ps 119 116). Do not destroy hope from out my heart, do not incline me to do evil, do not hide Thyself from my supplications, be gracious unto me and answer me, harken unto my prayer. Indeed Thou harkenest unto my prayer and I must give thanks for everything and sing Hallelujahs and praise Thy name, for goodness is in store for Thy saints! May I increase in greatness and mayest Thou comfort me! May these words which I have supplicated to the Lord come to pass, etc."<sup>1</sup>

This prayer is a psychoanalytic characterization of the man, Zahalon. He looked upon medicine as a sacred calling. The physician is

merely God's servant on earth to help his fellow-men. He reveals the famous adage—that the physician merely treats and God cures—as he says, "Thou art the physician, not I." He fully realized the great responsibility that medicine places upon the physician and he is also aware that to err is human. So he prays fervently for divine guidance so that he may increase his knowledge and not err. But book knowledge alone is not sufficient to make the great physician. To this must be added the physician's own intellect and faculties of observation. So he prays for the preservation of his health and all his faculties, so that he may serve mankind best. He has not chosen his profession for the sake of wealth or glory. But he prays for sustenance so that he may not be forced to accept anything from the poor for his services, but rather share with them. For what nobler ideals can one ask?

We hear a great deal at the present time about personal interviews and personal aptitudes of students who wish to be matriculated in medical schools, for it is claimed that personality is a factor in the making of a good physician. It is interesting to note that Zahalon in the Seventeenth Century, advocates this principle. He quotes the author of Olath Shabbath<sup>1</sup>, who says, "A physician must possess these requirements in order to secure the patient's confidence (1) He must be a respected man of good appearance, who will find favor in the eyes of all the people, the patient will trust him if he is a God-fearing man and a man of good stock." But personal appearance is not sufficient. A physician must be well-trained in the arts and science of medicine. Zahalon continues, "He must be learned in the science of medicine. He must be a man of experience in his work. He must possess the power of persuasion smooth speech, which will appease the sick person. 'His words have upheld him that was falling' (Job 4 4)."

Judging from his own expressions, Zahalon was convinced that his book supplied a great need. "In some towns" he tells us, "there are no physicians, but there is a scholar who is able to understand and to study closely and to seek cures for the sick in this book. Where the physician lives far from town and there is no time to be lost till he arrives, or again where several physicians visit a sick man and differ as to their treatment, the learned man can inform himself as to the valid and expert judgment of this book. This book will likewise be of benefit to physicians themselves, who will find a 'table spread' for them without expounding differences of opinion at great length, as is the prevalent method of books of medicine. I have only given the most proper, accepted and well-tried methods of cure. Furthermore, this book

<sup>1</sup>Quoted from Friedenwald's paper on Jacob Zahalon

<sup>1</sup>Joel Ibn Shu Alb Rabbi preacher and commentator of 15th Century

will be of benefit to the poor who are unable to pay the fees of a physician. He will easily learn the treatment of his disease in this book. I shall go into detail concerning the more common diseases and I shall be brief in regard to others."

As for the style in which the book is written this is very interesting. Zahalon adopted for his medical work the legalistic method used in rabbinical literature, namely, that of the Responsa, or in the form of question and answer.

#### OUTLINE

Chapter I as listed above deals with General Hygiene. This is written for the well and the sick. In this chapter he describes minutely general rules in hygiene. For example he devotes a great deal of space to the importance of fresh air. Of course, in the present day with the various fresh air cults, radio lectures, fresh air schools, summer lakes we have become air minded. But remembering the time in which Zahalon lived and that superstition reigned supreme, and the primitive housing condition it is astounding indeed to find him with this modern viewpoint. Then he describes in detail the kind of water that is fit to drink. This was the age before chemistry and bacteriology so he gives us simple home tests to detect impurities in water. For example he advises the following simple experiment: Take two pieces of cloth of equal weight put one in pure water and the other into the water to be tested. Then dry both pieces. If the water contains no impurities the weight of the two pieces of cloth when dry will be the same. Then he continues with the importance of exercise and relaxation. Following that he describes the rules of diet in detail. Of course, in these days we have all kinds of fads about dieting, the eighteen day diet, various reducing methods and particularly a flood of literature on vitamins, so what Zahalon has to say is not novel to us, but realizing that in those days when eating meant filling up the stomach as much as possible until one felt heavy and sleepy, Zahalon's advice is quite remarkable. He constantly advises that one should leave the table while still somewhat hungry. Now when it comes to the different kinds of food to eat, Rabbi Dr. Zahalon finds himself in his home territory. For whatever the origin of Jewish dietary laws may be they were all based on some hygienic principles.

In this chapter he summarizes the rules of hygiene by Maimonides. He concludes with an epistle by the Professors of Salerno to the King of England in regard to hygiene.<sup>1</sup> I shall quote

merely one passage that is of interest where Zahalon quoting them says, "If there is a lack of physicians, replace them with the following three, joyful thoughts, rest, and diet." In other words, the three wise, old physicians, Dr. Meriman, Dr. Rest and Dr. Diet, were as useful then as they are now.

In the second chapter he explains all kinds of fevers, their causes, signs and symptoms, and their treatment. At the end of this chapter he narrates the story of the Plague which occurred in Rome in June 1656.

Zahalon lived before the age of bacteriology, so he naturally did not know about bacillus pestis. But it is of interest to note what they actually did know and observe. He enumerates six causes of the plague:

- 1 Contaminated air as after a war, an earthquake, or flood, when dead bodies lie around on the ground.
- 2 The influences of the planets in accordance with the teachings of the astronomers.
- 3 Spoiled food such as is found during a famine, which is usually followed by the plague.
- 4 Poisons that contaminated the water supply.
- 5 Filth as observed from experience.
- 6 Contact with other people who suffer from the plague or with their clothes. This is particularly true when one is fatigued or weak.

Therefore, he advises "In times of epidemic keep away from crowds."

"Happy is he who is fearful and he that is stubborn will fall into evil." "One should also be careful about fresh air, good food, rest, relaxation, clean homes, and freedom from worry and aggravation."

In Chapter II he also wishes to prove how great is the effect of the imagination on the body so he narrates how a woman gave birth to a child whose abdomen was open and the intestines exposed and this, he explains, was due to the fact that the mother during pregnancy, passed by a meat shop and saw the butcher opening the abdomen and removing the contents of a calf. The power of her imagination affected her offspring in the same manner. This gives us a picture of certain beliefs in the Seventeenth Century.

Chapter III deals with the signs of the pulse, urine, and the tongue. He describes the mechanism of the pulse in detail and its variations. He mentions the regular and irregular pulse, the pulse where all beats are equal or when every other one or every third is unequal. Then he calls attention to the intermittent pulse where every third beat is skipped and the deficient

<sup>1</sup>This is probably the "Regimen Sanitatis Salernitanum" said to be addressed by the School of Salerno to Robert of Normandy, son of William the Conqueror. But this problem is still in dispute.



pulse, where there is a longer pause between the beats. This description of the pulse is picturesque in places. For example, he speaks of a pulse that jumps like a goat, and the one that feels, to the examining finger, like the ocean waves. "There is a pulse," he says, "like that of a worm, and then the tiny quick pulse like the ant, and the completely irregular pulse."

He also gives instruction to the physician on how to take the pulse. The examining finger must be soft, not hard, nor should it be too hot or too cold. The physician should not take the pulse as soon as he enters the house of the patient, for then the patient is frightened and the pulse changes, but he should allow him to rest a while. He should observe the pulse in both hands of the patient. The physician should feel the pulse with three fingers, and he should not press too hard so as to obliterate the pulse, nor too lightly, so as to miss the strength of the pulse. In a similar manner, he instructs the physician in the method of examining the urine of a patient. He finally concludes this chapter with the signs of the tongue, in case of illness.

Chapter IV deals with all kinds of poisons and their antidotes. He starts with a general discussion as to what is a poison, and whether it always damages the heart. He concludes that although some believe the latter, there are others who claim that every poison injures some particular organ. He divides the poisons into three classes, minerals, plants, and those in living organisms.

His discussion of mercury is very interesting indeed. He states that although physicians prescribe mercury in case of intestinal worms, yet it is injurious and kills. It injures the intestines and causes needle-like pain. At times it is accompanied by painful diarrhea, and a heavy feeling in the body. If it stays in the intestines too long, it causes retention of urine and the body appears like lead, there is a bad odor from the mouth, the hands are paralyzed, the heart is weakened, it blinds the eyes and paralyzes speech.

But what is even more interesting are his further observations. "These effects I have observed," he says, "not only when mercury is taken by mouth, but even when one rubs it on his head. Even the vapor of mercury will cause these bad symptoms, due to injury to the nerves and trembling and weakness of the limbs follow. There is damage to the senses, particularly to those of vision, hearing, constant headaches, falling out of the air, as it is observed among artisans in mercury." He continues, "These people have a marked salivation; the teeth become loose and there are ulcerations around the teeth. I have seen a patient who wanted to treat himself with medicine that contained mercury. I warned him not to, but he

finally did. The above lesions appeared in his mouth, followed by headaches. He died prematurely." The treatment of mercurial poisoning consists of enemas of olive oil mixed with chicken fat. The patient should drink a great deal of milk. But the best remedy is gold leaves, to be mixed with the food, which is specific against mercury. "I had this experience with the help of God—a young lady who rubbed her head with mercury and developed the above symptoms took leaves of gold, and blessed be the Lord, she was cured."

Especially interesting is his discussion of opium. Some physicians doubt whether it should be classed as a poison, others claim that it is a poison. Zahalon concludes that untreated opium is poisonous. "Although there are," he says, "habitual takers of opium to whom it is not injurious, this is no argument, since habit becomes second nature." He concludes, "Though a little may not kill, nevertheless every poison has its lethal dose. Opium causes a deep sleep known as a narcosis. It also causes pruritus and sweating of the skin. It diminishes the breathing, the eyes become darkened, and finally the motion of the limbs becomes confused." He brings this chapter to a close with a discussion of poisons caused by living organisms, snakes and mad dogs. In connection with the latter he observes that the incubation period of hydrophobia may be as long as a year or more.

Chapter V is divided into two parts—the first deals with the nature and temperament of man. The second part deals with signs and symptoms of diseases, and their prognoses. He starts out with a discussion as to whether medicine is an art or a science. "Although it is not positive at times," he claims, "yet it is a science, since it has the beginning of an accumulation of truths." He defines medicine as the science by which we study the elements of the human body in order to preserve and guard its health and regain it when it is lost.

Chapter VI is concerned with the treatment of disease, known as therapeutics. He describes simple and compounded remedies and their indications in various illnesses. He starts out in this chapter by stating that the physician should give general directions and instructions to all sick, and particular instructions in individual cases. "In every instance," he continues, "the physician must observe the following three rules—positiveness, speed, and pleasantness." He also emphasizes the importance of the patient's diet. This is followed by an alphabetical list of syrups and their uses, as well as pills, solutions, oils, ointments, etc. There is even a discussion on various baths. This chapter is a study in itself, for it gives us a clear picture of the state of medicine during his time. He finally concludes with a description of and the uses of various medicinal plants.

Chapter VII discusses specific diseases of the head, the eyes, the ears, the nose, and the tongue. Zahalon's time was no age of specialization. In each case he discusses the signs, causes and treatment. Here he gives a brief anatomical description of the organs of the body. This gives us an insight into the limitations of anatomy in the Seventeenth Century. For example he enumerates eight pairs of cranial nerves. Then he adds that there are thirty seven pairs of nerves that come from the brain through the spinal cord.

In one paragraph he discusses the treatment of "love sickness", which sounds like some of the modern psychoanalytical literature. This disease is recognized," he says "by the sinking of the eyes, and weeping like voice without tears. The patient's lids drop and are shinky and his pulse is rapid, like one who is troubled a great deal. His mental state is changed although he appears well otherwise." As for treatment it varies as follows: (1) To obtain the desired object, (2) or let him think of some fault in his sweetheart, (3) let him indulge in other higher interests, (4) let him change his place of residence and go to a large city where they will not meet, etc.

His first suggestion is obvious but what we now call Rationalization, and his third Sublimation.

Chapter VIII deals with diseases of the throat, esophagus, trachea, chest, lungs, heart and diaphragm.

Chapter IX discusses diseases of the abdomen, liver, spleen, intestines, kidneys, etc. He concludes this chapter with a long discourse on hypochondriasis, because the liver or spleen was supposed to be the seat of this disease.

Chapter X contains a discussion of external diseases of the body and surgery. It treats briefly tumors, ulcers, fractures, dislocations, their causes and treatment.

Chapter XI deals with particular diseases of women.

Chapter XII is missing in this book, and Chapter XIII was not published, for lack of funds.

Throughout the book he mentions numerous Greek, Latin, Italian and Hebrew authors, which is sufficient material for a study in itself.

In this book, he describes conditions during the plague in the following quaint manner:

"In 5416 (1656) in the month of June, a disease called morbilli broke out among the children. Most of them died. Afterwards adults became ill with blotches on the skin called petechiae and in three days they were dead. It appeared three months earlier among the Gentiles than among the Jews. It also came to an end earlier among the Gentiles. The Jews were forbidden to leave the Ghetto and enter the city, as was their custom. Two officers were sent to the Ghetto to prepare a suitable 'Lazaretto' where the sick could be placed so that they

were separated from the healthy and thus prevent the spread of the epidemic. They ordered that the place selected for this should be the houses on the street along the river near the gate of the Ghetto known as the Gate of the Bridge, where they should be confined until cured. They appointed an officer, Monsignor Negroni, who came twice a day to look after the needs of the community and to enforce rigid isolation at a great penalty, they set up gallows near the gate to hang anyone transgressing these orders. They appointed a Gentile physician, who remained confined in the Ghetto, and who ordered everyone affected to be brought to the 'Lazaretto'. For the care of the patients in the 'Lazaretto' there were resident there the physician Samuel Gabbai (may the Lord preserve him!), and his father, Circio, who died while the son recovered. The lazaretto houses were divided into three parts, to each of which one Jewish physician was appointed.

"Blessed be the Lord who did kindness to me and preserved me and saved me in order to carry out His will. I raise the cup of salvation and call upon the name of the Lord. Praises be given to the Lord for He is good, for His mercy endureth forever.

"At that time it occurred to me that a certain patient whose name was Sabbatei Cohen (of blessed memory) became ill with fever. He had a swelling in the groin and I did not consider it a bubo. When he died I stated that he did not die of the plague, but the Gentile physician said that he died of the plague because he saw the swelling in the groin which I regarded as a hernia of the intestines. There was therefore a great difference of opinion as to the closing up of the house, as was done when one died of the disease. They brought the body to the Gentile physician, opened it, and found that it was as I had said, and not a bubo as the Gentile physician had maintained, and I was saved. Blessed be he who redeems and saves!

This was the procedure. The Jewish physician visited the sick and if he saw any signs of the disease a black "carbuncle" or a bubo in the groin with fever or other serious symptoms, especially if the tongue was white as snow, he would call the Gentile physician to examine the patient, the latter would order that they take the patient and his bed to the lazaretto to Samuel Gabbai—or the patient might remain home and be treated there.

"When the physician visited the sick it was customary that he take in his hand a large torch of tar, burning it night and day to purify the air for his protection,\* and in his mouth he had theriac. With God's help, it also aided me greatly that on my left arm I placed a seton, from which there flowed much blood and bad pus.

In the nine months, during which this epi-

\*It is possible that the vapor of the burning tar impregnating his clothes, made the doctor an undesirable host for flies and thus afforded real protection.

demie lasted there died, both young and old, about 800, among them a young scholar expert in the science of surgery, Isaac Zahalon, my father's brother's son of blessed memory

"They brought the dead to the river in small boats and carried the bodies to the cemetery outside the city to a place called Piano dei devisori

"Since the people were not able to go to synagogue, on Sabbath Toledo (Kislev 2, 5417) I, Jacob Zahalon, preached in Catalena Street, from the window in the corner house of David Gatigno, to the people (may God preserve them!), standing in the street. At another time I preached in Toscana Street, from the window of the house of Judah Gatigno (of blessed memory), the people standing in the street to listen to the sermon. In other streets scholars would preach from the windows of their houses

"None were permitted to go out on the street save physicians, except at certain times to get food, at night no one was allowed to leave his house. The guards patrolled the city and if they found anyone they would put him into a prison appointed for that purpose

"After nine months the Holy One (blessed be He) remembered His people because of the merit of their forefathers and the disease came to an end and they were well and the gates were opened and Israel returned to the synagogues to pray as in former times. Give thanks and praise to God on High, whose kindness never ceases and whose mercy never ends!"

Judging from his book, Zahalon was a great physician and scholar. One of his contemporaries, Nathaniel Segie, declared that Jacob Zahalon was one of the three most learned men of his generation

I have given you merely a short biography of the man and a sketchy analysis of his book. For the scholar, this book, like any book of the past, offers a wide field of research. In the first place who are the men he quotes in his book? He mentions a number of Latin, Greek, Hebrew and Arabic authors, whom he read either in the original or in Hebrew translations. He quotes from many documents, as for instance, letters written by the professors of Salerno to the King of England. We would like to know who these professors were. Then he quotes in Hebrew transliterations numerous medical terms in Latin or in Italian, which give us a clue to the medical sources and the medical vocabulary of that day. He translates these terms into Hebrew which is of great value to Hebrew medical terminology, particularly is it of value at the present time with the revival of the Hebrew language and the medical and scientific courses being introduced in the Hebrew University on Mt Scopus. He makes references to many popular practices and treatments which may be collected and studied to give us a picture of how the healing art was carried on in those days. It is a great book of information for the student of medical history.

In conclusion, I wish to state that we are very grateful to the Hvams Fund for providing us with these old Hebrew classics on medicine, from which we can draw a knowledge of the history of the healing art in the past and inspiration in our work in the present. These books, like their authors, wandered from place to place, until they were given shelter in the Boston Medical Library due to the expert knowledge, vision and indefatigable effort of its Director, Mr James F. Ballard

#### DO YOU KNOW?

QUICK ACTION is necessary in appendicitis cases. Statistics recently compiled on Philadelphia hospitals show that among those admitted within twenty-four hours after onset of symptoms, one in forty-six died; among those admitted forty-eight to seventy-two hours, one in fourteen died; and among those whose admission was further delayed, one in ten died.

MOST PEOPLE believe that there is a 'cure' for everything. They make the wish father to the thought 'Master minds' of science, toiling through midnight hours in a feverish search for discoveries is the romantic picture, false to reality, which leads the multitude to expect too much from research. Strangely enough, many of the most useful advances in science have come while investigators were looking for something else. Much remains to be learned about our natural environment, and we have not begun to penetrate the mystery of life itself. Nobody knows how to put his finger on the

precise point where the inanimate becomes animate, and how

THE FIRST bathtub in the United States was installed in a Cincinnati home in 1842. It was made of mahogany and lined with sheet lead. Newspapers denounced it as an undemocratic vanity. Boston, in 1845 made bathing unlawful except when prescribed by a physician. Virginia "soaked the rich" by taxing bathtubs \$30 per year—*Excerpts from a column sponsored by the Medical Society of the State of New York*

#### THE NEW YORK HOSPITAL PLAN

The executive director of the Associated Hospital Service of New York reported the expectation that the ten thousandth member would be enrolled July 11, on the three-cents-a-day schedule.

One hundred and twenty-seven hospitals are participating in this service.

The plan includes hospitalization to members, in case of accidents or emergency illness while on vacations, in any American hospital.

## VERMONT STATE MEDICAL SOCIETY

### LOW BACK PAIN CAUSED BY LUMBOSACRAL ABNORMALITIES\*

BY MAURICE V. BELLEROSE, M.D.†

**C**ONGENITAL variations in the general anatomical structure of the lumbosacral joint are now recognized as one of the definite and common causes of pain in the low back and lower extremities. During the year 1933 as many at 467 cases admitted to the New York Orthopaedic Dispensary and Hospital complaining of symptoms traceable to the lumbosacral region could be attributed directly to anomalies in this area. These figures are given in an effort to convey the relative importance and frequency of these anatomical defects as causative agents in the production of pain and disability. This is not an end result study, nor a consideration of differential diagnosis but merely a presentation of the usual clinical and roentgenographic findings with case histories.

Before explaining how these variations may give rise to acute and chronic backache I should like to present a general clinical picture typifying them as a group.

#### *Acute Backache*

An *original* acute attack is usually associated with a type of injury which places severe stresses upon the lumbar region, such as the lifting of heavy objects in a flexed position sudden twists and falls. Many times however the pain may be initiated by some apparently trivial movement, such as bending over a wash basin to brush the teeth, etc. Pain in the back may be severe sometimes so much so that the individual drops to the ground and is unable to rise for several minutes. It is usually more marked in the lumbosacral region with radiation down the posterolateral aspect of one or both legs. Sometimes the pain in the lower extremities exceeds that in the back. Less often it is referred to the region over the sacroiliac joints, buttocks, hips or coccyx. Referred pain may be either unilateral or bilateral, irrespective of the type of injury or anomaly.

#### *Signs*

The patient assumes a protective attitude, holding the spine rigid, partially obliterating the lumbar lordosis. The trunk is flexed at the hips, and a list of the trunk to one side may be noticed, causing a tilting of the pelvis and apparent shortening of one leg—the so-called sciatic scoliosis. The sacrospinal muscles are in marked spasm and stand out prominently.

\*From a study at the New York Orthopaedic Hospital read before the Vermont State Medical Society at its Annual Meeting held in Burlington, Vermont, October 4 and 5, 1934.  
†Bellerose, Maurice V.—Orthopaedic Surgeon, Rutland Hospital. For record and address of author see "This Week's Issue," page 183.

There is tenderness over the spinous process of the fifth lumbar and its ligamentous attachments, but if board like rigidity is present, tenderness may be absent. There may be tenderness over either or both sacrosciatic notches, the sciatic nerve, and along the course of the superficial peroneal nerve. Occasionally tenderness is found over the tip of the coccyx, and may lead to the mistaken diagnosis of injury to that structure. Motion in the lumbar spine is limited, especially flexion and lateral movements, the enforcement of which will cause considerable pain in the lumbosacral joint and will frequently be referred to one of the previously mentioned areas. Flexion of the thigh with the knee fully extended compression or separation of iliac crests, or forceful abduction or internal rotation of the thighs may cause pain in the low back.

#### *Chronic Backache*

The great majority of people suffering from these anomalies however, do not have so definite a history nor such marked symptoms and signs, their picture is more obscure. Fatigue, weakness, or dull ache in the low back, with or without radiating pain may be the only complaint, usually appearing after mild exercise, or after sitting or standing for a moderate length of time. More often they have repeated subacute attacks of pain which are relieved by rest but which recur with increasing frequency and severity the duration of the pain, the disability, and the rest periods becoming progressively longer, and the periods of relief correspondingly shorter. These attacks are often associated with some particular type of movement and may be accompanied by a sensation of something slipping or giving way in the joint. Sometimes the only complaint is pain, with or without paresthesia along the outer surface of the thigh and leg. It is advisable to examine the spine carefully in such instances in order to rule out the presence of lumbosacral defects, since it is believed that in the great majority of cases the cause of sciatica is a lumbosacral abnormality. It is the general opinion among neurologists that a primary neuritis of the sciatic nerve is a rarity.

The signs in these cases are the same as in the acute cases but less marked.

*Roentgenographic examination* is of invaluable assistance in establishing a diagnosis, without it, it would be impossible to detect the presence of skeletal anomalies. To demonstrate this

line of weight thrust passed well within the first sacral body. He was treated conservatively for one month, at the end of which time he was free from symptoms.

His rapid recovery was probably due to his good muscular development, which was able to compensate for the defective mechanics at the lumbosacral joint.

### *Spondylolisthesis (Anterior displacement)*

As has already been stated, posterior displacements of the fifth lumbar body on the sacrum most often occur with anteroposterior or the rudimentary type of facets. Anterior displacements of the fifth lumbar on the sacrum can occur only when there are developmental defects in the neural arch, that is, failure of fusion of the pedicles to the body, the pedicles to the laminae, or the laminae to one another.

*Eleanor S* was a girl of thirteen years who came to the clinic because of a lateral curvature. She had never had symptoms referable to the low back. Although one-half inch anterior displacement of the fifth lumbar was present, together with defects in the laminae of the fifth lumbar and the first sacral vertebrae, the patient was symptom free. Evidently her soft tissue structures were able to compensate for these marked defects. This patient is very young, and will undoubtedly have trouble later because of the poor mechanics at the lumbosacral junction with the additional strain of a lateral curvature.

### *Long Spinous Process*

*James D*, aged twenty-eight, was a case rather unusual in type of anomaly present and also in the kind of treatment which gave relief.

The skilogram shows an exceptionally long spinous process of the fifth lumbar with a defect in the posterior elements of the sacrum, forming a slot to receive it. The long spine is due to fibrous union of the tip of the first sacral spinous process to that of the fifth lumbar. The patient had a seven months' history of intermittent pain in the right hip, sometimes radiating down the leg, across the lower abdomen, and up to the upper lumbar area, but never in the low back. It may be that the tip of the long spinous process pressed upon the meninges when the spine was extended, causing irritation of the meninges and giving rise to impulses which passed through the afferent fibres of the sympathetics to the posterior roots of the first and second lumbar nerves. This might account for the peculiar distribution of the pain, since these nerves supply sensation to the parts mentioned. It was found that the patient had a three-quarter inch shortening of the right lower extremity, which was equalized by removing lifts from one heel and adding to the other. This simple procedure gave complete relief from symptoms.

### *Transitional Vertebrae*

I have previously mentioned that the lumbar spine is undergoing evolutionary changes. This manifests itself in the trend of the lumbar spine to become shortened, that is, to have four lumbar vertebrae instead of the usual five, the fifth becoming incorporated in the sacrum. In some instances the fifth lumbar is in a state of transition and becomes only partially sacralized.

*Mr M*, aged twenty-one, and in good health, had a transitional type of fifth lumbar vertebra.

The lateral process on the right is of the sacral type and forms a false joint with the ala of the sacrum, this is obviously a poor mechanical arrangement. The patient complained of a queer sensation in the right thigh and knee. Four years ago he had slight pain in the region of the right great trochanter, which has gradually extended itself down the outer side of the thigh to the knee. This he described as being more "a tired feeling" than an actual pain. The muscles and ligaments of the thigh felt stiff and tired easily. Although the pain complained of began four years ago and persisted intermittently in the right iliac crest region and the lateral side of the right thigh, not until six months ago did it become frequent. Since that time it has been constant and more severe. Lately the patient has been suffering from a slight pain over the fifth lumbar vertebra and in the posterior aspects of both thighs.

He was treated conservatively for seven months with heat and massage and wore a lumbosacral belt, without relief of symptoms. Physical examination was negative. Spine fusion is being considered.

Sometimes the transverse process becomes fused to the ala of the sacrum on one or both sides. Unilateral fusion of the lateral mass to the ala of the sacrum sometimes causes strain upon the opposite facet with resultant pain and disability.

### *General Treatment*

The underlying principle of treatment is relief of symptoms by immobilization. This may be procured by two methods: 1. Conservative, 2. Operative.

*Conservative treatment* is always used in original, acute and infrequent attacks. If the attack is very painful and disabling, the patient is given complete bedrest for from one to three weeks. It is important that the bed be hard, that is, one which does not sag. Such a bed can be made in the home by placing longitudinal boards between the springs and mattress. The low-back is firmly strapped with adhesive tape from mid-sacrum upwards so as to include the lower ribs, care being taken that some of the strips are well anchored to the anterior borders and crests of the ilia. A small pad beneath the tape pressing over the lumbosacral joint sometimes gives added relief. Dry heat may be applied to the part, but in some cases it aggravates the pain. After the muscle spasm and acute tenderness have subsided, massage is indicated.

The patient is then gradually allowed out of bed in a snugly fitting lumbosacral belt of heavy canvas, which has a rhomboid-shaped pad on its skin surface pressing over the lumbosacral joint. The belt should be worn as short a time as possible, the patient leaving it off an increasing length of time daily, until it is no longer needed. One of the most important factors in the convalescent treatment is *educational exercises*. They increase the flexibility of the spine, strengthen the ligamentous and muscu-

lar structures, and help correct any postural defects. These exercises should be done under competent supervision.

In the milder and infrequent attacks of low back pain, strapping followed by massage and exercises are usually all the treatment necessary.

### Operative Treatment

In many cases conservative treatment is sufficient, but if pain and disability persist, or recur at short intervals, operative treatment should be resorted to.

The operative procedure, as used at the New York Orthopaedic Hospital is fusion of the fifth lumbar vertebra to the sacrum by the Hibbs method, which has proved to be very satisfactory in relieving symptoms where the conservative measures have failed, because it absolutely immobilizes the lumbosacral joint. This operation does not appreciably hinder mobility of the spine as a whole, since there is normally motion of only five degrees in this joint.

Cases in which the lumbosacral articulations are asymmetrical or in which the fifth lumbar is partially sacralized are particularly likely to be unresponsive to conservative measures. In spondylolisthesis the spine should always be fused, and in this anomaly, of course, the fusion is extended from the fourth lumbar vertebra to the sacrum.

Fusion operations upon the spine are regarded by many surgeons as an extensive, radical and dangerous procedure, but statistics prove otherwise. Up to 1927, as many as 150 lumbosacral fusions were done in the New York Orthopaedic Hospital with no deaths or instances of postoperative shock. Since that time over 200 more have been done with the same results.

Before concluding this paper, I should like to pay tribute to the genius of the late Dr. Russell A. Hibbs, who first devised the spinal operation for tuberculosis of the spine and who later was the first to apply it to lumbosacral abnormalities. This opened an entirely new field in the treatment of these conditions, and made it possible to restore to normal activity many individuals who otherwise would have remained permanently handicapped.

### SUMMARY

1. Congenital anatomical variations in the lumbosacral joint increase the mobility at the expense of stability.
2. Instability of the lumbosacral joint causes strain upon the supporting soft tissue structures and articular facets.

3. The most common causes of so-called sciatica are anomalies in the lumbosacral region.

4. Conservative treatment is based on an attempt to decrease the degree of mobility of the lumbosacral joint and to improve the relationship between the fifth lumbar and the first sacral vertebra. When this fails to give adequate relief from symptoms, the lumbosacral joint may be completely stabilized by the Hibbs spine fusion operation.

### RECENT DEATHS

**WATSON**—HORACE L. WATSON, M.D. aged seventy two died at his home in Montpelier Vermont May 19 1935 after an illness of three months.

Dr. Watson was born on October 22 1862 at Worcester Vt., the son of Oliver and Nancy Darling Watson. He was educated at Barre Academy and at the University of Vermont graduating from the medical school in 1887. Before coming to Montpelier he practiced at Plainfield N. H., Hartford and West Topsham Vt. He studied at intervals at the College of Physicians and Surgeons in New York.

He was a member of the Odd Fellows the Knights of Pythias the Delta Mu Fraternity at the University of Vermont, and the Washington County and Vermont State Medical Societies.

Dr. Watson is survived by his wife Mary S. Watson, whom he married at Plainfield in 1890, two of their three children, Dr. Harold L. Watson of Montpelier and Mrs. Marian E. Burgess of Brookline Mass., two grandchildren and a sister Mrs. D. C. Hayes of Waterbury Center Vt.

**PIERCE**—WALLACE M. PIERCE, M.D., died suddenly at his home on Main Street, Burlington Vermont, June 3 1935. He was born February 17 1872 the son of Lemuel and Luella Armstrong Pierce.

Dr. Pierce was graduated from Brigham Academy and from the University of Vermont Medical College in 1898. He then began the practice of medicine in Middlebury Vt., later going to Providence R. I. He had been a sales representative for the Abbott Laboratories of New York and Chicago for the past twenty three years.

Dr. Pierce was a member of Washington Lodge No. 2 and A. M. Burlington Chapter No. 2, R. A. M. Burlington Council No. 6 R. and S. M., Burlington Commandery No. 2, K. T., Haswell Lodge of Perfection J. W. Roby Council P. of J. Delta Chapter of Rose Croix Vermont Consistory A. A. S. R. Klismet Temple No. 98 A. A. O. N. M. S. of Brooklyn New York.

Dr. Pierce is survived by one son Francis, of Long Island N. Y. and a grandson.

# CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C CABOT, M.D

TRACY B MALLORY, M.D., *Editor*

## CASE 21301

### PRESENTATION OF CASE

A forty-four year old Canadian housewife entered complaining of weakness and severe headache of seven weeks' duration

The patient stated that her symptoms began following a hemorrhoid operation seven weeks before entry. Upon further questioning, however, her history dates back to three years before entry when she had sore gums and tongue associated with vague indigestion and gas. At that time she ate only a small amount of meat and lived for the most part on green foods. One and a half years before entry she noticed numbness of her hands, more marked on the left, which was soon followed by a similar feeling in her toes. Since then she had considerable fatigue and slight shortness of breath upon exertion during the past eight months but no other symptoms. Following the hemorrhoidectomy she began to have increasing weakness and excruciating headaches from which she could get no relief. Two weeks before entry she visited her physician who told her she had anemia for which he prescribed liver and iron.

Her family and marital histories are non-contributory.

Physical examination showed a very pale, fairly well-developed and nourished woman complaining of headache. Her skin was sallow and the sclerae were white. The tongue was smooth on both lateral edges. The fundi showed petechiae and flame shaped hemorrhages. The heart, lungs and abdomen were negative. The blood pressure was 100/60. A neurological examination was negative except for absent abdominal reflexes and hyperactive left knee jerks.

The temperature was 100°, the pulse 120. The respirations were 25.

Examination of the urine showed a specific gravity of 1.010 to 1.020 and a sediment containing numerous epithelial cells. The blood showed a red cell count of 1,150,000, with a hemoglobin of 40 per cent. The white cell count was 1,200. A smear showed poikilocytosis and anisocytosis but no achromia. A differential count showed 28 per cent polymorphonuclears, 32 per cent lymphocytes, 28 per cent myelocytes, 4 per cent myeloblasts, and 8 per cent

large mononuclears. Platelets were seen in very small numbers. The stools were negative. The icteric index was 5. The van den Bergh was normal. The nonprotein nitrogen of the blood was 21 milligrams. The serum protein was 6.4 per cent. A gastric analysis showed no free hydrochloric acid. The bleeding time was 30 minutes.

X-ray examination of the chest and abdomen was negative.

On the fourth day she was given a transfusion of 600 cubic centimeters of whole blood with immediate relief of her headache, and the following day 3 cubic centimeters of liver extract intramuscularly. She did not respond to liver. During the third week information was received from her family that the patient had worked in a rubber factory with benzol for four years until one month before her present illness. She was given repeated transfusions followed by a very slow rise in her red blood cell count. After being in the hospital for one month her red blood cell count was 2,650,000, with a hemoglobin of 60 per cent. The white cell count was 2,800, 53 per cent polymorphonuclears, 42 per cent lymphocytes and 5 per cent large mononuclears. Very few platelets were seen. She developed numerous ecchymotic spots all over her body and several petechiae appeared on the soft palate, tongue and inside of the cheek. Because of excessive vaginal bleeding she was sterilized by x-ray during the sixth week. During the ninth week she developed areas of subcutaneous induration over the left forearm and upper arm. A few days later similar lesions appeared over her legs and trunk. She was having chills every afternoon with fever as high as 104°. During the eleventh week she developed right lower quadrant pain, vomiting and bloody diarrhea. Her white blood cell count reached 6,000. She was critically ill for ten days but gradually improved. During this period there developed a very tender mass in her right lower quadrant which disappeared as her condition improved. Transfusions were continued. She began passing considerable blood in her urine and stools. The subcutaneous lesions increased in number. Her red blood cell count at the beginning of the fourth month had reached 3,500,000. The reticulocyte count was 0.5 per cent. Toward the end of the fifth month she complained of right upper quadrant pain, abdominal distention and pain in her fingers. Both hands became swollen, blue and hemorrhagic. Her white cell count steadily fell and she finally died five months after entry after having received forty transfusions.

### DIFFERENTIAL DIAGNOSIS

DR. CHARLES L. SHORT. The history as given on the patient's admission is certainly that of a progressing anemia of at least one and a half

years' duration. The fact that she ate only a small amount of meat is of interest but seems of minor importance in view of the severity of her anemia. Similarly, the numbness of her hands is merely a symptom of severe anemia without necessarily suggesting the diagnosis of pernicious anemia. The fatigue and headache are all compatible. The physical examination is not significant except for pallor and retinal hemorrhages. Her blood showed a severe anemia, tending toward a high color index. We are not told about the size of the cells. It would be interesting to have a volume index. There is no sign of regeneration of the red cells as evidenced by the peripheral blood. There was severe leukopenia with absolute decrease of all the elements. Twenty-eight per cent myelocytes may signify that there is some regeneration going on in the granulocyte series. The markedly diminished platelets and the prolonged bleeding time perhaps foreshadow the hemorrhages during her stay in the hospital. The normal icteric index and van den Bergh gave no evidence of any peripheral red cell destruction.

To sum up, we have a patient with symptoms of anemia for at least a year and a half presenting pallor and retinal hemorrhages. From a therapeutic viewpoint the first thing to determine would be whether she had pernicious anemia. If so, the smear should show at this level of red cells more characteristic forms in the erythrocytes, and we would expect more mature polymorphonuclears. We should also expect to have some evidence of peripheral blood destruction. We should not expect to find the prolonged bleeding time. The retinal hemorrhages and the achlorhydria are compatible with this diagnosis. At this point I should say that the evidence was distinctly against pernicious anemia but that she very properly got a therapeutic test with intramuscular liver. The failure of the patient to respond in the absence of sepsis or some other complication completes the elimination of pernicious anemia as a diagnosis.

Next, I think the diagnosis of primary thrombocytopenic purpura is unwarranted in view of the severe anemia and leukopenia with the lack of history of hemorrhage up to this point.

Aleukemic leukemia is suggested by the presence of myelocytes but we hear nothing more about them in the repeated blood examinations which were undoubtedly done during the next five months while the patient was on the ward, so I think we can rule out this diagnosis.

We are told that the patient worked in a rubber factory with benzol for four years until one month before the present illness. I think that this information gives the clue as to the etiological diagnosis and renders further discussion of the differential diagnosis unnecessary, including such things as primary aplastic anemia and malignancy. We know exposure to benzol will produce aplastic anemia, which is often fatal,

with depression of all three elements of the bone marrow either simultaneously or successively. We know that the process will go on in the bone marrow for many months sometimes, even though all exposure to the poison has ceased. In this case she had apparently stopped working in the factory about three months before entry to the hospital. At that time she had well marked symptoms of anemia. We do not know just how much exposure she had to benzol. We do not know the conditions in the factory. We do not know whether the other workers had symptoms of anemia. There is marked variation in susceptibility to this drug and it is possible that she was the only employee who was suffering from any obvious anemia. We see a similar individual hypersusceptibility in two other drugs which occasionally cause marked damage to the bone marrow, arsphenamine and amidopyrin. In the case of benzol one difference is that the lesions can be pretty regularly reproduced experimentally in animals if the proper dose is given. The severe headaches that the patient had seem to be a rather consistent symptom of this form of poisoning. I do not think there is any doubt that she was suffering from benzol poisoning. The myelocytes may represent some regeneration going on along with the aplasia as we know that this may precede or follow it, both in animals and in man. In fact a few cases of hyperplastic marrow have been found at autopsy with or without signs of regeneration in the peripheral blood.

This patient was treated by repeated transfusions which, as far as I know, constitute the only worthwhile method of treatment. I believe Dr. Jackson has treated a few milder, more chronic cases with nucleotide with apparently some increase in red cell regeneration but I do not know of any severe cases being treated successfully by this method. It was certainly very worthwhile in this case to continue with the transfusions since, if the patient could be carried along, at any time the bone marrow might start to show some sign of regeneration and the patient might be saved. The transfusions apparently restored her to a certain point as indicated by her red cells and leucocytes, but had little influence on the bleeding tendency, which was undoubtedly maintained not only by the scanty platelets but by increased capillary permeability.

The subcutaneous indurated areas I should interpret as hemorrhages under the skin or in the muscles. Chills and fever in the absence of obvious sepsis are commonly described in benzol poisoning and are said to be of serious prognostic omen. Of course they may represent some undiscovered infection and the question next arises whether the patient did have sepsis or whether the whole picture was due to benzol poisoning. We know that the resistance to infection is depressed in benzol poison-



ing Without further definite evidence, however, I do not think we have any right to conclude that she did have sepsis although a septicemia, endocarditis or pneumonia is possible

The right lower quadrant mass which disappeared I should interpret as intraperitoneal hemorrhage, as well as the final right upper quadrant pain of which the patient complained "The hands became swollen, blue and hemorrhagic" I should think this was probably due to hemorrhages in the subcutaneous tissues and in the muscles

I believe, then, that this patient died of benzol poisoning with bone marrow aplasia and a marked bleeding tendency I think that generalized hemorrhages will be a striking finding at autopsy She probably had an aplastic bone marrow since she shows so few signs of regeneration in the peripheral blood However, the peripheral blood does not always accurately reflect the state of the bone marrow and it is possible that she will have a hyperplastic marrow, representing a state of arrested maturation

#### CLINICAL DISCUSSION

DR WALTER BAUER From the occupational history we obtained information which of itself was very suggestive that we were dealing with an individual suffering from benzol poisoning However, in order to be more certain of our diagnosis, some of the material used in the factory was obtained for analysis Its physical properties were similar to those of benzol This additional evidence seemed to leave little doubt as to the correctness of our diagnosis

In this clinic we have never had anyone live this long and eventually recover However, such cases are reported in the medical literature One mild case of chronic benzol poisoning reported from Guy's Hospital was transfused repeatedly over a period of two years with ultimate recovery Coming back to this patient, it is interesting that the only time she had a nearly normal white count was following the intra-abdominal hemorrhage At this time the white count went to 6,000 Someone suggested at that time that she be given fever therapy in the hope that it might be maintained This, however, seemed too dangerous to think of undertaking All the time she was on the ward we wondered whether we should take a biopsy in order to be absolutely certain that we were dealing with benzol poisoning and not with some other form of aplastic anemia We transfused her repeatedly in the hope that her own bone marrow would start manufacturing red blood cells before she succumbed to some intercurrent infection Because she had been treated enthusiastically and had failed to respond we did at times wish that we could see a section of the bone marrow However, the risk of serious bleeding or secondary infection seemed too

great and therefore it was never undertaken I do not think one can fully appreciate just how much work the house officers did in treating this woman They finally ended up by doing transfusions using the veins of the neck I think if it had not been for their enthusiasm she would have succumbed much sooner than she did

#### CLINICAL DIAGNOSIS

Aplastic anemia due to benzol poisoning

DR CHARLES L SHORT'S DIAGNOSIS

Aplastic anemia due to benzol poisoning

#### ANATOMIC DIAGNOSES

Aplastic anemia (benzol poisoning)

Typhlitis, acute and chronic

Gas bacillus septicemia

Septic staining of aorta, endocardium and pulmonary artery

Bullous lesions of the skin

Decubitus

Peritonitis, chronic localized

Hemorrhage into right renal pelvis and ureter

Hemopericardium, slight

Cholesterosis of the gall bladder, slight

#### PATHOLOGIC DISCUSSION

DR TRACY B MALLORY The autopsy in this case showed all that one could expect a case of chronic benzol poisoning to show In other words the bone marrow was practically completely aplastic There is nothing pathognomonic about the picture We cannot tell the difference between aplastic anemia due to benzol and the so-called primary aplastic anemia, if there is such a thing The immediate cause of death as it is so often in these cases was sepsis The record gave no adequate indication of its character She developed a generalized septicemia with *B. Welchii* and in the short intervening period between death and her arrival at the morgue the body had blown up to an almost unrecognizable form There were bullae four and five inches in diameter filled with gas scattered throughout the subcutaneous tissues and deeper organs Most of that gas-formation undoubtedly occurred postmortem so that the record could not well have shown it

Dr Short was speaking of experimental work in benzol poisoning I think perhaps a word is in order there It is quite true that lesions can be produced with regularity in animals with adequate doses of benzol but by and large they are not very typical of lesions seen in man The effect in animals is much more on the white cells than the red cells In man that may be true of individual cases but on the whole anemia is a fairly constant feature The great majority of cases of benzol poisoning show at autopsy an aplastic marrow There are a few cases re-

ported with a hyperplastic marrow and you can reproduce a similar stage in animals with proper dosage.

**A PHYSICIAN** What percentage of cases of benzol poisoning recover?

**DR. F. B. HUNTER** It is rather hard to say. We had six here some years ago that got well. Interestingly enough the ones that died all had white counts below 1200 and all had fever. Since then we have looked upon fever in these people from the onset as an unfavorable sign.

**A PHYSICIAN** Did you find anything to account for the episode in the right lower quadrant?

**DR. MALLORY** The cecum was distended and the walls somewhat thickened. It raised a question in our minds of primary typhilitis due to gas bacillus. I have heard of two such cases.

**A PHYSICIAN** That was many weeks before.

**DR. MALLORY** That makes it seem improbable. The organs were so distorted by gas bubbles that it was pretty difficult to recognize any minor changes.

#### CASE 21302

##### PRESENTATION OF CASE

**First Admission** A fifty-three year old German housewife entered complaining of abdominal swelling of two and a half months duration.

Approximately eight months before entry the patient noticed edema and shooting pains in her legs. She believed that this condition was the result of varicose veins, which she had had for years, and at that time began to have the veins injected at another clinic. After the fifth injection, approximately three months before entry, her sclerae became yellow. Two and a half months before entry the swelling of her legs increased and soon after that she noticed that her abdomen was getting larger. Two months before entry she became nauseated every morning and vomited sour yellowish fluid following which she felt much better. She also noticed a dragging sensation in her lower abdomen and in addition a feeling of pressure in the left upper quadrant which was relieved by pushing her hand against that region. Her abdomen continued to increase in size and the edema of her legs also increased. Two and a half weeks before entry her physician removed two and a half gallons of fluid from her abdomen, and five days before entry removed about four gallons. Following each tap the abdomen immediately swelled again. Her urine had been scant in amount. The stools were normal in color.

Her family and marital histories are non-contributory.

She had worked as a cook and a maid until seven years before entry. From a very early

age she had drunk wine or beer nearly every day and occasionally a little hard liquor. She stated that she had never had enough to make her intoxicated at any time, though her friends asserted she would frequently drink a quart of whiskey in an evening.

Physical examination showed a well-developed and obese woman lying in bed with some respiratory embarrassment. The lips were slightly cyanotic. The skin and sclerae were jaundiced and there were spider angiomas over both shoulders. There was slightly pitting brawny edema over the back, sacrum, thigh and legs. The lower half of the right chest was flat to percussion and showed bronchial breathing, absent tactile fremitus, egophony and a few rales. There were also a few rales in the left base. The heart was in a transverse position due to the high diaphragm. No murmurs were heard. The blood pressure was 154/68. The abdomen was huge, tense and markedly distended. An umbilical hernia was present. There were enlarged veins over the epigastrium. There was a definite fluid wave. No organs or masses were felt.

The temperature was 98.4°, the pulse 100. The respirations were 24.

The urine was dark brown in color and had a specific gravity of 1.014 to 1.024 and a very slight trace of albumin; there was no bile present. The sediment contained one to five white blood cells and five to ten red blood cells. The blood showed a red cell count of 3,250,000, with a hemoglobin of 70 per cent. The white cell count was 6,100, 79 per cent polymorphonuclears. The stools were brown in color and contained no occult blood. The Hinton test was negative. The nonprotein nitrogen was 27 milligrams per 100 cubic centimeters. The liver function test showed 90 per cent retention, the icteric index was 75. The van den Bergh was 8.77 milligrams per 100 cubic centimeters direct.

An abdominal paracentesis on the day of admission yielded 16½ liters of yellowish, slightly blood tinged fluid with a specific gravity of 1.005. Following this the spleen was felt and the liver edge also, just below the costal margin.

She was given intravenous salyrgan on the second and fourth days followed by theobromin, 30 grams a day. On the sixth day a note was made that she weighed 47 pounds less than at entry. The edema of her lower extremities had cleared up remarkably well. Two days later she became slightly irrational and on that day 7½ liters of fluid were removed from the abdomen. She improved somewhat but the ascites reaccumulated. On the eighteenth day 6 liters of fluid were removed. She was discharged approximately one month after admission to return to the Emergency Ward for abdominal paracentesis and to remain on potassium iodide solution, 5 drops three times a day.

**Second Admission**, seven weeks later.

She remained fairly well after discharge but

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## THE DOCTOR'S BILL

At a time when there is so much loose talk about State medicine it is good for us to have as sound a discussion of the factors involved in medical economics as Hugh Cabot gives us in "The Doctor's Bill." Beginning his book with a delightful chapter on medical practice in 1890 and 1930 Doctor Cabot, in the salty phraseology which we associate with him proceeds to analyze the chief features of medical practice to-day. In this study which is satisfactorily thorough as to the facts presented and is interspersed with the author's comments on these facts, Doctor Cabot includes the requirements of modern medical diagnosis, our medical resources (the training of medical students and of nurses and the development of hospitals), the relation of specialism to general medicine, various types of group health services, workmen's compensation acts, the ability of the public to pay for medical services, and a résumé of the methods employed by

other countries, notably Great Britain and Germany, in meeting the situation

Following his presentation of the principal factors involved in the problem, Doctor Cabot suggests various ways in which medical practice in the United States might depart from its present status. His own attitude may be inferred from the following quotation "It should be remembered, however, that the decision as to what pattern medical practice will gradually assume will not be made, in the long run, solely upon the opinion of the profession. In this field physicians have no exclusive rights to the expression of authoritative opinion. The problems are economic and social, rather than technical and professional. In the long run, the decision must remain with public opinion, since, after all, it is the public, and not the profession, which is most vitally concerned. I cannot subscribe to the view that any group in the community has any rights which the public is bound to respect, if they can be shown to be opposed to the public interest."

That this attitude is essentially sound seems to us to be obvious. The logical conclusion is that if any measure can be found which will provide better medical care for a larger number of people, this measure should be incorporated in the practice of medicine.

Doctor Cabot does not attempt to tell us the answers to the questions which he has suggested. Instead, he indicates possible solutions, and gives his views as to their practicability. Since he offers no panacea, it is difficult to give in abstract the conclusions at which he has arrived, more particularly so because he leaves us with the suggestions instead of the conclusion. One gets the impression that he would favor experimentation by various localities with various methods of voluntary insurance. Compulsory insurance in this country he believes would prove unsatisfactory. He would favor the regulation of specialists, but unlike many writers, he believes that the growth of true specialism is good and not harmful. He prefers a National Registry for doctors, such as exists in England, to the individual State Boards such as we have here, and finds much that is good in group health services, such as those organized by some universities and industrial corporations. As regards group medicine itself, Cabot says, "It appears to me to be of the first importance that we should consider very carefully the ultimate possibilities of group practice, particularly if we look forward to the development in this country of some plan which is suited to our own state of social progress, and is based upon developments which have already taken place here. It should not be forgotten that the development of the group is not only peculiar to this country but is the single outstanding contribution

of the medical profession to improved organization for the delivery of medical service."

In effect, Cabot's only advice is that we should not oppose new departures just because they are new. "On the part of organized medicine, too great an insistence on the perpetuation of the present order is in danger of developing into a struggle for the perpetuation of a vested interest." His book is suggestive, not conclusive, but it contains much material which can be employed in building a road out of the somewhat unstable region in which we now are, to higher and more solid ground.

#### PUBLICITY BY A MEDICAL SOCIETY

The Public Relations Bureau of the Medical Society of New York has engaged in the distribution of short pithy articles to newspapers throughout the State of New York. Some of the subjects referred to for several weeks are "Baby's Care During the Summer", "The Title Doctor", "The Heart", "Sunburn", "Use of Honey", "Criminals", "Motor Accidents", "Summer Campers", "First Aid", "Swimming", "Fruits", "Rabies", "Ice Water" and "Accidents".

Publication is restricted to New York newspapers. The information is pertinent and presented in this way, is valuable for the information of the laity. Every state medical society might follow this custom to advantage, both because of its instructive features and as a demonstration of the interest of the society in the problems of preventive medicine.

#### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

HILL, LEWIS WEBB. A.B., M.D. Harvard University Medical School 1913 Associate Visiting Physician, Children's Hospital. Instructor in Pediatrics, Harvard Medical School. Visiting Physician, Boston Nursery for Blind Babies. His subject is "Sensitivity to Environmental Allergens in Infantile Eczema." Page 135 Address 319 Longwood Avenue, Boston, Mass.

SLOWICK, FRANK A. M.D. Tufts College Medical School 1927 Orthopedic Surgeon, St. Luke's Hospital, Pittsfield, Mass. His subject is "Traumatic Chondromalacia of the Patella. The Report of Two Cases." Page 160 Address 150 North Street, Pittsfield, Mass.

STEINBERG, NAAMAN M.D. Tufts College Medical School 1919 Proctologist to the Beth Israel Hospital Boston. His subject is "Recent Advances in the Treatment of Rectal Diseases by Injection Methods in Ambulatory Patients. I. The Use of Gabriel's Modified Solution in the

Treatment of Fissure-in Ano." Page 162 Address 311 Commonwealth Avenue, Boston, Mass.

FITCHET, SETH M. B.A., M.D. Harvard University Medical School 1921 B.P.H. F.A.C.S. Visiting Surgeon, Orthopedic Department, Children's Hospital. Assistant in Surgery, Massachusetts General Hospital. Associate Surgeon, New England Baptist Hospital. Consulting Surgeon, Josiah B. Thomas Hospital, Peabody, Mass., and Massachusetts Eye and Ear Infirmary. Assistant in Orthopedics, Courses for Graduates, Harvard University Medical School. His subject is "The Etiology of Congenital and Hereditary Deformities." Page 164 Address 319 Longwood Avenue, Boston, Mass.

CHAPMAN, EARLE M. B.S., M.D. Johns Hopkins University School of Medicine 1929 Assistant in Medicine Harvard University Medical School. His subject is "The Phthalein Test of Kidney Function in Anemia." Page 166 Address 66 Commonwealth Avenue, Boston, Mass.

SAVITZ, HARRY A. B.S., M.D. Harvard University Medical School 1925 Assistant in Medicine, Beth Israel Hospital. Medical Director, Associated Jewish Philanthropies. His subject is "Jacob Zahalon and His Book 'The Treasure of Life'." Page 167 Address 471 Commonwealth Avenue, Boston, Mass.

BELLEROSTE, MAURICE N. B.S., M.D. University of Vermont College of Medicine 1929 Orthopedic Surgeon, Rutland Hospital. His subject is "Low Back Pain Caused by Lumbosacral Abnormalities." Page 177 Address Rutland, Vermont.

#### MISCELLANY

##### APPOINTMENT OF DR. JAMES W. MANARY

Dr. James Westcott Manary has been appointed to the position of Superintendent of the Boston City Hospital. He has served as Director of the Out Patient Department for several years and during Dr. Dowling's illness served as Acting Superintendent.

Dr. Manary was born in 1884 in South Boston and graduated from the Tufts College Medical School in 1908. He is a Fellow of the Massachusetts Medical Society and the American Medical Association and is very popular with the profession.

The report is current that Dr. Manary has assured His Honor Mayor Mansfield that every effort will be made to correct all irregularities which were alleged in the Boston daily papers to have existed.

The size and importance of the hospital with its staff of eminent physicians will be an inspiration to the new superintendent to maintain the traditions of this great municipal institution.

## DR MARION DORSET DEAD

A brilliant scientific career devoted to public service was ended with the death of Dr Marion Dorset July 14 at his home in Washington, D C, after an illness of a few days. As a research worker in biological chemistry and chief of the Biochemic Division, Bureau of Animal Industry, U S Department of Agriculture, Dr Dorset gained an international reputation for contributions having useful application in the livestock, meat and dairy industries, and in public health.

On the occasion of his discovery of anti hog cholera serum, Dr Dorset had the opportunity to acquire wealth through the manufacture and sale of this product for which a large demand promptly developed. But after applying for and receiving a patent, he gave it to the Government and to the public so that any person in the United States might use the method without the payment of royalty—*U S Department of Agriculture*

## APPOINTMENT OF DR MARTIN EDWARDS

Mr T Grafton Abbott, President of the Board of Directors of the Boston Young Men's Christian Association, has appointed Dr Martin Edwards to assist in the development of the guidance program for 1935-1936.

Dr Edwards was the former Dean of the Harvard Medical School of China.

## PETER BENT BRIGHAM HOSPITAL

## ANNUAL REPORT

The twenty-first annual report of the Peter Bent Brigham Hospital, for the year 1934, records a slight increase in bed occupancy over the preceding year, from 4,263 to 4,358. The percentage of free patients fell, largely due to an increase in part-pay patients, rated at \$2.10 a week. Actually, the receipts from patients in the open wards were less than for the previous year. The daily per capita cost of patients' care was \$7.15 as compared with \$7.60 in 1933.

The slight increase in operating expenses of the hospital was offset by an increase in receipts of \$36,492, so that, for all purposes, the treasurer was called upon for \$25,833.69 less than in the previous year.

The chief problem of the hospital, as of most privately organized institutions during these years, has been a financial one. However, its services are indispensable, and there is little question but that ways will continue to be found to meet its needs.

## MORTALITY RATES

Telegraphic returns from 86 cities, with a total population of thirty-seven millions for the week ending June 29, indicate a mortality rate of 10.5, as against a rate of 10.8 for the corresponding week of last year. The highest rate (19.4) appears for Memphis, Tenn., and the lowest (5.1) for Waterbury, Conn. The highest infant mortality rate (17.0) appears for Knoxville, Tenn., and the lowest for Hartford, Conn., Miami, Fla., New Bedford, Mass., Port

land, Oreg., San Diego, Calif., Somerville, Mass., Tacoma, Wash., Trenton, N J., and Yonkers, N Y., which reported no infant mortality.

## COMPARATIVE FIGURES FOR THE FIRST HALF OF 1935

The annual rate for 86 cities is 12.2 for the twenty-six weeks of 1935, as against a rate of 12.1 for the corresponding period of the previous year—*Bureau of the Census*

## A BIOGRAPHY OF DR WILLIAM H WELCH

An announcement in the *New York Times* concerning the retirement of Dr Simon Flexner from the Rockefeller Institute states that he will "write the life of Dr William H Welch, with whom he studied and taught in Johns Hopkins."

## CORRESPONDENCE

## THE FAMILY PHYSICIAN AND PREVENTIVE MEDICINE

Editor, *New England Journal of Medicine*,

At the recent meeting of the State Society there was an excellent symposium on modern preventive measures of communicable diseases. One was impressed by the excellent work that has been done by the State Department of Health in its careful study of these measures and in making available to the physicians of Massachusetts the most modern material to use in the prevention of these diseases.

It was also apparent that there is considerable variation in the reactions of different individuals to these procedures as well as variations in the methods in which they may be applied to suit the individual. It seems obvious that they should be much more widely employed by the family physician in his private practice. He should not only employ these specific immunological procedures in protecting his patients, he should also seize the opportunity to advise other preventive and corrective measures which the individual requires.

In this part of the State for the past several years the Health Department has had practical monopoly of vaccination against smallpox and immunization against diphtheria. This is probably due in part to the enthusiasm of the Health Department nurses and their desire to make the work a success, and in part to the lack of interest of the average physician, or his fear of appearing mercenary if he urges his patients to come to him rather than the Health Department Clinics.

The Worcester District Society recently appointed a committee to inquire into this situation and see what could be done. This committee has secured whole-hearted cooperation from the Board of Health in urging parents to have these procedures done by their family physicians. With the cooperation of the Health Department and the City Clerk, the Medical Society is sending out a letter to the parents of every new-born child explaining to them these immunological procedures and urging them to bring the infant to the family physician for these protective measures during the first year of

life. The Society has furnished posters to every doctor for his office and to many druggists urging upon parents the importance of these measures and informing them that their physicians are prepared to administer them.

The committee feels that if the physicians would cooperate with the health authorities and overcome any reluctance they have to urge these procedures upon their patients concentrating especially on infants under one year this field of medicine could be restored to the private practitioner

Respectfully

GARDNER N COBB, M.D. *Chairman*

36 Pleasant Street,  
Worcester Mass

#### OFFICIAL ACTIONS OF THE BOARD OF REGISTRATION IN MEDICINE

State House Boston

July 13 1935

Editor *New England Journal of Medicine*,

This is to inform you that the Board of Registration in Medicine has restored the suspended license of Dr Eli Silverman as of July 1 1935

Yours very truly

STEPHEN RUSHMORE, M.D., *Secretary*

#### ELECTION OF OFFICERS OF THE BOARD OF REGISTRATION IN MEDICINE

State House Boston

July 13 1935

Editor *New England Journal of Medicine*

This is to inform you that at the annual meeting of the Board of Registration in Medicine held July 11 1935 Dr Charles P Sylvester of Boston was re-elected Chairman for the ensuing year Dr Stephen Rushmore of Boston was re-elected Secretary for the ensuing year

Dr Sylvester Dr Rushmore and Dr Edward A. Knowlton of Holyoke were designated as members of the Board to act in the Division of Chiropody

Yours very truly

STEPHEN RUSHMORE, M.D., *Secretary*

#### UNEXPECTED RELIEF OF SUBDELTOID BURSITIS

July 3 1935

Editor *New England Journal of Medicine*

I hope the following experience may prove helpful to someone

A woman of middle age, while playing an active game thirteen months ago<sup>1</sup> was seized with a sudden and severe pain in the right shoulder. During the ensuing ten months there was marked limitation of motion and more or less pain in the shoulder. It was difficult for the patient to do her hair and she could not raise her right hand to her back. No treatment was undertaken however

Three months ago I had occasion to give the pa-

tient a series of three antityphoid inoculations using the vaccine prepared by the Health Department of Massachusetts and employing the usual dosage of 0.5 cc 1 cc and 1 cc at weekly intervals. The injections were followed by slight local reactions and no general reaction was noted after any of them.

The first injection was given over the left deltoid muscle and the second and third over the right deltoid. Nothing unusual was observed after the first injection but the second was followed promptly by great improvement in the mobility of the shoulder and by marked diminution of pain on motion. Further improvement of a like character followed the third injection after which mobility returned almost to normal. During the three months which have elapsed since the inoculations were completed, there has been no recurrence of symptoms and the persisting limitation of motion has been very slight.

It seems improbable that the relief of symptoms could have been brought about through psychic means because the benefit experienced was entirely unexpected. Failure of the first injection to produce any benefit and the absence of appreciable general reactions after the subsequent injections seem to exclude non-specific protein reaction as the cause. Therefore I am inclined to believe that the benefit resulted from counterirritation.

GEORGE CHEEVER SHATTUCK M.D.

Boston, Mass

#### ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON PHARMACY AND CHEMISTRY

535 North Dearborn Street, Chicago, Ill.,

July 3 1935

Editor *The New England Journal of Medicine*

In addition to the articles enumerated in our letter of June 5 the following have been accepted

Abbott Laboratories

Abbott's Cod Liver Oil

Hynson, Westcott & Dunning

Surgical Solution of Mercurochrome-H. W. & D

Lederle Laboratories Inc.

House Dust (New York Apartment House) Allergic Extract Lederle

Merck & Co Inc

Aminoacetic Acid Merck

Parke Davis & Co

Antipneumococcal Serum (Felton) Types I and II Refined and Concentrated

E. R. Squibb & Sons

Soluble Gelatine Capsules Squibb Stabilized Halibut Liver Oil

Soluble Gelatine Capsules Squibb Stabilized Halibut Liver Oil with Viosterol

The following article has been accepted for inclusion in the List of Articles and Brands Accepted

nasal deformities is more or less arbitrary, it is convenient and easily followed

For his operative procedures the author has largely followed Joseph's technique but often supplements it with modifications of his own. He rightly condemns the practice of paraffin injection for building up the dorsum of the nose yet it is regrettable that he approves of the use of ivory as a transplant for the saddle-shaped nose. This in the reviewer's opinion has no place in corrective rhinoplasty. The author's statement that general anesthesia should be absolutely interdicted and only local anesthesia used is too rigid and deserves modification.

A scholarly chapter on historical culture has been written by Dr Hermon Pomeranz and adds much to the volume as a whole.

The reviewer feels that, owing to the increased attention that has been given to corrective rhinoplasty in recent years, this compact book will be well received by those interested in this branch of surgery.

**International Clinics** A quarterly of illustrated clinical lectures and especially prepared original articles. Edited by Louis Hamman. Volume 1, forty fifth series, 1935. 310 pp. Philadelphia, Montreal and London. J B Lippincott Company.

This volume is another excellent addition to a series which has achieved recognition in medical literature. There are articles helpful to the practitioner such as those on the "Management of the So-Called Blood Diseases" and the "Treatment of Diabetes Mellitus and Its Complications," and on the other hand more involved and technical are the articles on the "Red Blood Cell of Man" and "Calcium and Disease" and a review of "Cholesterol Metabolism." The authors are all competent and well known figures in medical literature.

**Diseases of the Heart.** John Cowan and W T Ritchie. With a chapter on The Ocular Manifestations of Arterial Disease by Arthur J Ballantyne. Third Edition, 61 pp. Baltimore. William Wood & Company \$9.00.

The rapid advances in our knowledge concerning the heart during the past decade have made it necessary for these well known British authors to revise and rewrite this book completely. This edition is therefore quite new and presents a comprehensive survey of the cardiac problems in the light of present knowledge. There are twenty four chapters including the anatomy, physiology and pathology of the heart. The main emphasis, however, is clinical. The illustrations are sufficiently numerous and clear to add a great deal to the reader's interest. All phases of heart disease are considered, including roentgenological, polygraphic and electrocardiographic. The numerous citations and accounts of personal experiences with cases illustrate in a very readable fashion the clinical prob-

lems under consideration. This book is complete, authoritative and very well arranged. It can be regarded as one of the best volumes on the subject of heart disease that is available for the student and practitioner.

**The Harvey Lectures** Delivered under the Auspices of the Harvey Society of New York. 1933-1934. By Drs R. E Dyer, W Mansfield Clark, and others. Series XXIX. 262 pp. Baltimore. The Williams & Wilkins Company.

After a tribute to its late President, Dr Alfred Fabian Hess, this edition presents the Lectures of the Harvey Society of New York for the year 1933-1934. The Lectures show a wide variation in subject matter, from the purely clinical lecture of Dyer on the prevalence of Typhus and Rocky Mountain Spotted Fever in the United States, read with ease and enjoyment by the medical man, to the highly technical paper of Clarke on Potential Energies of Oxidation-Reduction Systems and their Biochemical Significance, which requires a more than speaking acquaintance with physical and biochemical laws in order to follow his discourse intelligently. Of especial interest to the medical man are the new thoughts on the rôle that inherited characteristics play in the development of intrauterine amputations, presented by Streeter in his lecture on the Significance of Morbid Processes in the Fetus, and the research work done by River on methods of propagating filtrable viruses in vitro, especially with reference to Psittacosis.

**Useful Drugs** A list of drugs selected to supply the demand for a less extensive materia medica with a brief discussion of their actions, uses and dosage. Prepared under the direction and supervision of the Council on Pharmacy and Chemistry of the American Medical Association. Edited by Robert A. Hatcher and Cary Eggleston. Ninth Edition. 203 pp. Chicago. American Medical Association \$60.

In this ninth edition of an always handy compendium the editors describe a chosen list of drugs from the enormous and increasing numbers available in the various official formularies. The average practitioner is hopelessly entangled in the mass of frequently evanescent material dealing with this phase of therapeutics. He is so bombarded by the high pressure methods of pharmaceutical manufacturers that the memory of names alone, to say nothing of physiological action and indications, is becoming an impossible burden. His only recourse is to those drugs of long tried efficiency and simple name, sensibly and briefly described in Hatcher and Eggleston's little book. The beginner should start with this *vade mecum*, and stick to it, for he will find the volume an essential part of his working library.

# The New England Journal of Medicine

VOLUME 213

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NUMBER 5

## The Massachusetts Medical Society

### SECTION OF PEDIATRICS

Georgian Room, Hotel Statler Boston, June 5, 1935, 9 A.M.

#### PRESIDING

Dr Joseph Garland Chairman  
Dr James M Baty Secretary

#### SYMPOSIUM ON THE CONTROL OF CERTAIN COMMUNICABLE DISEASES

CHAIRMAN GARLAND The meeting will please come to order. One of the first duties in opening the meeting is to appoint a nominating committee to furnish names of officers for the next year. I will

appoint Dr Fred Allen of Holyoke as Chairman, Dr John Lovett Morse and Dr Elmer Barron.

It has seemed fitting to the officers of the Section this year in view of the new procedures that have been developed along epidemiological lines, to have a symposium which would help to clarify some of these rather difficult problems, and with that end in view we have I think arranged a valuable and interesting program.

The first paper on this program, which we are calling a Symposium on the Control of Certain Communicable Diseases will be a paper on measles control by Dr R. Cannon Eley of the Children's Hospital.

#### THE CONTROL OF MEASLES\*

BY R. CANNON ELEY, M.D.†

THE control of measles by public health measures such as placarding quarantine etc is inadequate, nor does there exist at the present time a satisfactory method for active immunization against the disease. However that measles may be either modified or prevented after an individual has been exposed by the administration of human immune antibodies has been satisfactorily established. Furthermore the advisability of either modifying or preventing the occurrence of this disease in certain individuals, and particularly among infants and children has become recognized as a warranted procedure in the practice of medicine. Therefore the problem concerned in the control of this disease resolves itself into three phases namely the epidemiological factors concerned in the transmission and dissemination of the disease the selection of the proper patients for modification or prevention, and finally the selection of a satisfactory method for the production of passive immunization. The first phase is well understood and does not warrant consideration at this time. In the following discussion

I shall confine my remarks to the consideration of the last two aspects, namely, the selection of patients for treatment and the various prophylactic measures that may be employed in the modification or prevention of this disease.

The selection of patients for modification or prevention of measles necessitates not only the consideration of the individual, but also a critical appraisal of the circumstances which resulted in the patient's exposure to the disease. In considering the patient the first question to be entertained is whether prophylactic measures should be employed to prevent or to modify the infection. The solution to this problem depends upon the physical condition of the individual, as measles and its complications should be avoided in chronically ill, debilitated, tuberculous and acutely ill children. However, if the patient is in good health and the accompanying circumstances do not contraindicate the procedure, efforts should be made to obtain modification, as complications are infrequently encountered with this form of the disease. Furthermore it is generally believed that permanent immunity may result from the modified form.

The circumstances which resulted in the exposure of the patient may, however be of such a nature as to make protection rather than modification desirable. Thus in institutions such as foundling asylums orphanages, and sanatoria it would be advisable to institute prophylactic

\*From the Department of Pediatrics, Harvard Medical School, the Department of Communicable Diseases, Harvard School of Public Health, and the Children's and Infants Hospital, Boston.

†Read before the Section of Pediatrics at the One Hundred and Fifty Fourth Annual Meeting of the Massachusetts Medical Society Boston June 5 1935 as part of a symposium on the control of certain communicable diseases.

†Eley R. Cannon—Associate in Pediatrics and Communicable Diseases, Harvard Medical School and Harvard School of Public Health. For record and address of author see "This Week Issue," page 240.



measures as soon after the exposure as possible in order to eradicate the disease immediately. As the immunity conferred by the usual prophylactic measures is of short duration (four to five weeks), the converse of this is true when the disease occurs in epidemic proportions outside of institutions, for in such situations modification with resultant immunity (thereby gradually terminating the epidemic) is to be sought. If this is not obtained, individuals will repeatedly be reexposed necessitating further prophylactic treatment.

At the present time passive immunization may

TABLE 1  
PASSIVE IMMUNIZATION

Method	Dosage
Convalescent Serum	4-6 cc
Adult Immune Serum	15-20 cc
Adult Immune Whole Blood	30-40 cc
Placental Extract	2-6 cc

*Factors Influencing Passive Immunization*

- 1 Potency of material employed
- 2 Dosage
- 3 Time of administration
- 4 Age of patient
- 5 Degree of exposure

be obtained by the administration of convalescent serum, adult immune serum, adult immune whole blood and immune globulin obtained from human placentae. As can be seen in table 1 the effectiveness of each of these procedures depends

upon such factors as degree of antibody content, dosage, time of administration in regard to exposure, type of exposure, and the age and size of the patient. Therefore in considering the merits of each of these prophylactic measures care must be exercised that the above-named factors are duly considered.

Table 2, which has been compiled from statistics available in the literature<sup>1, 2, 3, 4, 5, 6</sup>, well illustrates the influence that the above-mentioned factors may exert upon the results obtained by any of the prophylactic measures. (In order to simplify the table the age groups and time of treatment have been omitted. The ages ranged from six months to fifteen years. All patients were treated within seven days or less after exposure.) Thus it can be seen that the percentage of successful treatments obtained by convalescent serum was almost twice that obtained by the use of adult immune serum even though the dosage employed was much less. In fact, in order to obtain the same percentage of protection with adult serum as with convalescent serum, from three to four times the dosage was necessary. The marked difference between the successful protections obtained with patients treated on account of exposure in the hospital as compared with the group treated for exposure at home is not surprising for undoubtedly many of the patients considered as exposed in the hospital probably were not infected at all. This would be particularly applicable in those institutions that employ the so-called cubicle

TABLE 2

Author	Serum	Cases	Protected	Modified	Failed
1 Schick and Karelitz	Hosp A S 6 cc Home 6 cc 8 cc 12-25 cc	69 65 75 54	83% 29% 46% 57%	17% 22% 43% 20%	0 49% 11% 23%
2 Morales and Mandry	Home A S 10 cc 15-30 cc 30 cc 40 cc Conval serum 4-6 cc	138 321 34 28 120	41% 58% 82% 82% 84%	— 22% — — 11%	— 20% — — 5%
3 Park and Freeman	Conval serum Conval serum 6 cc	652 226	Hosp 91% Home 52%	7% 42%	2% 6%
4 Levinson et al	Conval serum 3 cc / 3 yrs plus 0.5 cc per 6 mos	287	Home 60%	33%	7%
5 Nabarro and Signy	Conval serum 5-7 cc Conval serum	461 125	Hosp 97% Home 94%	— —	3% 6%
6 McKhann et al	Immune Globulin	1341	Both 73.3%	23.4%	3.2%

A S = Adult serum

Conval serum = Convalescent serum

system or where isolation technique is enforced. That an increase in the percentage of patients protected was obtained as the dosage of the serum employed was increased was to be expected as there was a proportionate increase in the antibody content. This fact illustrates the uncertainties encountered in the employment of either adult or convalescent serum when the potency is unknown. For the purpose of contrast the patients treated with immune globulins (obtained from human placental extract) were not subdivided in this table into those exposed at home and those exposed in hospitals. Instead all of the patients, regardless of the type of exposure, were grouped together, of 1341 patients treated 73.3 per cent were completely protected, 23.4 per cent had a modified form of measles and failure occurred in only 3.2 per cent. In all instances a standard dose of 5 cc was employed. The practicable value of a unit form dose does not need comment.

Table 3 demonstrates the results obtained

was less with placental extract than with convalescent serum.

One of the important questions that must be considered when any therapeutic measure is being employed is the possible untoward effects of the procedure upon the patient. Such manifestations, which usually are referred to as reactions, may be local or systemic in nature and have been noted following the institution of prophylactic therapy in measles. The fact that convalescent serum usually may be injected in adequate therapeutic amounts with only slight, if any, local or systemic reaction, has made this method superior to the employment of adult immune serum or adult immune whole blood, for when these substances are administered in amounts adequate to obtain therapeutic results, an area of tenderness, edema, and discoloration not infrequently develops at the site of the injection. Whether a systemic reaction, which usually manifests itself by malaise, indisposition, anorexia and temperature, will accompany

TABLE 3  
INTIMATE EXPOSURE

Solution (or Fraction)	Given to Protect				Given to Modify			
	Cases	P	M	F	Cases	P	M	F
T (0-50)	28	•	6	0	49	18	27	4
M (28-50)	47	26	11	7	153	67	69	16
R (28-50)S	16	13	3	0	19	12	5	2
S (0-50)	31	23	•	1	69	20	43	3
P Iso P	16	5	9	2	36	9	21	6
FP	9	2	6	1	13	5	8	0
V (S-TG)	2	1	0	0	14	5	9	0
W (T-TG)	0	0	0	0	6	4	2	0
Commercial Extract	24	12	11	1	102	68	30	4
Total	174	106	56	12	467	208	214	35
%		60.0	32.2	6.9		45.5	46.5	7.7
%		93.1				92.3		
		P—protected						
		M—modified						
		F—failed						

when individuals, who were *intimately exposed*, were treated with placental extract in an effort to obtain either complete protection or modification. If these figures are compared with those of Morales and Mandry, Park and Freeman, Levinson, and Nabarro and Signy (all patients received convalescent serum within five days or less after exposure and therefore should have obtained either modification or protection) it will be seen that the results obtained with the two procedures are comparable. This would indicate that placental extract is as effective as convalescent serum when employed in the prophylactic treatment of measles. This observation is further substantiated by table 4 which shows that although the percentage of patients *completely protected* was greater in the group treated with convalescent serum than with placental extract, yet the percentage of *failures*

this local reaction largely depends upon the degree of the local disturbance.

TABLE 4  
PATIENTS TREATED FOR PROTECTION OR MODIFICATION  
All Types of Exposure

Procedure	No Cases	Protected	Modified	Failed
Adult Serum	584	379 64.9%	139 23.8%	116 19.8%
Conv Serum	1627	1117 68.4%	273 16.8%	127 7.8%
Plac. Extract	1341	959 71.5%	321 23.9%	61 4.6%

Local and systemic reactions have been observed following the intramuscular administration of placental extract. As one might expect, these reactions occurred with greater frequency

during that period of time when the extract was first being employed and when some confusion naturally existed as to which of the various protein fractions possessed the immune bodies Table 5 illustrates this point In this table an ef-

the application of the method impracticable as a public health measure This is particularly true during an epidemic when such large quantities are instantly demanded Since it has been shown that placental extract possesses sufficient

TABLE 5  
REACTIONS

Fraction	Total No Patients	No Reaction		Local		Febrile		Local ++		Febrile (T = 101+)	
T	239	151	63 2%	58	24 3%	41	17.1%	6	2 5%	9	3 8%
M	436	317	72 7%	99	22 7%	35	8 %	8	1 8%	4	9%
R	144	112	77 7%	21	14 6%	14	9 7%	1	7%	2	1 4%
S	248	172	69 %	69	27 8%	20	8 1%	11	4 4%	4	1 6%
P	137	71	51 8%	56	40 9%	32	23 4%	10	7 3%	5	3 6%
V	22	5	22 7%	7	31 8%	4	18 2%	10	45 5%	7	31 8%
W	6	1	16 7%	2	33 3%	5	83 3%	3	50 %	0	0
	1232	729	59.2%	312	25 3%	151	12 3%	49	4 %	31	2 5%

fort has been made to tabulate all of the reactions, regardless of how mild or how transient, that have been noted following the administration of the extract If the patient suffered the slightest pain or showed the slightest discoloration at the site of injection, a local reaction was recorded This type of reaction occurred in 25 3 per cent of 1232 patients, 151 patients, or 12 3 per cent, presented a febrile reaction of one degree or less, a more intense local reaction appeared in 4 per cent of the group and only thirty-one patients or 2 5 per cent showed a febrile reaction of 101° or more From these statistics it would appear that neither the frequency nor the severity of the reactions are sufficient to contraindicate the use of placental extract as a prophylactic measure in the control of a disease as serious as measles

antibody content either to protect or to modify measles, and since the percentage of complete failures with this substance compares favorably with the failures encountered when other methods are employed, and in view of the fact that an adequate supply can be maintained, it would appear that the administration of immune globulins from human placenta<sup>e</sup> may be the procedure of choice in the control of measles by public health measures

REFERENCES

- Karelitz S and Schick B Epidemiologic factors in measles prophylaxis J A M A. 104 991 1935
- Morales E G and Mandry O C Relative prophylactic value of convalescent and immune adult measles serum Am J Dis Child 39 1214 1930
- Park, W H and Freeman R G Jr Prophylactic use of measles convalescent serum. J A M A 87 555 1936
- Levinson S O McDougall D, and Thalheimer W Use of convalescent serum for prevention and attenuation of measles Illinois M J 63 253 1933
- Nabarro D N and Signy A G Convalescent serum in prophylaxis of measles Brit M J 1 12 1931 Prevention and control of measles scarlet fever and diphtheria in institutions and the home Brit M J 2 599 1931
- McKhann C F Ann Int Med In press

CHAIRMAN GARLAND I think we will reserve discussion of these papers until they have all been delivered

The next paper on the program concerns the control of pertussis, by Dr Francis C McDonald, of the Boston Floating Hospital

# WHOOPIING COUGH\*

## With Particular Reference to Prophylaxis and Treatment With Vaccines

BY FRANCIS C MC DONALD, M D †

A T a similar meeting held also on a Wednesday morning in the first week of June, nineteen years ago, Dr John Lovett Morse spoke on "Whooping Cough The Measures to be Taken for its Control and Prevention." In the

nineteen years since that time there has been some improvement in that both the medical profession and laity now seem to realize the seriousness of the disease and do not consider it a "trifling affair" which latter attitude apparently greatly disturbed Dr Morse<sup>1</sup>

\*From the Boston Floating Hospital and the Department of Pediatrics Tufts College Medical School  
Read at the Annual Meeting of the Massachusetts Medical Society Section of Pediatrics June 5 1935

†McDonald Francis C—Assistant to the Physician in Chief Boston Floating Hospital For record and address of author see "This Week's Issue" page 240

There has been a steady decline in the death rates of the four major communicable diseases of childhood, but this has been disproportionately less for whooping cough and measles as

compared with scarlet fever and diphtheria and has resulted in whooping cough now assuming a greater relative importance as a factor in deaths from these infectious diseases. Between 1901 and 1930, in six countries whooping cough was responsible for a third or more of the deaths from the four infectious diseases mentioned. About ten thousand children under fifteen years of age die each year from whooping cough in this country. Roughly, six thousand die in the first year of life, three thousand from the first to the fifth year and one thousand from the fifth to the fifteenth year.<sup>2</sup>

When we consider seriously the use of a specific bacterial vaccine for increasing the resistance of the host against a specific disease process, we should feel fairly certain that the microorganism from which the vaccine is made is the cause of that disease. It is necessary then in a discussion of this type for us to review briefly certain labors on the etiology of whooping cough, particularly those relative to the major controversies.

Bordet in 1900, described tiny ovoid gram negative micrococci which were constant in their appearance and showed bipolar staining by toluidine phenol blue, and were recovered from the sputum of patients suffering from whooping cough. When other workers agreed with these observations, but on culture recovered influenza-like bacilli which were dissimilar in many ways from the organisms seen on direct observation he was stimulated to further investigation on the same subject. In 1906, together with Gengou he published a paper entitled "Le Microbe de la Coqueluche" in which they described the organism before and after culture, and suggested that the organism changed somewhat on prolonged growth. They also noted in guinea pigs the low general toxicity for a bacterial emulsion in contrast to its definite local necrotizing irritation reaction. It is also interesting to note that Bordet in this article commented upon the fact that studies of patients having this disease were less apt to be clouded by undesirable variables if observed in their own homes rather than in hospital units. In later papers he emphasized again that the organism changed its antigenic properties when grown for a long time on artificial media.<sup>3</sup>

In 1912, Mallory and Hornor described gram negative bacilli between and upon the cilia and bronchi in fatal pertussis. While attempting to prove the relationship of *B. pertussis* by further animal inoculations, it was found that in animals *Bacillus bronchisepticus*, considered by some to be the causative organism of distemper, may be easily confused with *B. pertussis* (There have been rare cases of bronchisepticus infections reported in human beings with symptoms that resemble pertussis). These two organisms differ only in that the *B. bronchisepticus* is motile and grows more rapidly on some media.

They even have some agglutination phenomena in common. The antiserum of *B. bronchisepticus* will agglutinate both *B. bronchisepticus* and old strains of *B. pertussis*. On the other hand *B. pertussis* antiserum will only agglutinate *pertussis bacillus*.<sup>4 5 6 7 8 9 10 11</sup>

Such discoveries called for a revaluation of all animal transmission experiments in which the disease distemper may have confused the results.

Workers again became less certain of the completeness of their knowledge of the cause of whooping cough when a series of studies on filtrable viruses indicated that some disease processes that were formerly considered to be caused by organisms of the same general family as *B. pertussis* were apparently caused by the concerted action of a filtrable virus and influenza like organisms. This is most clearly illustrated by Shope's work on Swine Influenza. Also studies on distemper, particularly those by Land law and Dunkin, now seem to indicate that this is primarily a virus disease and that other organisms, including *B. bronchisepticus*, are secondary invaders. These observations were applied, mainly by McCordock, to diseases giving similar pathological pictures in man. Whooping cough, measles and epidemic influenza are frequently complicated by a type of interstitial pneumonia that can be reproduced in animals by injecting vaccine virus together with a suspension of various types of bacteria. This together with the finding of inclusion bodies in the tissues of fatal cases of whooping cough, in a relatively higher percentage than in similar control series, has led McCordock and others to suspect that whooping cough, especially when pneumonia is a complication, may be the result of a virus and *B. pertussis* complex.<sup>12 13 14 15 16 17 18 19 20 21 22 23</sup>

An experiment made on four human beings by MacDonald and MacDonald is surprisingly simple, direct and convincing. A filtrate of a young culture of *B. pertussis* was instilled into the nasopharynx of all four human beings (two of whom had previously been given prophylactic inoculations of vaccine by Sauer's method) and they were quarantined for eighteen days without developing any unusual symptoms. Then a suspension containing about one hundred and forty *B. pertussis* organisms was instilled in each nasopharynx in the same manner as above. The two individuals who had not previously had vaccine prophylaxis developed definite symptoms and clinical, bacteriological and immunological signs of whooping cough. While this experiment leaves us with a feeling that whooping cough is not caused by the filtrate alone and that *B. pertussis* is the cause of the disease, contending investigators claim that it does not completely disprove the theory that it is caused by a combination of the virus and the Bordet Gengou bacillus. To settle this question much arises from the better history.

cently cultured organisms may carry the virus or that the virus may still have been present in the nasopharynx after the allowed eighteen day interval (see above), Shibley subcultured B pertussis organisms in their active phase over sixty times during several months. The virulent, frequently subcultured organisms produced symptoms and signs of whooping cough in the experimental animal. The author believes that frequently subculturing effectively separated these organisms from any virus that may have been present in the original culture.<sup>24 25</sup>

In summarizing the known, direct evidence, the following three facts were emphasized by Miller in 1933

- 1 The close association of the Bordet-Gengou bacillus with cases of whooping cough

- 2 The absence of the organism in the cough droplets of healthy individuals who are not in contact with cases of pertussis

- 3 The great frequency with which the organism is isolated in the catarrhal stage, the time observed to be most contagious, and the subsequent diminishing frequency which parallels the observed degree of communicability.<sup>26</sup>

MacDonald and MacDonald's human transmission experiments and Rich's, Sauer's and Shibley's animal transmission experiments would make a potent addition to Miller's triad.

We may conclude from this brief survey of the available evidence as concerning the etiology of whooping cough that there are no strong indications that the Bordet-Gengou bacilli are not the cause of the disease. The burden of proof lies with those claiming that a filtrable virus is responsible.

Nicolle and Connor in 1913, are usually given credit for first using a vaccine made from Bordet-Gengou bacilli on a fair-sized group of patients. They used it in a small epidemic in Tunis. Their vaccine was made from organisms recovered from the early cases for treatment of later cases in the same epidemic. In this country Graham of Philadelphia, and Maynard Ladd of Boston, reported their experiences with pertussis vaccine on a relatively few cases in 1911 and 1912. From this time on the reports were numerous and conflicting. Jones in 1928, and Lawson in 1932, submitted theses to the Harvard School of Public Health on whooping cough which carefully appraised the available evidence. Their work was carried on under the supervision of a Whooping Cough Committee appointed in 1925, consisting of Drs. George H. Bigelow, Francis X. Mahoney, Hans Zinsser, Kenneth D. Blackfan, Lawrence Smith and Richard Smith. General conclusions based on this Committee's appraisal of vaccine therapy taken largely from a series of patients studied in The Boston Floating Hospital together

with an appraisal of the literature, especially that published by members of the New York City Department of Health, are as follows.<sup>27 28 29 30 31 32, 33 34 35</sup>

- 1 The homemade vaccines made from several recently acquired fresh cultures seemed to have been more effective than most stock vaccines

- 2 Therapeutic results, if any, were obtained when the vaccine was given early in the disease. Most observers agreed that after the patient had been coughing a week or more vaccines were of little avail.

- 3 Larger bacterial dosages were thought advisable

- 4 It was agreed that heat killed vaccines were not so effective as chemically killed ones

- 5 Prophylactic administration appeared more rational and seemed more effective than did therapeutic. However, no controlled prophylaxis by vaccine, allowing a reasonable time interval before exposure, was attempted until Madsen's and Sauer's experience

- 6 Most all experienced workers recognized and described the difficulty of making a fair and just estimate of the therapeutic effect. In addition to the variable factors in the disease itself they recognized the unreliability of histories as given by parents. Luttinger illustrated this with the following remarks: "A case free from attacks all day long, having few paroxysms of coughing at night loud enough to awaken the father may be described as a severe case, whereas, another child with frequent severe paroxysms during the day who sleeps through the night leaves the father more indifferent. Young mothers may describe an example of coughing as unusually severe and disturbing. The same attack is trifling to the experienced matron." Histories often must be relied upon for clinical appraisal as not infrequently a really ill child may spend some time in a clinic without demonstrating the symptoms observed in the home.

Von Sholley, Blum and Smith, also of the New York City Health Department, questioned the psychological element in therapy and found that nonspecific influenza vaccine and milk-colored water were as effective as the pertussis vaccines they had been using. This same group of workers pointed out that 24.8 per cent of seven hundred non-vaccinated children who were exposed in their homes escaped the disease.

The fact that some experienced clinicians were favorably impressed by definitely good results from some vaccines and disappointing results from others together with a general realization in research laboratories that all cultures of pertussis bacteria did not behave alike prompted a series of investigations (Krumwiede, Leslie and Gardner) which reaffirmed Bordet's orig-

inal observation that the bacillus changed its antigenic powers when cultured and recultured outside of its host particularly if grown on media free from hemoglobin.<sup>26 27 28 29</sup>

Thus together with the favorable observations of clinical groups who were using vaccines on a large scale made from several recently isolated strains grown on hemoglobin enriched media (mainly in Denmark), revived the waning interest in the use of pertussis vaccines. Madsen's convincing Cutter Lecture given in Boston in 1926 describing the Danish experience was largely responsible for renewed activity in this country.<sup>40 41</sup>

At the present two vaccines are receiving the greatest attention. They are the vaccine introduced by Krueger and the vaccine introduced by Sauer.

Krueger was impressed by the work of several men which seemed to indicate the importance of the antigenic properties of intracellular constituents of bacteria and emphasized the danger of denaturation of antigenic factors by heat and chemicals. (Sauer's vaccine is killed by 5 per cent phenol.) Krueger places a bacterial suspension previously grown on media enriched with human blood in a mechanical grinder for ten to twelve hours. The ground material is taken up in buffered saline and this suspension is passed through an acetie collodion membrane which is supposed to permit the passage of a "finely dispersed phase" of the organisms and exclude "cell metabolites." A water clear filtrate is obtained, whereas, the original material was an opalescent suspension.<sup>42 43</sup>

This method has raised the following questions in the minds of some bacteriologists.<sup>44</sup>

If the filtrate is water-clear, is one certain that "cell metabolites" are the only masses filtered out? And after the use of these additional procedures how can one be certain of the dosage?

The clinical results following the use of this vaccine have been reported by Frawley, Stallings and Nichols, Munns and Aldrich. Their studies have been largely confined to current epidemics. Prophylactic treatment when given was within the time range of the epidemic and was not effective. Diagnoses were checked by accepted laboratory methods but the results of therapy and prophylaxis are recorded on the basis of subjective symptoms reported by patients. The results as given indicate that the disease was definitely milder and less severe in those cases receiving either prophylactic or therapeutic treatment before the end of the first week. The symptoms were relatively more severe in direct proportion to the duration of the disease before the administration of the vaccine. Reports of this sort are subject to the same difficulties of precise appraisal as were most of those between 1912 and 1928.<sup>45 46 47 48</sup>

The vaccine that has excited the most interest in this country recently is that being used by Sauer. His experience in clinical and experimental pertussis extends back to 1918. He used the stock vaccines for ten years with about the same uncertain results that most of the practitioners in this community obtained. He then used a freshly prepared one of his own on one hundred cases after the onset of the disease with unsatisfactory results. From 1928 on, he apparently attacked the problem with a vengeance and seems to have humbly accepted and tried most all of the important suggestions of previous workers even to giving the study of children in their home environment a large place in his series.<sup>49 50 51 52 53 54 55 56 57 58</sup>

His knowledge of the parents, the past histories, and the environment of the greater portion of his patients was detailed and personal as they were members of families in his own private practice in his own community. If the greater part of the study were concerned with history and symptoms as given by the parents, this knowledge used properly would tend to minimize the personal equation so far as the parents were concerned. However, a study of prophylaxis resolves itself into determining whether or not the child or the child's contacts have whooping cough rather than an evaluation of the severity of the disease.

The organism from which the vaccine is made grows best on a potato-glycerine hemoglobin media, only slightly different from that first described by Bordet. Realizing that pertussis is largely a disease of man, and recognizing the tendency of the organism to change its antigenic properties on subculture on other than a "hemoglobin" media, Sauer uses defibrinated human blood instead of defibrinated animal blood. This enables him to dispense with additional, centrifuging and washing measures which would be necessary to remove excess foreign blood protein after the bacterial harvest had been scraped off the media made with foreign blood. He thinks this also lessens the chance of immediate systemic or cutaneous reactions or of sensitization to the animal protein. The human blood is obtained from delivery rooms by collecting cord blood which is ordinarily discarded. The organisms are diluted with normal saline and killed by 5 per cent phenol.

Sauer's vaccine is diluted until 1 cc. contains approximately ten billion organisms. A total of eight cubic centimeters is generally given to each patient making a total dose of eighty billion bacteria as compared with the twenty to twenty five billion given by Madsen in Denmark and to the seven hundred million to four billion range during the 1912 and 1928 period in this country. At the present time Sauer gives the 8 cc. by three weekly subcutaneous injections (he avoids injecting in pre-

viously injected areas), 1 cc, 15 cc and 15 cc are given into each arm each respective week. The series is given during the non-epidemic period and completed at least four months before expected exposure.

His main results four months to seven years after injection as reported in an address to the New England Pediatric Society this spring were as follows:

One thousand two hundred and nine individuals were vaccinated, with sixty-two definite exposures and 152 casual exposures with six resulting cases of whooping cough. Three of the six contracted the disease shortly after recovery from measles. (This does not include an institution series of 400.)

Sauer, himself, has emphasized the need of further studies over a relatively longer period of time. As the majority of the group mentioned above have been inoculated since January of 1933 we are particularly interested in the subsequent history of his first group of 394 patients first reported upon in January 1933, which group had been inoculated during the five preceding years. Of the 394 individuals twenty-seven were from families having one or more other children, thirty-one of whom were left uninoculated as controls. All thirty-one of these controls contracted pertussis while all except one of their inoculated brothers and sisters lived with them throughout the incubation, catarrhal and paroxysmal stages without contracting the disease. Of the remainder of the original 394, 124 were reported to have been definitely exposed to the disease, yet none contracted it.

The Council on Pharmacy and Chemistry of the American Medical Association reconsidered vaccines of B. pertussis (Sauer's) in March 1934, after having previously omitted them from New and Nonofficial Remedies in 1931. They granted that Sauer's work appeared promising, but before rerecognition of the value of pertussis vaccine expressed a desire that a larger series of cases be collected and that they be gathered from a less localized geographical area.<sup>10</sup>

The Michigan Board of Health and the commercial laboratories are now manufacturing vaccines following Sauer's method. However, in making them on a large scale they find it difficult to collect human blood in sufficient quantities for use in the potato-glycerine media. Hence, animal blood is being used in the preparation of these vaccines. Kendrick, representing the Michigan State Board of Health, sees no reason why animal blood should not be used. Sauer still feels that until the value of the vaccine has been proved more definitely the technique of manufacture should not be altered. At the present time he does not use his vaccine for other than prophylaxis. This is in agreement with past clinical experience and with the

general feeling of many bacteriologists that the development of immunity as stimulated by vaccines is a matter of several weeks rather than of a few days.

In conclusion, while we cannot ignore the possibility that a filtrable virus may play a part in the disease picture, the proponents of vaccine prophylaxis have offered a program that gives promise of preventing whooping cough in the young patient. A question that naturally arises is: Are there any serious contraindications to the use of the vaccine? Two deaths are reported in Madsen's series in infants vaccinated because there was whooping cough in the immediate family. One was newly born. Four days after an inoculation of 1 cc, a second of 15 cc was given, thirty minutes later the patient died with hiccoughs, cyanosis and contracture of the extremities. The second fatality occurred in an eight day old premature infant. The first inoculation was 1 cc, the second 2 cc after a three day interval. Two hours later death occurred suddenly with slight cyanosis.

These deaths, particularly the latter, occurred in an uncertain age period where the vaccine may have played no direct part in the fatalities. However, the use of the vaccine made from organisms grown on media enriched with human blood prepared as advocated by Sauer appears reasonably safe and rational if given after the seventh month of life with the series completed at least four months before exposure. Sauer does not think that immunization should be attempted very soon after recovery from other diseases (N.B. measles) or within several months of other immunization (Diphtheria, smallpox, scarlet fever).

The Bordet-Gengou bacillus does play an important rôle in the disease picture of whooping cough. While vaccine therapy appears to be of doubtful value, vaccine prophylaxis as outlined by Sauer offers definite promise. However, several years of further use will be necessary for final evaluation.

#### REFERENCES

1. Morse John Lovett. Whooping cough: the measures taken for its control and prevention. Boston M. & S. J. 175 723 1916.
2. Epidemiological Report Health Commission—League of Nations. Relative importance of the principal infectious diseases of childhood. R. E. 173 (May June) 1934.
3. Bordet J. et Gengou O. Le microbe de la coqueluche. Ann. de l'Inst. Pasteur 20 731 1906.
4. Bordet J. et Sleswyk Sérodiagnostic et variabilité des microbes suivant le milieu de culture. Ann. de l'Inst. Pasteur 24 476 1910.
5. Mallory F. B. and Horner A. A. Pertussis: the histological lesion in the respiratory tract. J. M. Research 22 115 1912-13.
6. Mallory F. B. Horner A. A. and Henderson, F. F. The relation of the Bordet-Gengou bacillus to the lesion of pertussis. J. M. Research 22 391 1912-13.
7. Smith T. Some bacteriological and environmental factors in the pneumonias of lower animals with special reference to the guinea-pig. J. M. Research 24 291 1913-14.
8. Mallory F. B. The pathological lesion of whooping cough. Boston M. & S. J. 169 378 and 675 1913.
9. Rhea Lawrence J. The comparative pathology of the tracheal and bronchial lesions produced in man by B. pertussis (whooping cough) and those produced in dogs by B. bronchisepticus (canine distemper). J. M. Research 27 471 1915.

10. Ferry C S and Noble A. Studies relative to the apparent close relationship between b. pertussis and b. bronchopneumoniae. *J. Infect. Dis.* 3: 192, 1917.
11. Torrey J G and Rabe, A. H. Studies in canine distemper. *J. M. Research* 2: 1291, 1912, 13.
12. Brown, J. H.: Bacillus bronchopneumoniae infection in a child with symptoms of pertussis. *Bull. Johns Hopkins Hosp.* 33: 147 (Feb.) 1925.
13. Duran Reyes, J. The effect of extracts of certain organs from normal and immunized animals on the infecting power of vaccine virus. *J. Exper. Med.* 50: 377, 1925.
14. Shope Richard L.: Swine influenza. *J. Exper. Med.* 64: 219, 261, 372, 1931.
15. McCracken, R. S., McCordock, H. A. and Harter J. A study of vaccine virus pneumonia in rabbits. *Am. J. Path.* 7: 64, 1931. *Ibid.* 8: 53, 1932.
16. McCordock, H. A., and McCracken, R. S. The similarity of virus pneumonia in animals to epidemic influenza and interstitial bronchopneumonia in man. *Am. J. Path.* 9: 2-1, 1933.
17. McCullum W G. Pathology. *J. A. M. A.* 70: 1153 (Apr.) 1918.
18. McCordock, H. A. and Smith Margaret G. Intracellular inclusions; incidence and possible significance in whooping cough and in a variety of other conditions. *Am. J. Dis. Child.* 47: 1771, 1933.
19. McCordock, H. A.: Intracellular inclusions in pertussis. *Proc. Soc. Exper. Biol. & Med.* 29: 1233 (June) 1933.
20. Rich A. H.: On etiology and pathogenesis of whooping cough. *Bull. Johns Hopkins Hosp.* 51: 346 (Dec.) 1932.
21. Rich A. R., Long, P. H.; Brown, J. H.; Bliss E. A. and Holt, L. E., Jr. Experiments upon cause of whooping cough. *Science* 76: 322 (Oct. 7) 1932.
22. Laidlaw P. P., and Dunkle G. W. Studies in dog distemper. *J. Comp. Path. & Therap.* 39: 21, 213, 194, 411 (Mar. 31) 1917, 441 (Mar. 31) 1931.
23. Green, R. G.: Distemper in the silver fox. *Proc. Soc. Exper. Biol. Med.* 25: 676, 1928-29.
24. MacDonald, H., and MacDonald E. J.: Experimental pertussis. *J. Infect. Dis.* 63: 18 (Nov. Dec.) 1932.
25. Shibley J. S.: Etiology of whooping cough. *Proc. Soc. Exper. Biol. & Med.* 31: 576 (Feb.) 1934.
26. Miller J. J.: Etiology of whooping cough. *J. A. M. A.* 100: 481 (Mar. 4) 1933.
27. Nicole Compt. Rend. Acad. d. sc. Paris 46: 1219, 1917.
28. Graham, E. C. The treatment of pertussis with vaccine. *Am. J. Dis. Child.* 3: 41 (Jan.) 1912.
29. Ladd, M. Vaccines in the treatment of pertussis. *Arch. Pediat.* 24: 483 (Mar.) 1912.
30. Marret R. Present situation in France of biological prophylaxis and treatment in certain contagious diseases, especially whooping cough and measles. *Proc. Roy. Soc. Med.* 6: 1229, 1933.
31. Jones, John L.: A study of certain aspects of whooping cough. Thesis submitted to the faculty of the Harvard School of Public Health April 18, 1928.
32. Lawson, George M.: Studies on bacillus pertussis. Thesis submitted to the faculty of the Harvard School of Public Health July 1932.
33. Luttinger, Paul. Whooping-Cough; its treatment and prophylaxis based on the Bordet-Gengou etiology. *N. Y. Med. J.* 101: 1043 (May 22) 1916.
34. Von Sholley A. I., Blom, J., and Smith, L. Therapeutic value of pertussis vaccine in whooping cough. *J. A. M. A.* 63: 1451 (Mar. 19) 1917.
35. Hess, A. F. The use of a series of vaccines in the prophylaxis and treatment of an epidemic of pertussis. *J. A. M. A.* 63: 1907 (Sept. 19) 1914.
36. Povitzky O. H. Improved methods for isolation and later cultivation of b. pertussis. *J. Infect. Dis.* 3: 8 (Jan.) 1922.
37. Mishulow L., Oldenbusch, C., and Roholl M. Potency of stored pertussis vaccines. *J. Infect. Dis.* 41: 169 (Aug.) 1927.
38. Krumholz C.; Mishulow L., and Oldenbusch C. Existence of more than one immunologic type of b. pertussis. *J. Infect. Dis.* 32: 2, 18, 2.
39. Leslie P. H., and Gardner A. D. Phases of haemophilus pertussis. *J. Hyg.* 31: 433, 1931.
40. Madsen, T. Whooping cough; its bacteriology, diagnosis, prevention and treatment. Boston M. & S. J. 19: 50 (Jan. 2) 1926.
41. Madsen T.: Vaccination against whooping cough. *J. A. M. A.* 101: 187 (July 15) 1933.
42. Krueger A. P. Method for preparation of bacterial antigen. *J. Infect. Dis.* 32: 237, 1932.
43. Krueger A. P., Nichols W. C., and Frawley J. M.: Preparation of active adjuvanted antigen from hemophilus pertussis. *Proc. Soc. Exper. Biol. & Med.* 30: 1097 (May) 1933.
44. Thorngill Lefroy: Personal Communication.
45. Frawley J. M. Immunization of school children against whooping cough. *J. Pediat.* 4: 1116 (Feb.) 1934.
46. Frawley J. M., Stallings, M., and Nichols W. C.: New pertussis antigen preliminary clinical report. *J. Pediat.* 4: 1178 (Feb.) 1934.
47. Monna, G. P., and Aldrich C. A. Hemophilus pertussis endoantigen (Krueger) uses in 12 cases. *J. Pediat.* 5: 599 (Nov.) 1933.
48. Stallings M. and Nichols, W. C. Treatment of whooping cough with active unadjuvanted antigen. *Am. J. Dis. Child.* 48: 1113 (Dec.) 1934.
49. Sauer L. W. and Hambrecht L. Whooping cough vaccine therapy or early diagnosis. *J. A. M. A.* 91: 1861 (Jan. 2) 1928.
50. Sauer L. W. and Hambrecht L. Experimental whooping cough. *Am. J. Dis. Child.* 37: 733 (Apr.) 1930.
51. Sauer L. W., and Hambrecht, L.: Whooping cough; site of the lesion. *Arch. Path.* 8: 944 (Dec.) 1930.
52. Sauer L. W. and Hambrecht, L.: Whooping cough early diagnosis by the cough plate method. *J. A. M. A.* 92: 355 (July 26) 1930.
53. Sauer L. W.: Whooping cough résumé of a 7 years' study. *J. Pediat.* 2: 749 (June) 1933.
54. Sauer L. W.: Whooping cough study in immunisation. *J. A. M. A.* 100: 329 (Jan. 28) 1933.
55. Sauer L. W. Immunization with bacillus pertussis vaccine. *J. A. M. A.* 101: 1449 (Nov. 4) 1933.
56. Sauer L. W.: Preparation of bacillus pertussis vaccine for immunization. *J. A. M. A.* 10: 1471 (May 8) 1934.
57. Sauer L. W. Immunization against whooping cough. *Am. J. Dis. Child.* 49: 69 (Jan.) 1935.
58. Sauer, L. W.: Whooping cough and its prevention. Read at the New England Pediatric Society March 22, 1935.
59. Preliminary report of the Council on Pharmacy and Chemistry: Pertussis vaccine. *J. A. M. A.* 10: 1692 (Mar. 2) 1934.
60. Kendrick, P. and Edlering, G. Significance of bacteriological methods in diagnosis and control of whooping cough. *Am. J. Pub. Health* 8: 147 (Feb.) 1935.

CHAIRMAN GARLAND The third paper on the program will be on scarlet fever by Dr. Gaylord W. Anderson, Director of the Division of Communicable Diseases of the State Department of Public Health.

## THE PRESENT STATUS OF SCARLET FEVER PREVENTION\*

BY GAYLORD W. ANDERSON, M.D.†

TWELVE years have now elapsed since the Dicks announced their basic scarlet fever studies showing the etiological relationship of certain hemolytic streptococci\* to the production of a toxin injection of which might be used in small quantities to determine susceptibility\* and in large doses to enhance the human resistance\* and the production of a specific antitoxin which might be used for the treatment of the disease\*. The ensuing years have seen a large number of subsequent studies and the presentation

of much material the exact interpretation of which is far from clear, yet so far as I am aware, none of it has upset any of the fundamental facts originally established.

In attempting at this time to bring before you a brief critical analysis of the present status of scarlet fever prevention, it seems best that the conclusions should be based solely upon the findings of other observers than the Dicks and their immediate associates\*. My decision to do so was based primarily on the thought that the true practical value of such methods lies not in the results claimed by those originators who may have acquired special skill in a certain technique and who because of a pardonable pride in achievement may unwittingly view all doubtful data in their best possible light but

\*From the Massachusetts Department of Public Health. Read before the Section of Pediatrics at the One Hundred and Fifty Fourth Annual Meeting of the Massachusetts Medical Society, Boston, June 19, 1935, as part of a symposium on the control of certain communicable diseases.

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rather in the results obtained by others less familiar with the technique and approaching the problem without the least element of possible prejudice. They who come to criticize but remain to applaud are the best supporters of any cause. I have further thought it better to omit the results claimed by the Dicks because unfortunately many of the articles are so lacking in the details essential for a critical analysis as to leave doubt as to the exact value of the figures. This doubt is enhanced by claims which, if substantiated, would place the Dick test and the immunizing toxin in a separate class by itself, far superior in reliability and value to any other known biologic agents, a rating that cannot be accorded to them by the findings of other observers no matter how favorable their results. It has, therefore, appeared wise to base our opinions solely on the work of investigators other than those associated with the Scarlet Fever Committee.

#### THE DICK TEST

The first problem that must be considered is the reliability of the Dick test as an index of immunity to scarlet fever. To what extent can it be said that a person with a negative Dick test is immune to the disease? Studies of hospital nurses and internes, the majority of whom are at one time or another exposed to scarlet fever, furnish probably the most severe test. Thus Knights<sup>24</sup> on the basis of a one year's experience with a small group in Providence reports an attack rate of 2.1 per cent among the Dick negative nurses as contrasted with a rate of 18 per cent for the Dick positive. Peacock, Werner and Colwell<sup>25</sup> in Chicago report only one questionable case of scarlet fever among 186 nurses with a negative test, and two out of five whose test was positive. Faulds<sup>26</sup>, at the Royal Infirmary in Glasgow, found no cases among 298 Dick negative nurses for a three year period. Boynton<sup>27</sup>, studying the nurses in the University of Minnesota School of Nursing, found one case among 376 negative reactors, whereas seven of 619 that were neither tested nor immunized contracted the disease. Toyoda<sup>28</sup> and his associates working in Japan, found no cases among 157 immune hospital attendants and ten cases in forty-three susceptibles. In Edinburgh, Benson and Rankin<sup>29</sup> report but five cases among 1,063 negative reactors intimately exposed to the disease and fifty-two cases among 363 Dick positives who were in general less intimately exposed. In a survey of the hospitals in Massachusetts, Anderson and Reinhardt<sup>30</sup> found for a period ranging from one to eight years only nine cases of scarlet fever in 1,337 nurses with a negative reaction, whereas thirty out of 234 (12.8 per cent) of those who had a positive test and were not immunized contracted the disease.

These results from a group whose exposure to scarlet fever has been unusually intimate indi-

cate a high degree of specificity for the Dick test. The results are substantiated by institutional and community studies. Probably the largest series is that of Sparrow<sup>31</sup> who tested 23,657 children in Warsaw during 1925 to 1927, of whom forty-five per cent, were Dick negative. During the ensuing winter, when scarlet fever was at a high level, there were but four cases

TABLE 1  
RELIABILITY OF DICK TEST  
AMONG NURSES

Observer	Dick Neg	Cases of S F	Rate	Dick Pos	Cases of S F	Rate
Knights	143	3	2.1	22	4	18%
Peacock, etc	186	1	0.5	5	2	40%
Faulds	298	0	0	—	—	—
Boynton	376	1	0.3	—	—	—
Toyoda et al	157	0	0	43	10	23%
Benson and Rankin	1063	5	0.5	363	52	14%
Anderson and Reinhardt	1337	9	0.7	234	30	13%
	3560	19	0.5	667	98	15%

in this immune group as contrasted with 127 in the susceptible group. Nesbit<sup>32</sup> has found comparable data in the school system of Gary, Indiana, one year's observation showing no cases of scarlet fever in a group of approximately 1,000 spontaneously immune children. Albescio<sup>33</sup> reported an attack rate of 0.2 per cent among 3,051 Dick negative Roumanian children, as compared with 4.6 per cent among an unimmunized Dick positive group. Kiefer<sup>34</sup>, Molitch<sup>35</sup> and others have reported comparable results in institutions. In Japan, however, Toyoda and his associates<sup>28</sup> found forty-eight cases among 7,186 Dick negative school children, an attack rate of 0.7 per cent, as contrasted with 209 cases (4.4 per cent) in a group of 4,733 susceptibles. They<sup>36</sup> quote the experience of Ozaki, likewise in Japan, who found an attack rate of 10.6 in a small susceptible group as contrasted with a rate of 0.1 in a Dick negative group of 1495 children. Similarly, in a group of home contacts, Toyoda<sup>28</sup> reported no cases among seventy-three immunes and six, or 11.5 per cent, among fifty-two susceptibles. More recently Gordon and his associates<sup>37</sup>, working in Detroit, found in a study of family contacts an attack rate of two per cent among 723 Dick negatives, as contrasted with thirteen per cent among 566 susceptibles.

These results have been selected as typical examples of the findings of investigators in many different places. While they differ slightly in the exact degree of immunity indicated by a negative Dick test, they all agree, however, in indicating that the Dick test is in practice an extremely sensitive measure of resistance to clinically recognizable scarlet fever. It is true that

failures of the test will be encountered, but in this respect it differs in no regard from the Schick test. As a measure of human resistance to the disease it is therefore an extremely valuable and reasonably reliable addition to our control procedures.

TABLE 2  
RELIABILITY OF DICK TEST  
COMMUNITY STUDIES

	Dick Cases Neg of S F	Rate	Dick Cases Pos of S F	Rate
Sparrow	10 600*	4 0 04%	13 000*	127 10 4%
Nesbit	1 080	0 0	—	—
Albesco	3 051	7 0 2	329	15 4 6
Toyoda	7 186	48 0 7	4 733	209 4 4
Ozaki	1 495	2 0 1	47	5* 10 6

Figure calculated from author's data

TABLE 3  
RELIABILITY OF DICK TEST  
FAMILY CONTACTS

	Dick Cases Neg of S F	Rate	Dick Cases Pos of S F	Rate
Toyoda	63	0 0%	52	6 11 5%
Gordon	723	15 2	566	73 13

#### PASSIVE IMMUNIZATION

Passive immunization is possible through the use of three different products. Antitoxin originally recommended by the Dicks, will unquestionably give a protection lasting from two to four weeks. It has, however, fallen into more or less disrepute because of the subsequent serum reactions which are frequently more severe than the prevailing type of scarlet fever. There is, however, no doubt as to its efficacy. Blood serum from those convalescent from the disease may likewise be used where obtainable. Here also there is little doubt as to its efficacy if used in sufficient quantities, though the optimum dosage for different patients has not been determined. Meader<sup>23</sup> reported an eighty per cent reduction of secondary cases through a

dosage of 75 cc, though Gordon<sup>22</sup> finds larger doses preferable. The principal problem here, however, is that of obtaining enough serum for the needs of a community. More recently McKhann<sup>10</sup> has demonstrated a similar protective action from an extract of the placenta. All of these methods confer, however, merely a temporary protection and are of no lasting value.

#### ACTIVE IMMUNIZATION

Evaluation of the results obtained through active immunization using graduated doses of the Dick toxin is extremely difficult because of variations encountered in the dosages used. The early work of the Dicks and others must be largely disregarded because the dosages used were so small as compared with the present-day schedule that the results are not comparable. Yet in spite of the improvements coming from larger doses, one cannot help wondering if the advantage of improved level of protection may not have been outweighed by the obvious disadvantages of reactions and number of injections.

The protection obtained from these injections can be measured either in terms of their effect on the Dick test or the protection conferred to subsequent exposure to the disease. It can be generally stated on the experience of many different observers that the present-day dosages of 500, 2,000, 8,000, 25,000 and 80,000 skin test doses (S.T.D.) will cause a positive Dick test to become negative in about 90-95 per cent of the persons so treated. With smaller doses the percentage will fall off though by no means proportionately to the decrease in units.

The clinical evidence as to the immunity so established is best measured in the groups of hospital attendants. In table 4 are summarized many of the data now available. Although there was some variation in the doses of toxin used, the total number of units rarely fell below a total of 80,000. The difference between the low attack rate of 0.5 for the immunized nurses and fourteen per cent for the known susceptibles permits of no other interpretation than that the toxin injections have in reality conferred a high level of protection.

TABLE 4  
TOXIN IMMUNIZATION  
SCARLET FEVER ATTACK RATE AMONG NURSES

Observer	Immunized	Cases	Rate	Dick Pos	Cases	Rate	No Test	Cases	Rate
Knight <sup>24</sup>	28	0	0	22	4	18%	78	7	10 0%
Peacock et al. <sup>25</sup>	38	0	0	5	2	40%	—	—	—
Toyoda <sup>26</sup>	—	—	—	43	10	23%	—	—	—
Boynton <sup>27</sup>	164	0	0	—	—	—	619	7	1 1%
Platon <sup>28</sup>	149*	0	0	—	—	—	861	55	6 4
Benson and Rankin <sup>29</sup>	—	—	—	363	53	14%	—	—	—
Anderson and Reinhardt <sup>30</sup>	983	7	0 7%	234	30	13%	3787	118	3 1
	1360	7	0 5%	667	98	15%	5295	187	3 5%

Includes some children as well as nurses.

Similar data are available for community studies. Thus Nesbit and Thompson<sup>42</sup> report that in the Garv schools there have been approximately 10,000 given the toxin and during eight years only nine cases of scarlet fever among those who were negative on the retest Sparrow<sup>41</sup>, using dosages of but 3,500 S.T.D. found a reduction to one-fourth of that in the non-immunized group. Albescio<sup>43</sup> in Roumania, using small doses, never exceeding a total of 13,500 S.T.D. of toxin, found in two years an attack rate of 1.2 per cent among the immunized as compared with 4.6 per cent among a much smaller group of non-immunized susceptible children. Tovoda and his associates<sup>44</sup>, using dosages of 25,000 to 40,000 S.T.D., found an attack rate in Dairen of but 0.1 per cent among the immunized as contrasted with 6.2 per cent among the non-immunized. They also quote the experience of Ozaki, who found a rate of 0.3 per cent among the immunized and 2.4 per cent among the non-immunized. To these series might be added the experience of numerous institutions in this country and abroad showing that in the face of an outbreak those immunized with the Dick toxin were protected, although new admissions that were not so protected contracted the disease. It is therefore a fair statement to say that immunization with the Dick toxin in adequate doses confers to a person previously susceptible a level of resistance against clinically recognizable scarlet fever that is comparable to that shown by a negative Dick test, and furthermore, that this protection is probably comparable in effectiveness to that conferred against diphtheria through the use of the commonly accepted immunizing agents.

#### DURATION OF IMMUNITY

The exact measure of the duration of immunity is hard to determine because it usually is impossible to measure the extent to which the rapidly developed immunity produced by the toxin may have been maintained or enhanced by subsequent exposures to new infecting doses of the causative organisms. The results among nurses would suggest an immunity of at least three years though in this group especially there is, theoretically at least, opportunity for much reinforcement of the resistance through frequent exposures to subinfecting doses. Nesbit and Thompson<sup>42</sup> report eighty-one per cent immunity by Dick test among 171 children immunized five or more years previously while Bull<sup>45</sup> found sixty-four per cent negative and thirty-six per cent slightly positive among fifty immunized eight years previously. There are few published data available as to the permanence of a negative reaction among those found naturally immune. In studies carried on by the Department we have found in an institution where scarlet fever was not

prevalent that 644 or eighty-nine per cent of a group of 725 originally negative were still Dick negative four years later, a finding that compares quite favorably with similar studies of the permanence of a negative Schick test in a similar institution under similar conditions. On the other hand, of forty-one susceptible children left unimmunized in the same institution, thirty-one or seventy-five per cent were still susceptible at the end of four years.

#### REACTIONS

Whatever may be the differences of opinion as to the reliability of the Dick test and effectiveness of immunization with Dick toxin, there is a surprising unanimity of opinion as to the severity of the reactions encountered from the toxin injections. These reactions may be briefly described as nausea, vomiting, headache, fever, rarely sore throat and occasionally a typical scarlatiniform rash with or without desquamation. Most observers mention "severe" reactions in as high as ten to fifteen per cent of those so treated. These reactions have been sufficiently severe so that they have unquestionably militated against the ready acceptance of scarlet fever immunization in many instances. Thus many nurses have preferred to take their chances with the present mild form of the disease. In community programs there has been a markedly greater falling off in clinic attendance<sup>46</sup> than is encountered in similar diphtheria immunization programs. Melnick<sup>47</sup>, in institution work, was even prompted to recommend a "pre-immunization" preparation of a laxative, diet restricted to fruit juices, cereal, water, tea and toast on the day of the injection, restricted activities, and injection given at night and just before a week-end so as to avoid absence from school of those who would be in bed the following day. This latter is probably an extreme point of view, but the fact is inescapable that a definite percentage of those who are so treated will probably require bed care during the ensuing twenty-four to forty-eight hours. Unfortunately, it does not seem possible to avoid these reactions by reducing the dosage, as they have been described following doses that are but a fraction of that recommended by the Scarlet Fever Committee as needed for a lasting immunity. It is necessary, therefore, to turn to other types of preparations in search of immunizing agents that can be given without unpleasant reactions.

#### "TOXOID" IMMUNIZATION

Since the early days of toxin immunization many attempts have been made to modify the toxin in a manner comparable to that used in the preparation of diphtheria toxoid, in the hope of obtaining a potent immunizing agent that would at the same time be devoid of the

severe toxin reactions. Many preliminary but inconclusive reports have been published in this country and abroad, leaving the question still very much open to debate.

The most recent attempt in this country to produce a scarlet fever toxoid has been that of Veldee, who in 1930<sup>16</sup> and 1931<sup>17</sup> reported preliminary studies to this end, and in 1933<sup>18</sup> reported its use on several hundred children. Some of this work was carried on in collaboration with the Massachusetts Department of Public Health. Beginning with these studies in the fall of 1931 and continuing through the present day, the Department has been pursuing extensive studies of this formalized toxin solution prepared according to the methods of Veldee.<sup>18</sup> In the course of the studies we have Dick tested over 15,000 children and administered the material to 6,000 to 7,000 children. These studies have been carried on in twenty-seven different institutions in the nurses' training schools of several hospitals and more recently on a community wide basis in ten cities and towns. In some of these institutions the studies have been under way for about four years and in the majority for over two years. In two of the communities, over a year has now elapsed since the immunization work was completed and we are beginning to obtain results of real value. The work in the other communities has been concluded during the past winter or is at the present moment being finished so that no conclusions will be available for at least another year.

I am not prepared at the present moment to report to you in detail as to the results of these studies, other than in generalities. The material is being given in but three injections three weeks apart. The reactions it produces are no more severe than are encountered in diphtheria immunization and markedly less severe than with the Dick toxin. This is attested to not only by the physicians, superintendents, nurses and teachers who have seen its use, but also by the parents who have brought their children back for subsequent injections equally readily as for diphtheria. As measured by the Dick test the resulting immunity is not so high as obtained through the five doses of toxin, as recommended by the Dicks. Work of the past winter has strongly suggested, however, that after "toxoid" immunization, control tests with a heated toxin are essential to eliminate false positive reactions. These may give to the retests a more flattering appearance. The value of the "toxoid" when measured by the clinical test of protecting against clinically recognizable scarlet fever has been strikingly shown in a virtual absence of the disease from the institutions where it has been used. In the two communities where

it has been possible to evaluate results, there has been demonstrated a marked degree of protection for those children given the "toxoid." Clinically, therefore it is fair to say that at present it appears to offer an immunizing agent that, through its ready acceptance because of mild reactions, may be used so extensively as to lessen materially the incidence of scarlet fever even though the protection conferred in an individual case may be less than with the more powerful Dick toxin.

#### "SCARLATINAL TONSILLITIS"

In the midst of the studies of scarlet fever immunization the suggestion has frequently been advanced that immunization by protecting the individual against the rash would be followed by an increase in sore throats of streptococcal origin, which would in reality be scarlet fever without a rash or, as Benson has named them "scarlatinal tonsillitis". Kinloch, Smith and Taylor<sup>19</sup>, on the basis of a single year's experience, reported an increase in cases of tonsillitis among nurses after immunization has been carried on. Gordon and his associates<sup>20</sup> in a study of family contacts with cases of scarlet fever found that ten per cent of the Dick positives developed tonsillitis without rash whereas but 4.5 per cent of the Dick negatives had a similar experience, a rather surprising difference were the Dick test to indicate merely a resistance to the toxin and not to the infection itself. Benson and Rankin<sup>21</sup> in their studies at the City Fever Hospital of Edinburgh found no increase in tonsillitis among the probationer staff the preimmunization attack rate 1919-1925 being 22.1 as compared with a rate of 16.5 for the years 1926-1933 after immunization had become a routine. They have further studied the cross infection rate of scarlet fever to diphtheria patients as a test of the hypothesis that immunized nurses might more readily be carriers of the hemolytic streptococci of scarlet fever. Their results showed that during the preimmunization period 3.5 per cent of the diphtheria patients contracted scarlet fever, whereas during the years subsequent to the inauguration of scarlet fever immunization among the nursing staff only 2.1 per cent developed a cross infection of scarlet fever. They conclude that "there is no evidence that clinical scarlet fever has been replaced by 'scarlatinal tonsillitis' in successfully immunized nurses and an immunized nursing staff does not increase the risk of conveyance of scarlet fever to non scarlatinal patients." I know of no evidence that would prove the incorrectness of this statement.

#### SUMMARY

In summarizing this analysis of the present status of scarlet fever immunization I hope I may be pardoned if I express a personal estimate as to the value of the data here presented. Many of us, and I include myself among the group

<sup>18</sup>Recently the Dicks have questioned the existence of a true toxoid, maintaining that the immunizing effect of the solution is due solely to the residual toxin that has been unaffected by the formalin. Further studies are needed to clarify this situation.

have been so impressed with the reactions encountered from Dick toxin immunization that we have hesitated to recommend its use. This would be justifiable were it not for the fact that we have rationalized our hesitancy upon a doubt as to the validity of the Dick test and the efficacy of the toxin. The issues are in reality quite separate, but we have permitted them to become confused in our minds. We must, I believe, recognize that the Dick test is in reality a very reliable index of immunity to scarlet fever, little if any inferior to the Schick test in its own field. We should also acknowledge that with the Dick toxin susceptible persons can actually be protected against scarlet fever with a measure of success little short of that seen in diphtheria. Its only limitations are the reactions encountered which will probably for a long time to come make its use impractical on a community basis in public clinics. In institutions, and in the hands of the private practitioner, on the other hand, who can explain in advance the possibility of reactions and thus avoid alarm on the part of the parent, it offers an extremely effective means of scarlet fever control and is deserving of more extensive use than at present accorded to it.

## REFERENCES

- 1 Dick G F and Dick G H J A M A 81 1166 1923
- 2 Dick G F and Dick G H J A M A 82 801 1924
- 3 Dick G F and Dick G H J A M A 82 265 1924
- 4 Dick G F and Dick G H J A M A 82 544 1924
- 5 Dick G F and Dick G H J A M A 83 84 1924
- 6 Dick G F and Dick G H J A M A 82 1246 1924
- 7 Dick G F and Dick G H Am J Public Health 14 1022 1924
- 8 Dick G F and Dick G H J A M A 84 1477 1925
- 9 Dick G F and Dick G H Northwest Med 25 111 1926
- 10 Dick G F J Mich State Med Soc 26 351 1927
- 11 Dick G F Northwest Med 27 1 1928

- 12 Dick G F W Va Med J 24 441 1928
- 13 Hektoen L and Johnson C J Prev Med 2 289 1928
- 14 Dick G F and Dick G H Am J Dis Child 38 905 1929
- 15 Dick G H Illinois M J 57 22 1930
- 16 Dick G F Internat Clin 1 150 1930
- 17 Dick G F Kentucky M J 29 172 1931
- 18 Rhoads P S J A M A 97 153 1931
- 19 Rhoads P S J Iowa Med Soc 21 443, 1931
- 20 Dick G F M. Officer 49 75 1933
- 21 Dick G F and Dick G H Edinburgh M J 41 1 1934
- 22 Hektoen L and Johnson C J A M A 102 41 1934
- 23 Dick G H Journal Lancet 54 289 1934
- 24 Knights E M J Lab and Clin Med 14 614 1929
- 25 Peacock S C Werner M and Colwell C A J D C 44 494 1932
- 26 Faulds J S J Hyg 38 353 1933
- 27 Boynton R E Am J Nursing 34 330 1934 also Minn-esota Med 17 165 1934
- 28 Toyoda T Moriaki J and Futagi Y J Infect Dis 46 186 1930
- 29 Benson W T and Rankin A L K Lancet 2 1367 1934 see also Benson W T Edinburgh M J 35 617 1932
- 30 Anderson G W and Reinhardt W L J Inf Dis to be published
- 31 Sparrow H Presse méd 36 549 1928
- 32 Nesbit O B J A M A 84 805 1925
- 33 Albesco V Compt rend Soc de biol 115 1826, 1934
- 34 Klefer G L J A M A 91 1886 1928
- 35 Mollitch, M J A M A 102 2021 1934
- 36 Toyoda T Moriaki J Futagi Y and Okamoto M. J Inf Dis 46 219 1930
- 37 Gordon J E Badger G F Darling G B and Schooten S S Am J Public Health 25 531 1935
- 38 Meader F M J A M A 94 623 1930
- 39 Gordon J E Monthly Report of Herman Klefer Hospital Detroit June 1934
- 40 McKhann C F and Chu F T J Inf Dis 52 268 1933
- 41 Platon E S J of Ped 5 531, 1934 see also Minn Med 15 697 1932
- 42 Nesbit O B and Thompson S Am J Public Health 24 634 1934
- 43 Bull H G J A M A 101 363 1933
- 44 Schwartz, A B J of Ped 5 282 1934
- 45 Melnick T Arch Pediat 50 158 1933
- 46 Veldee M V Public Health Reports 45 1827 1930
- 47 Veldee M V Public Health Reports 46 693 1931
- 48 Veldee M V Public Health Reports 48 549 1933
- 49 Dick G F and Dick G H J A M A 103 1362 1934
- 50 Kinloch J P Smith J and Taylor J S J Hyg 26 327 1927

CHAIRMAN GARLAND The next paper on the program is on diphtheria, by Dr Elliott S Robinson, Director of the State Antitoxin and Vaccine Laboratory.

## THE CONTROL OF DIPHTHERIA\*

BY ELLIOTT S ROBINSON, M D †

THE experience of the last twenty years, more particularly the last ten, has shown clearly that the most satisfactory method of controlling diphtheria consists in active immunization of as many children as possible. There is every reason to believe that the more thoroughly and completely this practice is carried out, the lower will be the incidence of the disease in the community. Therefore, the discussion of the control of this disease consists not in considering whether active immunization should or should not be carried out but upon what immunizing agent should be used for that purpose.

The first immunizing agent to be used on a large scale was diphtheria toxin-antitoxin mixture. Dr Theobald Smith's suggestion made in 1907 that a mixture of toxin and antitoxin might be useful for human immunization was

first employed by Dr William H Park in 1913. In the twenty-two years since that time many thousands of children have been immunized with mixtures of this sort. Our experience in Massachusetts has shown that toxin-antitoxin mixture is efficient, safe and in a great many ways entirely satisfactory. It is true that in two communities there were severe reactions following the use of material which had been frozen, but that material was made by a formula now no longer in use and there is no reason to believe mixtures of the present type are subject to increased toxicity when frozen. On the other hand, frozen mixtures may prove to be less satisfactory as immunizing agents and should, therefore, never be used.

Chiefly as a result of some case reports from the middle west, there has been created a fear that toxin-antitoxin mixture will sensitize to horse serum. We have not felt that the sensitization so resulting, if it occurred at all, was of a degree to be practically important. The continued use of toxin-antitoxin mixture during the past two years when diphtheria toxoid has been

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available also shows that this fear is not generally held by the physicians in Massachusetts. For reasons which will be gone into later our present feeling is that diphtheria toxin-antitoxin mixture remains the most satisfactory immunizing agent for use in adults and in older children, but may well be replaced by diphtheria toxoid in younger children.

About ten years ago Ramon in France introduced the use of diphtheria toxoid or as he called it "anatoxine." This material consists of diphtheria toxin which has been detoxified by the addition of formalin and a period of incubation lasting a month or more. As a result of this treatment, the toxin loses entirely its poisonous properties but retains those properties which give it antigenic value. Extensive experience abroad, particularly in France, but also in Canada and many parts of the United States has shown that diphtheria toxoid is a satisfactory immunizing agent. The chief objection to its use lies in the fact that older children and adults may have reactions, both local and general, following its use. These reactions are probably due to previous sensitization to the protein of the diphtheria bacillus, and inasmuch as opportunities for sensitization are more numerous the longer one lives, such sensitization is, therefore, more likely to be found in older individuals. When we first distributed this product in Massachusetts, we recommended that it be used only in children under the age of six. Since then we have gradually raised the age limit until now we feel that it may be used with safety in children certainly up to the age of eight or ten and possibly somewhat older. There is some reason to believe that the age limit may be higher in those communities that have had relatively little diphtheria, and that the age limit should be lower in those communities having a good deal of diphtheria. Although we have no figures to support such a statement, it is quite in line with what we know of the disease and of immunization to it. In beginning immunization in a community with diphtheria toxoid, the most logical procedure would be to start with the younger children and as they were done with no reaction gradually increase the ages of the children immunized until reactions became too frequent to be satisfactory. Inasmuch as the reactions are unpleasant or uncomfortable rather than dangerous there would be no harm in such a procedure and it would lead to the immunization of the greatest number of children with diphtheria toxoid rather than with diphtheria toxin antitoxin mixture. For those children in the higher age groups, toxin antitoxin mixture should be used.

The number of doses and the intervals between them have been the subject of much discussion. This question is best answered by recalling that the five important factors in producing immunity are the antigen, the size of the dose, the number of doses, the interval between doses and

the basic immunity of the individual, and that we are anxious to produce the highest level of immunity reasonably attainable. We have advocated three doses rather than two because three doses are necessary to attain high levels of antitoxin. The interval of three weeks between doses probably does not give a much larger percentage of Schick negatives than are obtained with intervals of a week, but each individual will have more antitoxin and, therefore will remain Schick negative longer, because it takes longer for the antitoxin content to fall from the higher value. If only two doses of toxoid are given, the interval should be not less than a month.

Within the past few years there has been a great deal said about alum precipitated diphtheria toxoid. This product consists of the diphtheria toxoid previously described which has been treated by the addition of alum to give a precipitate. After washing this precipitate is resuspended in salt solution. The dose is usually 0.5 or 1 cc. The advantage claimed for the use of alum precipitated toxoid is that only one injection is required and that the level of immunity obtained is at least as high as is ordinarily obtainable with three doses of diphtheria toxoid. The early reports of immunization with alum precipitated diphtheria toxoid particularly those from Alabama, indicated that very satisfactory results were secured. Following the experience in Alabama other manufacturers undertook to produce this product and it has been used rather extensively during the past few years. In many instances the results obtained have been quite in line with the original claims but in other instances results have not been so satisfactory. Unfortunately, certain lots of alum precipitated diphtheria toxoid have given rise to local reactions which have gone on to the formation of sterile abscesses. In some instances these abscesses have occurred in a large proportion of children inoculated. So far as I know, none of these reactions have left any important sequelae, but such occurrences tend to give a bad reputation to the process of immunization. It is thought that these severe reactions may be traced to one of two causes, both of which lie in the method of manufacture. Some lots which have caused reactions have had a high content of alum. In other instances the fault has been laid to the fact that the toxin was allowed to incubate for a rather long period during the process of toxin formation. This caused the autolysis of an unduly large number of diphtheria bacilli and consequently a high content of diphtheria bacillus protein. One or both of these factors have been involved in those lots which have given unduly numerous reactions, and it is felt that, by avoiding these two faults, reactions may be prevented. A third source of reactions lies in the same mechanism which gives rise to reactions with the ordinary diphtheria toxoid, namely that the im-

nothing to what he has said except to call attention to further experimentation which is being carried on to determine the efficacy of placental extract given by routes other than subcutaneous injection. The practical matter which we have to decide is whether to use any substance and if it is to be used, when. Except under unusual individual circumstances, modification of the disease is preferable to protection. Modification should be used for all exposed children who are under three years of age and probably for all under five years of age. If further experience proves that subcutaneous inoculations can be displaced by a method of administration which gives no reaction, it would seem desirable to modify the severity of the disease in all persons exposed to measles.

4 In the fourth group, procedures of possible efficacy but still in the experimental period, we would place immunization against whooping cough. Perhaps one should mention poliomyelitis also, but fortunately it is outside of the field under consideration this morning.

Pertussis is such a dread disease that physicians and parents easily take "the will for the deed" so far as proof in relation to prevention is concerned. Dr. McDonald has been judicious in his conclusions. All of us would do well to follow his lead. Enthusiasm in relation to the value of vaccines has waxed and waned many times. Just now we are in a period of optimism but there have been times in the past when success seemed almost as near at hand as it does to-day and further experience has ushered in a period of depression. One is certainly justified in using vaccine in an attempt to produce immunity against whooping cough but one must be honest with himself and with his patients in acknowledging that proof of its protective efficacy is lacking. One must also guard against drawing conclusions from a few cases, from clinical impressions or from uncontrolled statistical reports. Time will determine whether a vaccine can be prepared of such a quality that, administered according to a given technique, it will afford protection against the disease. Until then let us maintain an open mind.

CHAIRMAN GARLAND I will now ask for the report of the Nominating Committee.

DR. ALLEN The Nominating Committee submits the following report:

Chairman for next year, Dr. George P. Hunt, of Pittsfield, and for Secretary, Dr. James M. Baty of Boston.

CHAIRMAN GARLAND You have heard the report of the Nominating Committee for Chairman, Dr. George P. Hunt, for Secretary, Dr. James M. Baty. Are there any further nominations? If not, the Chair will entertain a motion for the nominations to close.

[Voted, that nominations be closed.]

CHAIRMAN GARLAND The Chair will entertain a motion for the Secretary to cast one ballot for these officers.

[VOTED, that the Secretary cast one ballot for the officers as nominated.]

The Secretary cast one ballot for the officers nominated, and they were declared duly elected.

CHAIRMAN GARLAND The papers are open for discussion. I will ask the discussers to give their names and addresses plainly, and remember that discussion is limited to two minutes.

DR. CONRAD WESSELHOEFT, Boston In regard to the use of convalescent serum in measles, I would like to say a word from the standpoint of one who holds the pursestrings of one supply of this convalescent measles serum. It is not a pleasant position to hold because some people have the idea that measles is such a dread disease that it is very dangerous, even for an adult, and some family physicians explain to their adult patients that in the event of exposure and no knowledge of having had measles, if they could get some of this convalescent measles serum they would not come down with measles. Of course, the bread winner of the family does not want to contract the disease, and pressure is brought to bear on some of us who hold the pursestrings of this convalescent measles serum. If he happens to be a hospital trustee then I am up against it. I would like to say that it takes at least four times as much of this very valuable convalescent measles serum to protect a full grown trustee as it does to protect a small child. The difficulty in obtaining the serum lies in the fact that it is obtained only from adults, and few adults have measles.

I would like to emphasize the ruling that has been made in Providence, where they do not release the convalescent measles serum for any case that is not under four years old, except under those conditions which Dr. Eley brought out, for instance, if a child has whooping cough or is convalescent from scarlet fever. Then, of course, it is very desirable that the measles serum should be used.

I think the general tone to-day has been to stress the severity of these diseases. I think it is overstressed. The high mortality in measles comes before the age of four. After that it is not, according to the statistics, a dread disease. So I welcome, and so does everybody welcome, a placental extract which is so effective, and which may do away with this demand for convalescent serum which is far greater than the supply. At contagious hospitals a supply of this convalescent measles serum has to be kept on hand because measles can very well break out in a scarlet fever ward.

I would like to say in connection with this that I am always very much surprised when a doctor sends to the Haynes Memorial a case of scarlet fever knowing perfectly well that that child has also been exposed to measles within a week, and yet says nothing whatever about it at the time he calls up to admit the case. It is astonishing how often that happens.

As to scarlet fever, we must all welcome this toxoid because we know that we do get unpleasant results from the use of the toxin in the usual doses, or even though we split them up, as I do, into eight doses over eight weeks, and even then we sometimes get reactions. The toxoid would seem to do away with that.

Just one more point here, and that is that those of us who are interested in scarlet fever are very much concerned about this Dick patent. Of course, the discovery of the toxin was an important step, as has been brought out by Dr. Anderson. The active immunity obtained from this toxin not only protects against the disease but it protects against the complications as well, because pupil nurses so protected by inoculations when intimately exposed on scarlet fever wards not only fail to come down

with scarlet fever but they also do not come down with tonsillitis, otitis media and all the other complications arising from the pyogenic property of this hemolytic streptococcus. On the other hand the patient in the early stage of scarlet fever who is given the antitoxin may be immediately and dramatically benefited for the time being but is not thereby protected from the subsequent complications. Our present conception of the origin and nature of all these complications is very unsatisfactory.

The trouble with the Dick patent is that it not only covers the discovery of the toxin but all the discoveries which lead up to it and furthermore the patent is so all embracing as to prohibit any one from inoculating with any scarlet fever toxin any human being or animal who is not licensed by the Scarlet Fever Commission in Chicago. The patent was sanctioned by a committee of the A.M.A. with the idea that it would protect the profession from bad products during the period of its introduction. That was ten years ago. Such protection is no longer needed if indeed it ever was needed. The Massachusetts Medical Society in Council yesterday passed a resolution that this Society was opposed to the continuation of that patent and the delegates are to bring that resolution before the American Medical Association.

**CHAIRMAN GARLAND:** Is there any other discussion?

**DR. H. B. MARBLE,** Shelburne Falls: I have just three questions I would like to ask. The first one is: What is the present status of the value of ether injection in the treatment of whooping cough? The second: What would be a suggested dose or an average dose of toxoid in pupils of high school age? The third one is: We all know there are many children in the high schools who have been vaccinated but not successfully. What can be done about getting these children vaccinated so that they will be immune to smallpox?

**CHAIRMAN GARLAND:** Any further questions?

**DR. EDWARD M. SMITH,** Salem, New Hampshire: I wish to call attention to the importance of the mammalian transition period after birth and at the commencement of nursing. I believe that some of our pediatric problems along the line of discussion begin here. They can be solved or dismissed with our understanding by the use of the neglected substance the placenta.

The physiological effects and biological substances in the after-birth are too challenging for further neglect. (1) The fascinating McKhann immune bodies have been discussed and they or their precursors may be transmitted from the milk of the placenta-fed or placenta-extract-enriched post partum woman. (2) Not common knowledge is the fact that placenta has been shown to be one half more valuable per weight than the best liver in blood remitting substance or what I shall call Carnivorous Substance X (verbal communication, Dr. William Castle, 1936). (3) Estrogenic substance is present in highest titre in this embryonal material. It has definite lactogenic effects even on the male and one of the best tests for its presence is the growth of nipple and areolar skin. It may cornify and change the whole mucosa of the genital tract within forty-eight hours. It has been used to secure resistance to juvenile gonorrhea. It should be carefully tried in attempts to render the postpartum state more promptly non-infectable. (4) The hemorrhagic diseases of the newborn with an incidence of 16 per thousand may possibly be dismissed by placenta extract directly or through the mother. This ery-

throblastic crisis responds to liver extract and the naturally available substance should be preferred. Its explosive potentiality in stimulating and homeostatic balancing of mitosis is well known by the typical Blinot-Murphy reticulocyte curves. (5) The presence in high titre of progestin requires observation of the control over involution and subinvolution of the uterus. (6) The nonspecific substances present in both liver extract, placenta, and placental extract which extends to cord and brain changes in primary anemia may reasonably be expected to disturb postnatal nutrition and render breast feeding more vitally valuable. The effect needs study in the jaundice of the newborn, the immunity of the newborn, the early and later mortality of the newborn. It certainly may be used in the primary anemia of pregnancy.

Lying in hospitals as my own the Boston Lying In are to date disposing of as garbage this most valuable physiological material. It should be saved, extracted and rendered generally available for the studies indicated. About 3,000 lbs. is lost in this hospital alone.

Mammalian survival has been largely conditioned by the conservation of all already elaborated material. Placental eating and the resorption of the young are common indicators of nature's extreme conservatism in a mammalian economy. The discovery of carnivorous substance X (blood important) is partly based on the observation of carnivorous conservation of most valuable elaborated substance.

Important questions are suggested by my remarks with respect to correction of past errors in the treatment of the newborn child and the mother.

**CHAIRMAN GARLAND:** Any further discussion? Dr. Eley, have you anything to add?

**DR. ELEY:** No.

**CHAIRMAN GARLAND:** Dr. McDonald? Perhaps you can answer this question as to the use of ether and oil.

**DR. McDONALD:** Dr. Smith perhaps could give a more complete answer to the question concerning the use of ether injection in the treatment of whooping cough. I have had no experience with its use. Local practitioners seem to agree that the average case of whooping cough will respond best to rest and that it is only the rare case that requires the use of ether. An appraisal of the literature gave me an unfavorable impression for its continued use in the average case.

**CHAIRMAN GARLAND:** Dr. Anderson?

**DR. ANDERSON:** I haven't anything further to add in regard to scarlet fever. I would take the liberty of answering the Doctor's question about the vaccination certificates to high school pupils. As I understand your situation, the child is in the high school having not been successfully vaccinated. The Supreme Court of Massachusetts has ruled that the school committee is within its rights in requiring a parent to renew a vaccination examination certificate as often as once every two months. There has never been any ruling, however, on how often an attempt at vaccination shall be made but many school committees have interpreted that to the point of requiring that the vaccination attempt be made each year until such time as a successful take shall have been obtained. That has not, however, been ruled upon by the Court. It is merely precedent and as far as I know has never been challenged.

**CHAIRMAN GARLAND:** Dr. Robinson?



20	College of Physicians and Surgeons, Boston	33	Cornell University Medical College
21	Jefferson Medical College of Philadelphia	34	University of Pittsburgh School of Medicine
22	Medical College of Virginia	35	University of Virginia Department of Medicine
23	Indiana University School of Medicine	36	University of Georgia Medical Department
24	Emory University School of Medicine	37	University of Berlin
25	Northwestern University Medical School	38	University of Michigan Medical School
26	University of Nebraska College of Medicine	39	Long Island College Hospital
27	Tulane University of Louisiana School of Medicine	40	University of Chicago School of Medicine
28	College of Medical Evangelists	41	Dalhousie University Faculty of Medicine
29	Columbia University, College of Physicians and Surgeons	42	Loyola University School of Medicine
30	University of Buffalo School of Medicine	43	St. Louis University School of Medicine
31	New York Homeopathic Medical College and Flower Hospital	44	University of Cincinnati College of Medicine
32	University of Tennessee College of Medicine	45	University and Bellevue Hospital Medical College
		46	Temple University School of Medicine
		47	George Washington University Medical School

## DEATHS REPORTED FROM JUNE 6, 1934, TO JUNE 5, 1935

Admitted	Name	Place of Death	Date of Death	Age
1925	Adam, John Geikie	Great Barrington	December 1, 1934	56
1891	Arnold, Horace David	Waltham	March 11, 1935	72
1895	Baldwin, Herman Trost	Orlando, Florida	November 25, 1934	66
1934	Bayuso, Anthony Christiana	Framingham	December 30, 1934	32
1904	Bellamy, William Woolsey	Watertown	January 17, 1935	57
1924	Bigelow, George Hoyt	Framingham	December 3, 1934	44
1895	†Bradford, Cary Carpenter	Southbridge	October 20, 1934	79
1890	Bragdon, Horace Elwood	Winthrop	February 17, 1935	67
1886	Burrage, Walter Lincoln	Brookline	January 26, 1935	74
1928	Caldwell, John O.	Sharon	January 19, 1935	49
1908	†Chisman, Eudora Pierce (Higgins)	Boston	August 22, 1934	70
1907	Coffin, Frank Herbert	Haverhill	April 7, 1935	58
1922	Conway, Francis Bernard	Boston	September 17, 1934	64
1893	†Coolidge, John Nelson	Ottawa, Canada	January 9, 1935	68
1911	Coupal, James Francis	Washington, D. C.	January 3, 1935	50
1891	Cram, John Wesley	Colrain	April 5, 1935	76
1897	Crowley, Jeremiah Francis	Adams	July 4, 1934	62
1924	Curlev, George Frederick	Milford	April 15, 1935	62
1902	Dame, Fred Russell	Athol	December 21, 1934	62
1916	Dav, Edward Philip	Dorchester	October 31, 1934	66
1921	Dobson, Clarence Henry	Brookline	February 1, 1935	65
1897	Dow, George Farwell	Reading	December 9, 1934	65
1885	Durant, Charles Edwin	Haverhill	January 19, 1935	72
1906	Ellam, Herbert William	Melrose	June 4, 1935	55
1932	Fennessv, William Casey	Buzzards Bay	June 22, 1934	57
1902	Fisher, Irving Jewell	Liverpool, England	August 30, 1934	57
1894	Freeman, Franklin Willard	Lynnfield Centre	December 5, 1934	74
1900	Gardner, Harrie	Milton	May 11, 1934	64
1887	†Gilbert, John	Fall River	November 3, 1934	87
1928	Girardi, Victor Joseph	Plainfield	August 2, 1934	35
1903	Goodall, Harry Winfred	Boston	April 17, 1935	58
1911	Hall, Gardner Wells	Boston	April 21, 1935	59
1925	Hall, George Morris	Jamaica Plain	March 5, 1935	43
1899	†Hamilton, Annie Lee	Jamaica Plain	September 23, 1934	70
1900	Healy, Daniel Laurence	Framingham	June 21, 1934	62
1912	Hemeon, Frederick Chipman	Dorchester	May 26, 1935	65
1929	Herman, William J.	Boston	January 25, 1935	43
1923	Herrin, Herbert Elliot	At Sea	July 16, 1934	51
1894	†Hodges, Almon Danforth	Roxbury	October 17, 1934	69
1920	Hoer, Warren Henry	Newton Upper Falls	December 31, 1934	53
1916	Holzman, Joseph	Roxbury	June 3, 1935	64
1919	Horr, Albert Winslow	Watertown, New York	August 3, 1934	69
1904	Hussey, Edward John	Holyoke	December 4, 1934	61
1919	Hutchinson, Charles William	Boston	June 26, 1934	49
1905	Jennings, Curtis Herman	Fitchburg	December 31, 1934	58
1884	†Johnson, Francis Emerson	Erving	April 30, 1935	77
1905	Jones, Frederick Elmer	Weston	December 21, 1934	64
1921	Karcher, Edward Winslow	Lynn	February 18, 1935	52
1900	Kepler, Charles Ober	Brighton	November 1, 1934	66
1902	Knight, Charles Lewis	Boston	April 18, 1935	60
1930	Knowles, Charles Augustus	Dorchester	January 31, 1935	30
1916	Lane, Elwin Dexter	Andover	March 25, 1935	58
1897	Larrabee, Ralph Clinton	Boston	March 9, 1935	64
1923	Loughlin, John Joseph	Wakefield	September 6, 1934	54
1914	Lyman, Henry	Ponkapoag	June 15, 1934	55
1889	MacArthur, George Elden	Ipswich	April 10, 1935	77
1893	†Mangan, John Joseph	Lynn	March 29, 1935	77
1917	†Martin, George Forrest	Lowell	November 4, 1934	71

1913	Martin Harold Winthrop	Milton	April	15	1935	47
1897	McCabe John Joseph	Holyoke	November	18	1934	61
1904	McGillcuddy Richard Aloysius	Turners Falls	November	4	1934	55
1914	McGinty Joseph Taney	Springfield	December	24	1934	54
1912	McKelvey Alexander Dunbar	Ontario Canada	January	6	1935	49
1897	Metcalf Ben Hicks	Ruskin Florida	March	8	1935	63
1893	Mitchell, Arthur	Brookline	July	24	1934	70
1895	†Murphy, Emily Frances	Taunton	November	14	1934	75
1903	Myers Solomon	Dorchester	January	18	1935	62
1895	†Nason Osman Cleander Baker	Franklin	October	7	1934	76
1916	Newton Frank Loomis Sabin	Newtonville	May	30	1935	77
1911	Nield William Andrew	Boston	June	12	1934	69
1915	Nigro Michele	Medford	August	8	1934	51
1926	Norton James Joseph	Hartford Connecticut	January	19	1935	50
19*1	Ober Herbert Carroll	Winchester	June	10	1934	48
1900	O'Brien Thomas James	Boston	February	5	1935	63
1896	O'Connor John Henry	Hyde Park	July	7	1934	65
1891	Osgood, Gilman	Rockland	September	8	1934	71
1907	Paddock, Brace Whitman	Pittsfield	May	23	1935	56
1901	Parcher George Clarence	Boston	November	30	1934	68
1908	Pearce Arthur Cushing	Boston	March	16	1935	59
1902	†Pearson Charles Lusby	Newton	September	8	1934	74
1889	Peirson Edward Lawrence	Salem	January	18	1935	72
1907	Potcher Elias Henry	Boston	August	28	1934	53
1927	†Purinton Herbert Harmon	Somersworth, N H.	June	7	1934	69
1896	†Rawson George Wallace	Amherst	December	27	1934	73
1903	Richardson Charles Harper	Pittsfield	May	21	1935	65
1895	Roberts Linnaeus Alton	Cambridge	August	23	1934	66
1890	Robinson Thomas Johns	Taunton	May	5	1935	69
1904	Rochette Edward Charles	Worcester	December	13	1934	54
1926	†Rowe Allan Winter Ph D.	Boston	December	6	1934	55
1892	Rowen, Henry Stanislaus	Brighton	April	20	1935	66
1932	Russell, Rolfe Spaulding	Greenfield	March	17	1935	28
1897	Sheehan, Martin David	Winchester	September	4	1934	63
1890	Simpson James Edwin	Salem	January	19	1935	65
1888	Storer Malcolm	Boston	January	2	1935	72
1896	Sturgis Walter Horatio Wakeman	Hull	October	29	1934	61
1910	Sullivan, Andrew Joseph	Brookton	February	9	1935	49
1883	†Tallman Augustus Littlefield	East Boston	May	20	1934	84
1891	Tracy Edward Aloysius	Dorchester	January	12	1935	70
1893	†Trueman Harmon Silas	Biddeford, Maine	September	2	1934	76
1886	†Twombly Edward Lambert	Boston	May	10	1935	75
1921	Vogel George Lewis	Boston	March	12	1935	60
1919	Wagner Harvey Samuel	Boston	February	9	1935	57
1892	†Whiting George Washington Whitney	West Medford	February	14	1935	70
1904	Whitney Edward William	Northampton	February	18	1935	55
1893	Winslow Edward Smith	So Harwich	December	28	1934	68
1919	Wright Charles Wadsworth	Longmeadow	September	25	1934	70

†Retired Fellow  
‡Honorary Fellow

# OFFICERS OF THE MASSACHUSETTS MEDICAL SOCIETY FOR 1935-1936

ELECTED BY THE COUNCIL, JUNE 4 1935

*President* Charles E Mongan Somerville 24 Central Street.

*Vice-President* Channing Frothingham Boston. Office, Jamaica Plain 1153 Centre Street.

*Secretary* Alexander S Begg West Roxbury Office Boston, 8 Fenway

*Treasurer* Charles S Butler Boston 257 Newbury Street.

*Orator* Reginald Fitz Boston, 721 Huntington Avenue.

## STANDING COMMITTEES FOR 1935-1936

### COMMITTEE OF ARRANGEMENTS

W R Morrison, *Chairman* Horatio Rogers, W B. Burrage R. P Stetson Augustus Thorndike, Jr

### COMMITTEE ON PUBLICATIONS

R. I Lee, *Chairman* Homer Gage R B Osgood, R M Smith F H Lahey

### COMMITTEE ON MEMBERSHIP AND FINANCE

D N Blakely *Chairman* G C. Caner J E. Fish, H. F Newton, H. Q. Gallupe

### COMMITTEE ON ETHICS AND DISCIPLINE

David Cheever *Chairman* W D Ruston S F McKeen A. C Smith R. L. DeNormandia

### COMMITTEE ON MEDICAL EDUCATION AND MEDICAL DIPLOMAS

Reginald Fitz, *Chairman* C. H. Lawrence C. A. Sparrow E. S Calderwood A. S Begg

### COMMITTEE ON STATE AND NATIONAL LEGISLATION

C E Mongan *Chairman* F E Jones, A. W Marsh A. S Begg D L Lionberger

### COMMITTEE ON PUBLIC HEALTH

Dwight O'Hara, *Chairman* G N Hoeftel G D Henderson S C. Dalrymple, H. L. Lombard.

### COMMITTEE ON MALPRACTICE DEFENSE

F G Balch *Chairman* E. D. Gardner F B. Sweet, R. P Watkins, A. W Allen.

### COMMITTEE ON PERMANENT HOME

R. B. Greenough, *Chairman* C. G. Mixer J M. Birnie C. S Butler E C. Miller

## SPECIAL COMMITTEES FOR 1935 1936

## COMMITTEE ON CANCER

R. B. Greenough, *Chairman*, F. G. Balch, E. M. Daland, P. E. Truesdale, C. C. Simmons

## REPRESENTATIVES TO THE MASSACHUSETTS CENTRAL HEALTH COUNCIL

On Administrative Board  
Dwight O'Hara

## District Representatives

Eastern E. P. Joslin, A. W. Dudley  
Northeastern M. A. Tighe, F. W. Snow  
Southeastern W. D. Kinney, C. P. Curley  
Central G. D. Henderson, E. C. Miller  
Western H. J. Downey, R. J. Carpenter

## COMMITTEE ON PUBLIC EDUCATION

(A subcommittee of the Standing Committee on Public Health)

G. R. Minot, W. H. Robey, F. J. Cotton, F. C. Irving, R. M. Smith, E. H. Place, C. C. Simmons, J. H. Pratt, H. W. Stevens, J. B. Ayer, H. P. Mosher, R. B. Osgood, F. R. Ober, E. P. Joslin, J. D. Barney, H. L. Lombard

## COMMITTEE ON POSTGRADUATE MEDICAL INSTRUCTION

Frank R. Ober, Boston, *Chairman*, F. Dennette Adams, Boston, Roy Morgan, Westfield, John M. Birnie, Springfield, Harold L. Higgins, Boston, Joseph W. O'Connor, Worcester, Charles W. Blackett, Jr., Newtonville, Dwight O'Hara, Waltham, Reginald Fitz, Boston, Alexander S. Begg, West Roxbury, A. Warren Stearns, Billerica, Robert B. Greenough, Boston, Walter P. Bowers, Clinton, Henry D. Chadwick, Boston, Winfred Overholser, Boston, C. Macfie Campbell, Roxbury, Lincoln Davis, Boston, Leroy E. Parkins, Boston, *Secretary*

## COMMITTEE ON PHYSICAL THERAPY

F. P. Lowry, *Chairman*, R. B. Osgood, G. R. Minot.

## COMMITTEE TO CONSIDER THE TYPE OF PERSON TO BE ADMITTED TO THE MASSACHUSETTS MEDICAL SOCIETY AS A FELLOW

R. I. Lee, *Chairman*, A. W. Stearns, H. G. Stetson, P. E. Truesdale, E. R. Leib

## COMMITTEE OF THREE FROM THE MASSACHUSETTS MEDICAL SOCIETY TO CONFER WITH A COMMITTEE OF THREE FROM THE LIBRARY

R. B. Greenough, *Chairman*, P. E. Truesdale, E. C. Miller

## COMMITTEE TO CONSIDER RHEUMATISM AND ALLIED DISEASES IN MASSACHUSETTS

G. R. Minot, *Chairman*, R. B. Osgood, L. T. Swaim, F. R. Ober, L. D. Chapin, G. D. Henderson, H. D. Chadwick, H. L. Lombard, Walter Bauer, *Secretary*

## COMMITTEE ON PUBLIC RELATIONS

One member appointed yearly by each District Medical Society

The President of the parent society, Charles E. Mongan, is chairman

*Barnstable District Medical Society*

Merrill E. Champion, North Harwich

*Berkshire District Medical Society*

P. J. Sullivan, Dalton, 46 Curtis Avenue

*Bristol North District Medical Society*

Francis H. Dunbar, Mansfield P. O. address, Boston, 43 Bay State Road

*Bristol South District Medical Society*

Edward L. Merritt, Fall River, 130 Rock St

*Essex North District Medical Society*

Elmer S. Bagnall, Groveland, 281 Main Street  
*Secretary*

*Essex South District Medical Society*

John Joseph Egan, Jr., 52 Pleasant Street, Gloucester

*Franklin District Medical Society*

Halbert G. Stetson, Greenfield, 39 Federal Street

*Hampden District Medical Society*

Patrick E. Gear, Holyoke, 630 Dwight Street

*Hampshire District Medical Society*

Francis E. O'Brien, Haydenville, Hampshire County Sanatorium

*Middlesex East District Medical Society*

J. Harper Blaisdell, Winchester Office Boston, 45 Bay State Road

*Middlesex North District Medical Society*

Michael A. Tighe, Lowell, 9 Central Street

*Middlesex South District Medical Society*

Charles E. Mongan, 24 Central Street, Somerville

*Norfolk District Medical Society*

Walter A. Lane, Milton, 173 School Street.

*Norfolk South District Medical Society*

William G. Curtis, Wollaston, 10 Grand View Avenue

*Plymouth District Medical Society*

Thomas H. McCarthy, Brockton 142 Main Street

*Suffolk District Medical Society*

Channing Frothingham, Boston Office, Jamaica Plain, 1153 Centre Street

*Worcester District Medical Society*

Ernest L. Hunt, Worcester, 28 Pleasant Street

*Worcester North District Medical Society*

Harry R. Nye, Leominster, 19 Lancaster Street

## DELEGATES AND ALTERNATES TO THE HOUSE OF DELEGATES OF THE AMERICAN MEDICAL ASSOCIATION

## DELEGATES

## ALTERNATES

J. M. Birnie, Springfield	W. C. Leary, Springfield
C. E. Mongan, Somerville	L. S. McKittrick, Boston
J. F. Burnham, Lawrence	E. L. Hunt, Worcester
R. H. Miller, Boston	Cadis Phipps, Brookline
E. F. Cody, New Bedford	P. E. Truesdale, Fall River
Reginald Fitz, Boston	G. P. Reynolds, Boston

## COUNCILORS—1935 1936

## ELECTED BY THE DISTRICT MEDICAL SOCIETIES AT THEIR ANNUAL MEETINGS, APRIL 15 TO MAY 15, 1935

NOTE—The initials M. N. C. following the name of a Councilor indicate that he is a member of the Nominating Committee. V. P. indicates that a member is a Councilor by virtue of his office as President of a district society and so Vice President of the general society. C. indicates that he is chairman of a standing committee. Sec. indicates that he is secretary of his District Society.

## BARNSTABLE

P. P. Henson, Hyannis, Main St., V. P.  
S. M. Beale, Sandwich  
W. D. Kinney, Osterville M. N. C.  
J. I. B. Vail, Hyannis, 155 Main St., Sec.

**BERKSHIRE**

R. J. Carpenter North Adams 85 Main St. V P  
H. J. Downey Pittsfield 184 North St. Sec.  
M. N. C.  
W. T. Frawley, Pittsfield, 184 North St.  
G. P. Hunt, Pittsfield 34 Fenn St.  
T. H. Nelligan Pittsfield 184 North St.  
G. H. Thompson Pittsfield 74 North St.

**Bristol North**

L. E. Butler Taunton 148 High St. V P  
W. H. Allen Mansfield, 70 North Main St.  
M. N. C.  
A. R. Crandell Taunton 48 Church Green  
C. B. Kingsbury, Taunton 63 Prospect St. Sec.  
F. V. Murphy Attleboro 51 Bank St.

**Bristol South**

E. L. Merritt Fall River 130 Rock St. V P  
J. A. Barre Fall River 1555 Pleasant St.  
R. H. Baxter Marlton 6 South St.  
G. W. Blood Fall River 82 New Boston Rd.  
R. B. Butler Fall River 278 North Main St.  
E. F. Cody New Bedford 105 South Sixth St.  
M. N. C.  
E. D. Gardner New Bedford 150 Cottage St.  
S. V. Merritt, Fall River 297 Osborn St.  
Charles Shanks, New Bedford, 645 Kempton St.  
Sec.  
I. N. Tilden Mattapoisett, Barstow St.  
C. C. Tripp New Bedford 416 County St.  
P. E. Truesdale Fall River 151 Rock St.

**Essex North**

C. F. Warren Amesbury 1 School St. V P  
E. S. Bagnall Groveland 281 Main St. Sec.  
R. V. Baketel Methuen, 7 Hampshire St.  
J. F. Burnham Lawrence 567 Haverhill St.  
M. N. C.  
H. F. Dearborn Lawrence 193 Garden St.  
A. P. George Haverhill 397 Main St.  
T. R. Healy Newburyport, Office Boston 370  
Marlborough St.  
F. W. Snow Newburyport, 24 Essex St.  
L. T. Stokes, Haverhill 190 Main St.  
R. L. Toppan, Newburyport, 148 High St.  
W. I. Walker Andover 121 Main St.

**Essex South**

Hanford Carvell Gloucester 1038 Washington  
St. V P  
N. P. Breed, Lynn 9 Washington Square.  
C. L. Curtis, Salem 101 Federal St.  
C. F. Deering Danvers 38 Elm St.  
J. F. Donaldson Salem 32 Lynde St.  
R. E. Foss Peabody 125 Main St.  
C. L. Holt, Lynn, 170 Western Ave., M. N. C.  
J. F. Jordan, Peabody 76 Lynn St.  
A. E. Parkhurst, Beverly 163 Cabot St.  
O. S. Pettingill Middleton Essex County Sana-  
torium.  
C. H. Phillips Beverly, 11 Broadway  
W. G. Phippen Salem 31 Chestnut St.  
R. E. Stone Beverly 88 Lothrop Boulevard, Sec.  
J. W. Trask Lynn 90 Ocean St.

**FRANKLIN**

H. B. Marble Shelburne Falls 63 Bridge St., V P  
H. M. Kemp Greenfield, 43 Franklin St., M. N. C.  
H. G. Stetson, Greenfield 39 Federal St., Ex Pres  
A. H. Wright, Northfield Main St.  
Charles Moline, Sunderland, Office South Deer-  
field 120 Main St. Sec.

**Hampden**

T. S. Bacon Springfield, 69 Maple St. V P  
F. H. Allen Holyoke 16 Fairfield Ave

E. P. Bagg Jr Holyoke, 207 Elm St.  
J. M. Birnie Springfield, 14 Chestnut St., Ex Pres  
J. J. Carroll, Holyoke 172 Chestnut St.  
W. A. R. Chapin Springfield 131 Chestnut St.  
J. L. Chereskin Longmeadow Office Springfield  
333 Bridge St.  
A. J. Douglas, Westfield 93 Elm St.  
G. L. Gabler Holyoke, 98 Suffolk St.  
P. E. Gear Holyoke, 630 Dwight St.  
Frederic Hagler Springfield 20 Maple St.  
G. D. Henderson Holyoke 312 Maple St.  
E. A. Knowlton Holyoke, 207 Elm St.  
M. W. Pearson, Ware, 18 Pleasant St.  
A. G. Rice Springfield 38 School St.  
G. L. Schadt, Springfield 44 Chestnut St., M. N. C.  
H. L. Smith Springfield 249 Union St., Sec.  
G. L. Steele Springfield, 20 Maple St.

**Hampshire**

L. B. Pond Easthampton 115 Main St., V P  
J. J. Bonnevillie Hatfield, 43 Main St.  
A. G. Hanson Northampton, 219 Elm St., M. N. C.  
F. E. O'Brien Haydenville Hampshire County  
Sanatorium Sec

**Middlesex East**

F. O. West, Woburn 60 Pleasant St., V P  
J. H. Blaisdell Winchester Office Boston 5 Bay  
State Rd.  
Richard Dutton Wakefield 33 Avon St.  
J. H. Fay Melrose, 49 Lake Ave.  
E. M. Halligan Reading 3 Salem St.  
K. L. Macclachlan Melrose, 1 Bellevue Ave. Sec.  
R. R. Stratton Melrose, 538 Lynn Falls Parkway  
M. N. C.

**Middlesex North**

E. O. Taber Lowell 18 Shattuck St., V P  
M. L. Alling Lowell 9 Central St.  
A. R. Gardner Lowell 16 Shattuck St.  
J. E. Lamoureux, Lowell 768 Merrimack St.  
G. A. Leahy Lowell 128 Merrimack St.  
F. R. Mahony Lowell, 310 Merrimack St., M. N. C.  
T. A. Stamas Lowell, 226 Central St. Sec.  
M. A. Tighe Lowell 9 Central St.

**Middlesex South**

S. H. Remick, Waltham 775 Trapelo Rd. V P  
C. F. Atwood Arlington 321 Massachusetts Ave.  
E. W. Barron Malden Office Boston 20 Ash St.  
C. F. K. Bean West Medford, 61 Harvard Ave.  
E. H. Bigelow Framingham Center 81 Pleasant  
St., Ex Pres  
G. F. H. Bowers Newton Highlands 156 Wood-  
ward St.  
C. O. Chase Watertown, 6 Patten St.  
F. R. Clark Newtonville 221 Walnut St.  
W. H. Crosby Brighton 304 Faneuil St.  
A. C. Cummings Newton 447 Center St.  
D. F. Cummings Natick 12 East Central St.  
D. E. Currier Cambridge 1573 Massachusetts  
Ave  
J. E. Dodd Framingham 141 Franklin St.  
D. C. Dow Cambridge 1537 Massachusetts Ave.  
A. W. Dudley Cambridge 1740 Massachusetts  
Ave., M. N. C.  
H. Q. Gallupe Waltham 751 Main St.  
W. G. Grandison Charlestown 65 High St.  
W. W. Harrington Lexington 1900 Massachusetts  
Ave.  
F. A. Higginbotham Watertown 112 Mt Auburn  
St.  
N. M. Hunter Hudson 20 Lincoln St.  
C. M. Hutchinson Cambridge 47 Garden St.  
L. H. Jack, West Newton 379 Austin St.  
M. M. Jackson, Everett, 513 Broadway

Josephine D Kable, Marlborough, 42 West Main St.  
 H. F. Keever, Auburndale, 69 Maple St.  
 A. A. Levi, Cambridge, Office Boston, 485 Commonwealth Ave, Sec.  
 F P Lowry, Newton, 313 Washington St.  
 L W McGuire, Malden, Office Boston, 395 Commonwealth Ave  
 J A McLean, West Somerville, 16 Curtis St.  
 Edward Mellus, Newton, 15 Clements Rd.  
 C E Mongan, Somerville, 24 Central St., Pres  
 F L Morse, Somerville, 78 Highland Ave  
 J P Nelligan, Cambridge, 2336 Massachusetts Ave  
 D G Nutter, Newton Center, 1094 Center St.  
 E J O'Brien, Jr, Brighton, Office Boston, 270 Commonwealth Ave  
 Dwight O'Hara, Waltham, Office Boston, 5 Bay State Rd, C  
 C T Porter, Waltham, Office Boston, 520 Commonwealth Ave  
 Ezekiel Pratt, Arlington, 385 Massachusetts Ave  
 W D Reid, Newton, Office Boston, 510 Commonwealth Ave  
 E F Sewall, Somerville, 380 Broadway  
 F G Smith, Somerville, 145 Highland Ave  
 C H Staples, Malden, 180 Summer St.  
 H P Stevens, Cambridge, 1911 Massachusetts Ave  
 H W Thayer, Newtonville, 355 Walnut St.  
 Fresenius Van Nüys, Weston, Boston Post Rd  
 H J Walcott, Concord, 92 Main St.  
 W S Whittemore, Cambridge, 3 Concord Ave  
 Alfred Worcester, Waltham, 314 Bacon St, Ex-Pres

## NORFOLK

L F Johnson, Norwood, Office Boston, 15 Bay State Rd, V P  
 H L Babcock, Dedham, Office Boston, 99 Bay State Rd  
 K. R. Bailey, Jamaica Plain, Office Boston, 483 Beacon St  
 Henry Baker, Dorchester, Office Boston, 483 Beacon St  
 F G Balch, Jamaica Plain, Office Boston, 279 Clarendon St, C  
 H G Batchelder, Dedham, Office Boston, 510 Commonwealth Ave  
 A S Begg, West Roxbury, Office Boston, 80 East Concord St., Secretary  
 D D Berlin, Brookline, Office Boston, 68 Bay State Rd  
 D N Blakely, Brookline, Office Boston, 87 Milk St, C  
 H K Boutwell, Brookline, 15 Green St.  
 F S Cruickshank, Brookline, 1236 Beacon St Sec.  
 D G Eldridge, Dorchester, 15 Monadnock St.  
 A A Fenton, Norwood, 17 Walpole St  
 I A Finkelstein, Dorchester, 1095 Blue Hill Ave  
 J E Fish, Canton, Massachusetts State Hospital School  
 C S Francis, Brookline, 76 High St  
 Maurice Gerstein, Roxbury, Office Boston, 483 Beacon St.  
 Alice M Gray, Roxbury, 149 Warren St  
 W A Griffin, Sharon, 28 South Main St.  
 J B Hall, Roxbury, 60 Windsor St.  
 G W Kaan, Sharon, G P O  
 W B Keeler, Roxbury, Office Boston, City Hall Annex  
 C J Kickham, Brookline, 31 Harvard St  
 M M Knudson, West Roxbury, 78 Park St  
 H M Landesman, Roxbury, Office Boston, 463 Commonwealth Ave

W A. Lane, Milton, 173 School St.  
 J S H Leard, West Roxbury, 1895 Center St.  
 Charles Malone, Jamaica Plain, 46 St John St  
 F W Marlow, Jr, Brookline, 1284 Beacon St.  
 J S May, Roxbury, 90 Warren St.  
 F P McCarthy, Milton, Office Boston, 371 Commonwealth Ave  
 L T McCready, Jamaica Plain, 2 Peter Parley Rd  
 S F McKean, Brookline, 96 Dean Rd  
 E F Murphy, Jamaica Plain, Office Roxbury, 394 Riverway  
 T J Murphy, Roxbury, 372 Dudley St., M N C  
 Samuel Nadel, Dorchester, Office Boston, 524 Commonwealth Ave  
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## HYPERINSULINISM\*

BY J. ARTHUR BARNES, M.D.,† AND EUGENE L. RICHMOND, M.D.‡

**H**YPERINSULINISM, the syndrome first de-  
scribed by Harris in 1923, is the condition  
in which the pancreas produces so much insulin  
that hypoglycemia and its attending symptoms  
occur. While the disease entity is probably not  
new, the mechanism was not recognized or un-  
derstood until the isolation of insulin and its  
use to combat diabetes.

Spontaneous hyperinsulinism is to be distin-  
guished from spontaneous hypoglycemia which  
is merely a descriptive term indicating the low-  
ering of the blood sugar which may be induced  
by a variety of causes. Hyperinsulinism is con-  
sidered to be due to overactivity of the islands  
of Langerhans and this overactivity may be  
due to diffuse hyperplasia or to adenoma forma-  
tion.

The clinical picture of hypoglycemia is  
familiar to all who have had experience with  
the use of insulin. It is only recently that  
disturbances of the pancreas other than hypo-  
function of the islands of Langerhans with its  
anatomic changes of atrophy and production of  
diabetes have been reported. There have been  
increasing observations of spontaneous hyper-  
function associated with hypertrophy and  
adenoma of the pancreas with the production  
of hyperinsulinism. It is apparent that the  
sequence, hyperfunction, hyperplasia, tumor  
formation against hypofunction, hypoplasia,  
aplasia destruction is manifest in the pancreas  
as with the earlier studies of the thyroid and  
the pituitary.

In a résumé of the cases reported it is stated  
that most patients presented a history of grad-  
ual onset with symptoms varying from hunger,  
weakness, dizziness and a feeling of apprehen-  
sion to that of momentary loss of consciousness  
with associated automatic movements lasting  
from a few seconds to several moments. These

symptoms all followed a long starvation period  
at first and were especially common before  
breakfast. They were likewise often seen when  
severe muscular exercise directly preceded a  
meal. They usually disappeared or could be  
aborted by the ingestion of food. There was a  
tendency for the attacks to become more fre-  
quent and more severe until, by the time the  
patient was seen, convulsive attacks associated  
with coma were common. Another finding  
which was marked in several patients was a def-  
inite mental deterioration. A striking feature  
in the typical history is that the patient usually  
notices the association between attacks and  
hunger. The symptoms of the late cases are  
identical with those of insulin shock, weakness,  
headache, nervousness, anxiety, fatigability,  
coldness, numbness of the extremities, epigastric  
distress, tremor, profuse perspiration and visual  
disturbances. In short the symptoms are so pro-  
tean and indefinite that the busy practitioner is  
too liable to dismiss the case as one of hysteria  
or nervousness, and prescribe one of the many  
mild sedatives and is quite surprised that these  
are of no benefit and the patient progresses to  
the typical attacks of actual coma. Those cases  
seen with convulsions in which the attack is  
preceded by typical premonitory symptoms of  
dizziness, chilliness, profuse perspiration, a crav-  
ing for sweets, an involuntary cry or a fall, with  
increasing drowsiness followed by coma with  
muscular twitching, at first limited to the hands  
or face followed by generalized rigidity and  
salvation are often mistakenly diagnosed as  
epilepsy or the convulsions of a brain tumor.  
In one series the diagnosis of idiopathic epilepsy  
was made fourteen times in a series of sixty-  
five reviewed cases of spontaneous hypoglycemia.  
Because of this close clinical relationship it is  
strongly recommended that all epileptics have  
blood sugar studies as there seems to be a small  
number whose convulsions are secondary to hy-  
poglycemia.

Physical examination usually reveals nothing

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of any significance. There is a tendency for the patients to be overweight due to the excessive intake of carbohydrate. Blood pressure readings are commensurate with the age of the patient. Basal metabolic readings are not significant although in many cases this was not done due to the danger of a long fast.

The dextrose tolerance curve varies. In the functional group the elevation of sugar level is small, rarely an increase of so much as fifty per cent in one hour and a drop to the pre-fasting level or below in three hours. Yet there have been five reported exceptions to this observation. In the majority of cases with adenoma the elevation is in excess of normal and the fall to the low level is delayed. However, there have not been enough observations to use this test to differentiate the three types of pathology in the pancreas, hyperplasia, adenoma and cancer.

Epinephrin is supposed to exert an hyperglycemic effect by the liberation of sugar from the glycogen in the liver. In normal individuals the injection of 0.6 cc of a 1:1000 solution of adrenalin causes an increase in blood sugar of thirty-five to forty-five mgm within forty-five to sixty minutes not returning to the normal level for two hours. Theoretically one would expect that adrenalin would be efficacious in raising the blood sugar level in cases of hypoglycemia of pancreatic origin and not in cases of hepatic origin. In the reported cases the elevation is more prompt than in normal cases. The rise is almost as high and there is a more rapid drop to the pre-injection level. Because of this fact the administration of adrenalin in an attack is very beneficial but it must be followed at once with ingestion of glucose to maintain the elevation.

Pituitrin, although it has some antagonistic effect on the action of insulin, has not proved of value in warding off attacks.

Thyroid extract is somewhat more potent. If enough extract is given to maintain a metabolic elevation of twenty per cent, the tendency to attacks will be checked. The disadvantages of this form of therapy are obvious.

An accepted classification of the causes of hypoglycemia is as follows:

(1) Excess of insulin as a result of therapeutic injections of insulin, of tumors and hyperplasia of the pancreas or of functional hyperinsulinism.

(2) Lack of opposing secretions may result from diseases of the suprarenal glands, tumors of the anterior or posterior lobe of the pituitary or from myxedema.

(3) Lack of glycogen.

This lack may result from destruction of reservoirs, disease of the liver or wasting of muscles, from abnormal secretion of sugar in starvation and intoxications from phosphorus or arsphenamine poisons.

(4) Interference with regulating center. This may result from disease affecting the pons or from overaction of the vagus nerves.

Accepting the facts that studies of the blood sugar in the fasting state and for dextrose tolerance curves and that the therapeutic use of dextrose reasonably establishes the occurrence of hyperinsulinism, the problem of determining the nature of the pancreatic pathology presents a great many difficulties. A localized malignant growth may be found. The impossibility of resolving the diagnostic uncertainty of the underlying pancreatic pathological changes and of thereby determining the operative procedure make the decision for operation quite difficult as only exploratory intervention can be done and the prognosis is uncertain. Medical treatment by excessive feeding, especially carbohydrates, is only a temporary procedure and in many cases, as with the present reported one, will not relieve the attacks. Then, too, there is always the possibility of increased hyperfunction due to the stimulation of forced glucose feeding which will speed up this progressive disease entity.

From the few papers concerned with the intensive study of these cases it is apparent that there is no striking difference between those with an adenoma and those with no demonstrable pancreatic lesion. For this reason it is suggested that all patients be given a trial at medical treatment for a suitable interval. There is a very grave note of warning suggested in the report of one author (Wilder) who found two cases of carcinoma with metastasis in fourteen cases. This ever-present danger coupled with the fact that a medical régime has not been accepted by all men as being satisfactory, many recommending frequent high carbohydrate feedings, others high fat, low carbohydrate, would seem to indicate that one cannot dally too long. The reasoning of those advocating a high fat diet seems to be more sound as repeated carbohydrate feeding would tend to cause excessive production of insulin by a gland already hyperfunctioning. This is well borne out by the clinical history of those patients who early recognize the value of food especially quickly assimilated carbohydrate and their rapidly progressive decline.

Another (Ryneerson) states that it would seem advisable to subject all patients with this syndrome to abdominal exploration since there is no method of diagnosing it preoperatively. He bases his premise on the belief that all these tumor cells are neoplastic with some resemblance to island cells and producing insulin or some related substance. He further states that so many carcinomata give no warning signs, yet here is a type that shrieks for it.

Experience with surgical treatment to date, however, has not been entirely satisfactory. When an adenoma has been found and removed a cure has resulted, but if a tumor has

not been found and if resection of the pancreas has been attempted, the benefit has been slight. However, many authors feel that the gland can be resected with safety. The probable cause of the hyperplastic cases is that not enough gland substance has been removed, again paralleling early thyroid surgery.

We are indebted to Dr. M. Gene Black for a complete medical and laboratory investigation during the eighteen months previous to our investigations when the patient consulted her at irregular intervals. During this period the patient had consulted numerous physicians who had told her that her symptoms were due to a "nervous condition." Medication for this nebulous diagnosis had given no relief.

#### Report of a case

K. P. B., single female aged thirty-five

Past history uneventful but for a D & C and cauterization of the cervix for pelvic pain and vaginal discharge three years ago. Blood count, blood pressure and urine were negative at that time. Blood chemistry studies were not recorded.

The exact beginning of the present illness was difficult to determine because of the vagueness of the symptoms. Eighteen months ago she sought medical relief for a fall. Blood pressure, blood count and urine were negative at this time. The patient was extremely nervous and emotionally unstable. All manipulations causing extreme apprehension. In retrospect this was probably the beginning of the present syndrome.

For approximately one year the patient has been suffering from fainting and sinking spells lasting from ten to fifteen minutes during which there was loss of consciousness with clonic and tonic contractions. Recovery was always spontaneous leaving the patient fatigued and exhausted. There was no conscious association with the taking of food to allay or prevent the attacks although the patient stated that she has always had a craving for sweets. Has been consuming candy in larger quantities lately and always has some with her. In spite of the increased carbohydrate intake there has been no increase in weight. The attacks have had a definite periodicity occurring either at ten A.M. or three P.M. with luncheon at twelve noon. They have been of increasing frequency and duration. Examination at this time revealed nothing significant. There was slight tenderness in the L.U.Q. In addition to the fainting spells the patient complained of weakness, fatigue, coldness, irritability and insomnia. There was definite emotional instability as indicated by frequent crying spells and marked apprehension during the examination. Basal metabolism was +3 and +4 in repeated tests. Previous basal metabolism tests one year ago revealed +9 -35 -75.

The patient was placed upon a high carbohydrate diet with marked immediate relief of symptoms. Subsequent blood sugar determinations were as follows:

Fasting	6 00 A.M.	30 mgm per 100 cc blood
	7 30 A.M.	83 " "
	4 30 P.M.	90 " "
	10 00 P.M.	68 " "
	11 00 P.M.	41 " "

on different days without controlled high carbohydrate diet.

On admission to the hospital blood sugar fasting specimen was sixty mgm. After the ingestion of 100 Gm of glucose, the readings of the glucose tolerance test were the following one-half hour

eighty mgm one hour seventy eight mgm two hours eighty four mgm three hours ninety four mgm. four hours eighty mgm. At no time was there any overflow of sugar into the urine.

During the test the patient had two typical attacks during which there was generalized rigidity of the entire body, eyes fixed, face and mouth rigid. The B.P. remained normal and there was no change in the pulse rate. The patient did not respond to questions or pressure over the supraorbital nerves. The first attack was of ten minutes duration the second of fifteen. Recovery was spontaneous followed by lassitude and prostration and alternating periods of crying and forced gaiety. This type of curve as contrasted with the reported observations would indicate the pathology in the pancreas to be of the hyperplastic type. Yet of those reported five were marked exceptions to this and in one of them carcinoma was found at postmortem.

She was placed upon a high carbohydrate diet and the following morning the blood sugar was 115 mgm. One-half hour after the injection of 0.5 cc. 1:1000 adrenalin the blood sugar was 150 mgm which persisted for one hour. Inasmuch as epinephrin is supposed to exert its hyperglycemic effect by the liberation of sugar from the glycogen in the liver it would indicate in this case that the patient had adequate stores in the liver and that it was readily available and that the hyperinsulinism was not due to liver pathology.

Basal metabolism tests ruled out any thyroid disorder as the basic cause and there were no stigmata to indicate pituitary dysfunction.

Because of the increase in symptoms and the progressive nature of the disease as seen in many reported cases diagnosed only at the autopsy table a loss of fifteen lbs in six weeks and bearing in mind the warnings issued by authors reporting well-developed malignant growths exploratory intervention was decided upon even though a clean-cut differentiation of hyperplasia adenoma and cancer could not be predetermined.

At operation adequate exposure was obtained through the gastrocolic omentum. Thorough palpation of the entire gland failed to reveal any discrete adenomata. The major portion of the gland was softer and paler than in the normal organ. At the extreme tail of the pancreas adjacent to the spleen there was a shotty like feel to the gland. Approximately two inches of the tail was then resected.

Following the operation and four hours after the intravenous injection of sixty Gm. of glucose the blood sugar was 333 mgm. with 0.5 per cent in the urine. Two days later the sugar was 178 mgm on forced carbohydrate feeding. The persistence of sugar in the blood was an encouraging sign that the rapid formation of insulin had been checked.

Three days postoperatively the patient developed a diffuse bronchopneumonia followed by acute dilation of the stomach and died. Autopsy permission was not obtained.

#### Pathologic report

Section through the pancreas shows an increase in the interstitial fibrous tissue and an irregular infiltration of lymphocytes about the islands. There were no marked abnormalities histologically involving the islands themselves of the sections studied. From these sections it would appear that the hypersecretion was due to overactivity of normal appearing epithelium.

There is definite need for more elaborate studies of this chemical entity. This paper is intended primarily to bring the syndrome before the profession so that earlier diagnosis of this condition can be made. Unquestionably it is

much more frequent than the literature would indicate, and a plea is made for a more thorough investigation of those obscure cases that we all too readily dismiss as being functional in origin

## REFERENCES

1. Cairns R. McD and Tanner S E Adenoma of Islets of Langerhans associated with hypoglycaemia. Brit. M J 1 8 (Jan 7) 1932
2. Carr Archie D. Parker Robert. Grove Edward. Fisher A. O. and Larimore J W Hyperinsulinism from B cell adenoma of the pancreas operation and cure J A. M. A. 96 1363 (April 25) 1931
3. Frank, Heinz Fatal hypoglycemia in adenoma of the pancreas Deutsche Arch f klin Med 171 175 1931
4. Graham E A. and Womack, N A. The application of surgery to the hypoglycaemic state due to islet tumors of the pancreas and to other conditions Surg Gynec & Obst. 56 728 1933
5. Harris Seale Hyperinsulinism and dysinsulinism (insulinogenic hypoglycemia) with a chronological review of cases reported in the United States and Canada. Internat. Clin Forty-Second Series 1 9 (March) 1932
6. Harris Seale Hyperinsulinism and dysinsulinism J A. M. A. 83 729 (Sept. 6) 1924
7. Howland Goldwin Campbell, Walter R Maltby Ernest J., and Robinson W L Dysinsulinism convulsions and coma due to islet cell tumor of the pancreas with operation and cure J A. M. A. 98 674 (Aug 31) 1929
8. Jacobs Sydney Hyperinsulinism with report of a case New Orleans M & S J 86 724 (May) 1934
9. Rathery F., and Sigwald J Fatal hypoglycemia during the course of treatment with insulin Gaz. méd. de France P 384 (June 1) 1932
10. Rynearson E H and Moersch F P Neurologic manifestations of hyperinsulinism and other hypoglycemic states J A. M. A. 103 1196 (Oct. 20) 1934
11. Tedstrom Milo K. Hypoglycemia and hyperinsulinism Ann Int Med 7 1013 (Feb.) 1933 34
12. Terbrüggen A Diabetes mellitus regeneration of the islands of Langerhans and adenoma of the islands of Langerhans pancreatic hyper- and hypoglycemia Munchen med Wchnschr 80<sup>3</sup> 1705 (Oct. 27) 1933
13. Thalhimer W and Murphy Francis D Carcinoma of the islands of the pancreas hyperinsulinism and hypoglycemia. J A. M. A. 91 88 (July 14) 1928
14. Well Clarence K. Functional hyperinsulinism epileptiform convulsions accompanying spontaneous hypoglycemia. Internat. Clin. 4 33 (Dec.) 1932
15. Wilder Russell M. Hyperinsulinism. Internat. Clin. 2 1 (June) 1933
16. Womack Nathan A Hypoglycemia due to adenoma of the islets of Langerhans South M J 27 135 (Feb.) 1934

## BRAIN ABSCESS AS A COMPLICATION OF SEPTIC PLEUROPULMONARY DISEASE\*

BY D A NICKERSON, M D †

## INTRODUCTION

THE unexpected, sudden appearance of symptoms of suppurative disease of the brain as a complication of septic pleuropulmonary disease has long been recognized. Why the brain is attacked more frequently than the other organs has always been a puzzling question and the relative rarity of metastatic abscesses in acute septic conditions, such as endocarditis, makes it even more difficult to understand. Many theories have been advanced, but none have been entirely acceptable. Schorstein<sup>1</sup> felt that in acute septic diseases, the brain has a greater resistance, while in chronic pulmonary disease, it is not so fully protected as other organs by locally formed antitoxic agents. Eagleton<sup>2</sup> asserts that the cerebral metastases from the lungs are primarily of venous or thrombotic origin as contrasted with abscesses of embolic or arterial origin in acute septic cases. He feels that pulmonary disease favors the thrombotic process in the cerebral veins, and substantiates his views by Arnold's<sup>3</sup> experiment. The latter injected foreign material into the larger neck veins and by producing a positive intrathoracic pressure found the material in the cerebral veins. This was explained as a retrograde venous phenomenon, but the relatively minor venous return by the azygos veins refutes this view. Gardner<sup>4</sup> felt that long-continued coughing, by producing a positive intrathoracic pressure, lowers the cardiac output temporarily, and a consequent transient ischemia of areas of the brain develops which tends to lower cerebral resist-

ance. Proof of this momentary ischemia is seen in the temporary unconsciousness occasionally noted in vital capacity tests. Parker<sup>5</sup> questions whether it is possible that the tissues of the lung and brain have something in common whereby brain tissue acts as a favorable soil for metastases of suppurative or carcinomatous processes of the lungs.

Following Schorstein's paper, cases of septic pleuropulmonary disease with subsequent brain abscesses have been divided into several types dependent upon the pathological lesion in the lung, chiefly, lung abscess, empyema and bronchiectasis. Such a classification is necessarily arbitrary since the pathological boundaries are not always clear and many cases combine several types of lesions. Many authors do not separate their cases properly, so that figures regarding the incidence of the various processes in the lung and metastatic cerebral abscesses are subject to criticism.

## MATERIAL

This report is based upon a study of sixty cases of brain abscess and 538 cases of septic pleuropulmonary disease occurring in a series of 10,502 autopsies performed in this laboratory over a period of thirty-nine years (1896-1934). This has been done in an attempt to establish the incidence and location of brain abscesses associated with septic disease of the lung and pleura.

Of the sixty cases of brain abscess, twenty-seven (45 per cent) were secondary to otogenic infections, a figure in accord with most writers. Twelve cases (20 per cent) were secondary to disease in the lungs, six cases (10 per cent) were associated with septicemia, five cases (8.4 per

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cent) occurred with acute endocarditis two cases (3.3 per cent) were consequent to septic disease of the orbit and eight cases (10 per cent) were sequelae of various other diseases.

In correlating these figures with the analysis of 538 cases of pulmonary disease only those cases where examination of the head was done of which there were 180 cases, are included in this study. Seventy-four cases of lung abscess showed eleven brain abscesses, a percentage of 14.7. Sixty-six cases of empyema showed but one cerebral abscess, a percentage of 1.5. Forty cases of bronchiectasis showed no cerebral metastases.

#### DISCUSSION

Table 1 gives the essential details of the twelve cases of cerebral abscess which occurred as sequelae of suppurative disease of the lung.

is higher than that usually quoted. Schorstein<sup>1</sup> found that thirty-two (62 per cent) were multiple and nineteen were single. Eagleton<sup>2</sup> in a review of the literature estimated that 45 per cent were single. Parker<sup>3</sup> found that his fourteen cases were evenly divided, seven being single and seven multiple.

There appears to be a slight predominance of localization in the parietal lobe in this group, four of the nine solitary abscesses being found in this area. There was but one abscess found in the frontal lobe, which indicates that localization here is a rarity in contrast to the commonly accepted belief. Of interest is one case involving the cerebellum as this is an unusual site, Groth<sup>7</sup> stating he had never seen one.

As to the side of the brain involved no direct relationship existed between it and the side on which the primary lung pathology was found.

TABLE 1

No	Sex	Age	Type	Brain Abscess		Lung Abscess	
				Location		Type	Location
97-378	Male	20	Single	Left Frontal		Single	Right Apex
99-69	Male	7	Double	Right Occipital		Single	Right Apex
01-29	Female	35	Single	Right Cerebellum		Single	Left Base
02-49	Female	42	Multiple	Right Parieto-Occipital		Multiple	Throughout
02-179	Female	58	Single	Throughout		Empyema	Left
06-151	Female	9	Single	Left Basal Ganglia		Single	Left Base
24-122	Female	26	Single	Left Parietal		Multiple	Right Base
24-173	Male	41	Single	Right Parietal		Single	Left Apex
26-164	Male	36	Multiple	Cerebellum (Uvula)		Bilateral	Both Bases
28-83	Male	27	Single	Throughout		Multiple	Left Base
32-465	Male	50	Multiple	Left Parietal		Single	Right Apex
33-7	Male	32	Single	Throughout		Multiple	Right Lung

and pleura. Of these, seven cases (58 per cent) followed single lung abscess, four cases (33 per cent) were associated with multiple lung abscesses. One case was secondary to empyema. These figures are in direct contrast to Schorstein, who collected sixty-nine cases, nineteen of which were his own. He found bronchiectasis present in thirty-eight cases (55 per cent), empyema in fifteen (23 per cent), gangrene of the lung in six (9 per cent) and the remaining ten were evenly divided with abscess of the lung present in only two cases. The figures are in keeping, however, with more recent reports. Cohen<sup>6</sup> in reporting nineteen cases, found that fourteen (73 per cent) were associated with lung abscess of which ten were single and four were multiple. Four of his cases (21 per cent) were secondary to empyema, and one case (5 per cent) followed bronchiectasis. No cases associated with pulmonary tuberculosis were found in this study, which is in accord with most authors, although Parker<sup>3</sup> reports one case and also cites a case secondary to pulmonary actinomycosis.

In this present series, eight of the cerebral abscesses (66 per cent) were single and four multiple. This incidence of solitary abscesses

No age group was preponderantly involved, the cases being quite evenly divided between the first to sixth decade. There was, however, a distinct predominance of the male sex by a ratio of 2.1.

No definite conclusions could be drawn from the bacteriological studies. The otogenic cases showed a predominance of hemolytic streptococci. Those secondary to disease of the lung showed a wide variety of organisms. The septicæmia cases were chiefly hemolytic streptococci, one unusual case, however, was found to have *B. mallei* in the heart's blood and brain. Of the acute endocarditis cases, two showed hemolytic streptococci, and two staphylococcus aureus in the heart's blood.

#### SUMMARY

1. Sixty cases of brain abscess and 528 cases of septic pleromypulmonary disease have been studied in an attempt to establish the incidence and location of cerebral metastases in suppurative disease of the lung and pleura.

2. Twelve cases of metastatic cerebral abscesses are presented in detail.

3. Of the etiological factors in brain abscess,

## CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

### CASE 21311

#### PRESENTATION OF CASE

A thirty-eight year old Chinese-American waiter entered complaining of abdominal pain.

During the past year the patient had gas pains localized to an area about four inches in diameter just below and to the right of the umbilicus. The pain was constant, occasionally sharp, and never radiated. At times it produced nausea but never actually caused him to double up or vomit. Three months before admission it became more severe and more constant. It bore no relation to meals but if he ate a hearty meal it would become more severe. His appetite, however, remained good. The pain was relieved in three ways: (1) pressure over the painful area, following which he could feel and hear the gurgle of gas passing, (2) a bowel movement, (3) lying on his right side with his knees slightly flexed. There had been no change in his bowel habits except that he had used mineral oil for the past three weeks on the advice of his physician. There was no pain associated with his bowel movements, nor had he ever noticed any bloody, tarry or clay-colored stools. During the past three months before admission he occasionally felt feverish and stated that on one afternoon a week before admission he had had a temperature of  $102^{\circ}$ . He had never had cough or hemoptysis. He had frequent night sweats during this illness. He had lost approximately thirty pounds in weight during the past three months. His present weight was about ninety-five pounds.

His father and mother, both over seventy, were living and well. One brother and sister were living and well.

He had been married twenty-one years. His wife and three children were living and well.

There was no history of carcinoma, diabetes or tuberculosis. Except for an appendectomy fourteen years before admission the past history is non-contributory.

Physical examination showed a thin man in no acute distress. There was evidence of marked loss of weight. The heart and lungs were negative. The abdomen was soft and very tympanic except in the right lower quadrant, which was completely occupied by a firm, elastic, slight-

ly tender, fixed, irregular mass. The right lower quadrant appendectomy scar was fixed to the mass. The right thigh could not be fully extended without pain. There was one small gland in the right axilla. His fingers were slightly clubbed. The blood pressure was 110/60. The temperature was  $99.2^{\circ}$ , the pulse 95. The respirations were 25.

Examination of the urine was negative. The blood showed a red cell count of 4,600,000, with a hemoglobin of 85 per cent. The white cell count was 13,000, 77 per cent polymorphonuclears. A Hinton test was negative. A barium enema passed without delay to a point in the transverse colon just distal to the hepatic flexure. At this point a loop of small bowel was observed to fill. There was a definite obstruction at this point to the passage of barium onward into the colon but the loops of small bowel continued to fill. A small amount of barium did pass on to outline poorly a very spastic cecum and ascending colon. The mass was found to overlie the constricted area, which was three inches in length. The edges of this constriction were shelved and the margins showed marked irregularity. A chest film was negative. A flat abdominal film was negative.

On the third day through an incision just inside the right anterior superior spine an abscess cavity was broken into by blunt dissection without entering the peritoneal cavity. A tube was sutured into the cavity and the wound closed. A culture of this abscess showed bacillus coli and non-hemolytic streptococcus. He ran a very slightly septic temperature, ranging between  $99^{\circ}$  and  $101^{\circ}$ . Approximately three weeks after the first operation the incision in the flank was enlarged posteriorly in order to give him adequate and more dependent drainage. Ten days later laparotomy was performed.

#### DIFFERENTIAL DIAGNOSIS

DR. LELAND S. MCKITTRICK: We might stop for the moment and review the information we have been given down to the laboratory examination.

"During the past year the patient had gas pains localized to an area about four inches in diameter just below and to the right of the umbilicus." Three months before admission the pain became more severe and continuous. I do not know what the writer means by "gas pains." According to my own conception it is a pain that comes and goes, more like colicky pain. The more you talk about steady pain,—I dissociate it a little bit from the so-called gas pains—the more we think of an inflammatory process. It is conceivable and quite likely that both are associated and that he may have something interfering with the normal peristaltic activity, presumably of the large bowel, because the level of the pain is below the level of the umbilicus and in addition he may have a localized inflam-

matory process somewhere in the right abdomen giving the more constant pain and soreness.

His procedures for getting relief are interesting and significant. "(1) Pressure over the painful area following which he could feel and hear the gurgle of gas passing." I do not know just how much importance to stress on the pressure of the hand over that area. I presume his relief of pain came in some way during manipulation, causing him to pass gas. "(2) A bowel movement." That is a perfectly definite concrete thing. He has pain, has a bowel movement, and then has relief from pain. That to me means that he probably has an obstructing lesion in the large bowel. "(3) Lying on his right side with his knees slightly flexed." The only significance that I can put on that is that he probably has an inflammatory process. When he lies down and relaxes the abdominal muscles by flexing his knees, he gets some relief from the discomfort he would otherwise have from the more tense muscles. To me that suggests that in addition to the obstructing lesion of the bowel there must be some inflammatory process present. There is very little in the rest of the present illness except the fact that he has had fever. He knows he had a fever of 102° on one occasion and he has felt feverish at other times. This is wholly in keeping with the conception that there is present an inflammatory process. His loss of weight fits in with either or both.

The next important thing is in the physical examination. The entire right lower quadrant is completely occupied by a firm, elastic, slightly tender, fixed irregular mass. He has an appendectomy scar which seems to be fixed to the mass, also the right thigh cannot be extended without pain. Whether that means that stretching his ileopsoas is the cause of the pain or simply means that in flexing the thigh there is a relaxation of all the abdominal muscles and relief of pain for that reason, I do not know. But I think it is suggestive again of the presence of an inflammatory process. I do not believe that one can thus far draw any conclusion other than to say that it would seem as if this man had an inflammatory process involving the large bowel in such a way as to give him some mechanical interference with a normal bowel activity.

The blood examination gives us no help. Frequently in a malignant disease of the right colon a marked secondary anemia is present. On the other hand one can have it without the secondary anemia so that that picture does not give me any great help, although I confess I am surprised that a man who has been sick as long as he has, who has lost thirty pounds and has been running a fever, should have as high a red cell count and hemoglobin.

He has by barium enema a definite obstruction at the proximal portion of the transverse

colon, when the barium gets around to that point the small bowel seems to fill, the mass overlies the constriction and the lumen of the bowel presents a shelving. That must mean an elevated portion within that area where it is constricted. The constriction is about three inches in length. The negative chest film may or may not be of interest in relation to a subsequent discussion of tuberculosis as a possibility. I mention it now because I think it can be dismissed. Tuberculosis of the bowel may occur in the absence of x-ray evidence of disease of the lungs just as well as in its presence. Diffuse enteritis is practically always associated with tuberculosis of the chest but localized tuberculosis that we see in the large bowel is not.

As we come down to the laboratory notes, I picture a process in the right colon which is a combination of an obstructive with an inflammatory process. That is he may possibly have had some type of inflammatory process which had constricted and obstructed the bowel or he may have had some type of lesion within the bowel which had perforated subacutely and had given him an inflammatory process secondary to the lesion of the bowel itself. A barium enema gives us very definite information. It localizes a lesion just distal to the hepatic flexure, that is the proximal portion of the transverse colon. I presume this man was small and thin, was very light probably, and had a very low transverse colon so that the mass could swing around and seem to be lower down in the bowel than it actually was. The other interesting thing in the x-ray is that as the barium reaches the obstruction the small bowel fills. There is only one interpretation that I can intelligently put on that. Whatever the process is, there must be an opening between the transverse colon at that point and a loop of small bowel which must be adherent to the lesion. In other words, we have an obstructive process involving the proximal portion of the transverse colon to which a loop of small bowel is adherent and between these loops a spontaneous anastomosis has taken place.

What are the conditions that one has to consider in attempting to come to some conclusion as to what the process is? Of course the thing that immediately comes up is carcinoma. I cannot from anything that is in the story exclude a carcinoma of the transverse colon with involvement of a loop of small bowel with secondary abscess. That is a possible explanation for the process. There is nothing about it which is not easily and entirely in keeping with such a diagnosis. Tuberculosis is the next, I think, and most likely. I think it is quite possible that the formation of a fistulous opening between this process and the adjacent coil of small bowel may be more in keeping with a tuberculous lesion than with malignant disease. As

we have already said, a negative chest x-ray means nothing. He has had a suggestion of fever with this for some little time, which might suggest strongly that it is of tuberculous origin rather than malignant disease. According to the description of the x-ray here—and I am quite willing to admit I do not know too much about tuberculosis of the large bowel—but my conception of tuberculosis of the large bowel is not quite in keeping with a constriction the edges of which are shelved. The shelving of the edges of the constriction to me more definitely suggests the possibility of a new growth in the bowel than it does the more diffuse process that one gets with tuberculosis. On the other hand I cannot completely and intelligently exclude it. There are certain other things that one thinks of. I have seen two cases of actinomycosis of the right side following appendectomy, but in each of the cases the interval between appendectomy and actinomycosis was a matter of a few weeks or months. There is an interval of fourteen years here so that the appendix cannot be a source for it. The description of an elastic mass is wholly out of keeping with the board-like mass one gets in actinomycosis and I think that can be dismissed merely after the mentioning of it.

Lymphosarcoma that one sees in the large bowel again must be mentioned and certainly is a possibility. I do not think that that is what it is. Most lymphosarcomas we have seen have not gone on to abscess formation in this way, and while again it is a possibility we may exclude it. Some time ago I happened to discuss at one of these conferences a large intestine case and about two months afterwards I had a very nice letter from a doctor in Nigeria who described a patient with a mass in relation to the right colon due to *entameba histolytica*. This patient is a Chinaman but I believe he has been in this country all of his life. He has not diarrhea, although this does not exclude it.

The other condition that one has to consider is the localized inflammatory process usually termed localized or regional ileitis. This lesion may involve the large bowel. It shows a great tendency to become adherent to adjacent structures, a fistula frequently forms and it is perfectly conceivable that such a process may be present in this man. It is a very unusual condition and, although there is no diagnostic x-ray picture and while none of us have seen many of these conditions, particularly in the large bowel, I do not think one would expect the constriction to have shelved margins. Therefore I would not be content to make that diagnosis.

It seems to me that the reasonable conclusion is that this man has either a carcinoma or tuberculosis of the beginning of the transverse colon with a loop of small bowel adherent to it and with a communication between, and with

the large mass surrounding the entire area largely inflammatory in character.

### CLINICAL DISCUSSION

DR ARTHUR W ALLEN. This man was very ill when he came in and had obviously been ill for a long while. He had this enormous mass in his right side which was a good deal more tender I think than the history would lead you to believe. An enthusiastic service had a barium enema done before we saw the patient. We feel that barium enemas perhaps may be dangerous in large bowel lesions in the acute stage with obstruction and although it did this patient no harm and contributed some very valuable information I think perhaps we ought to mention the fact that it is not a good policy to do a barium enema routinely until at least you have had a flat plate of the abdomen. We felt that whatever the original process was in the colon that there was no question he had an abscess in the region of the cecum. So, in spite of any suspicion that we might have as to the original lesion, an incision and drainage of the abscess was done. He responded only moderately well to this operation. His temperature did come down at first but in a few days started to rise again. We were getting quite discouraged about him and finally decided that the only thing to do was re-drain his abscess at a lower level. This gave a very good result evident in his chart and general condition, so that ten days after the second drainage it was possible to go in through a clean incision and resect the entire lesion. As you might imagine it was very adherent to surrounding structures, involving the cecum, ascending colon, terminal ileum, and extending into the psoas muscle, parietal peritoneum, etc. It was possible to remove it all and do a lateral anastomosis and the patient was finally discharged some twenty days after the last operation to a convalescent hospital.

### PREOPERATIVE DIAGNOSES

- First Operation. Pericecal abscess. Carcinoma of hepatic flexure.
- Second Operation. Pericecal abscess.
- Third Operation. Carcinoma of the cecum and transverse colon.

### DR LELAND S MCKITTRICK'S DIAGNOSES

- (1) Carcinoma or (2) tuberculosis of the transverse colon with involvement of the ileum.

### PATHOLOGIC DIAGNOSES

- Tuberculosis of colon and ileum.
- Fecal fistula.

### PATHOLOGIC DISCUSSION

DR BENJAMIN CASTLEMAN. The surgical specimen consisted of the entire ascending colon

and a portion of transverse colon and terminal ileum. The anastomosis described by the roentgenologist was a surgical one and not spontaneous as one might infer from the lack of any history. Apparently at the time of his appendectomy fourteen years before the surgeon resected a portion of cecum and anastomosed the terminal ileum to the ascending colon. What Dr. Allen did was to repeat this first operation higher up, i.e., resect the blind end of the ascending colon including the ileocolic anastomosis and perform another ileocolic anastomosis.

Almost the entire section of colon is markedly thickened and constricted. The mucosal surface shows an almost annular zone of irregular ulceration which corresponds to the shelving described by x ray. This is especially marked in the distal portion. There is also ulceration of the ileum at the point of anastomosis and at the base of this region there is a fecal fistula that apparently had drained through the psoas muscle and from which a culture of bacillus coli was obtained. Histologic examination showed tuberculosis. This case apparently belongs to the hypertrophic type of intestinal tuberculosis which often shows ulceration with surrounding areas of elevation. It is not the acute form of ulcerating enteritis that is usually associated with pulmonary infection.

DR. ALLEN. We thought that was a spontaneous anastomosis and the x ray people did commit themselves with a diagnosis of carcinoma as the first choice and tuberculosis as the second. I thought it was carcinoma.

DR. RALPH ADAMS. Dr. Langdon Parsons and I went over fifty two cases of tuberculosis of the cecum from 1924 to 1933. Of these twenty four were proved pathologically. We were directed to this study by a case that Dr. Parsons had in the Baker Memorial in which it was difficult to differentiate carcinoma of the cecum and tuberculosis. In fifty two cases of carcinoma of the cecum during the same period four had a preoperative diagnosis of tuberculosis. The most common symptom was pain referred to the region of the umbilicus. An irregular mass with tenderness was found in half of the cases and most of them were fixed to the right lateral wall. A minor point in distinction was that the red blood cell count was not below 3,800,000 in any of the cases of tuberculosis as contrasted with the carcinoma cases, in which the counts were almost all below 3,500,000. A positive guaiac on the stools appeared only five times. Thus we thought was due to the fact that most of our cases fell within the older groups which tend to have constriction and absence of blood, as against diarrhea and bloody stools in the younger groups. The x ray findings consistently reported spasm of the cecum. These findings were spoken of as a standard defect both in the hospital reports and in the literature. The attempt to confirm the barium enema by a gastro-

intestinal series almost consistently failed and in several cases the diagnosis was not made at the first entry. The most common error was the interpretation of the films as carcinoma of the cecum. We found that one third of the patients in the age group over thirty five who had the disease had it in the absence of clinical or x ray evidence of tuberculosis in the chest and only one third of the cases had clinical symptoms referable to the lungs or chest.

## CASE 21312

### PRESENTATION OF CASE

*First Admission.* A thirty five year old Italian laborer entered complaining of right lower quadrant pain.

Approximately one year before admission he noticed that he was bleeding from his rectum. This hemorrhage continued for four or five days and then disappeared for a period of a month. There was no pain and no other symptoms except for moderate constipation. The hemorrhage continued to appear at intervals until three months before admission, at which time it became continuous more marked at night. Associated with this increased melena there was severe tenesmus, often as much as thirty times a day, each attempt being rewarded by a slight show of watery fecal material and some blood. During the past three months there had been intermittent pain often very severe, which was localized to the right lower quadrant but at times was generalized throughout the abdomen and was often relieved by a bowel movement. There was some pain upon urination, especially on the right side of the scrotum. During the past year he had lost about fifteen pounds in weight.

His family, marital and past histories are non-contributory. There was no history of carcinoma or tuberculosis.

Physical examination showed a thin, undernourished man with evidence of recent loss of weight. His teeth were dirty and carious, there was moderate pyorrhea. The chest showed a few prolonged inspiratory and expiratory sibilant and sonorous rales. There was no dullness. The breath sounds were not prolonged. On rectal examination there was a firm, irregular, fixed annular mass well within the reach of the finger. The finger however, could be passed through the lumen but the top of the growth could not be reached. The blood pressure was 106/64.

The temperature was 99.6°, the pulse 65. The respirations were 20.

On the day following admission abdominal exploration revealed a firm, annular mass in the upper portion of the rectum. The liver was free from metastasis. Upon incision the perineal reflection from the rectum was found to have extensive glandular enlargements. It was thought unwise to attempt resection of the



growth The sigmoid was then delivered through the wound and a colostomy performed Histologic examination of a lymph node and a fragment from the rectum showed no evidence of malignancy

He had a stormy postoperative convalescence and was finally discharged two weeks after operation to the Huntington Hospital for radium treatment

*Second Admission, four years later*

Following discharge he reported to the Huntington Hospital every two or three weeks for radium treatment over a period of six months A histologic examination of a piece of tissue from the region of the tumor removed at the Huntington Hospital showed no evidence of neoplasm He did well for the remainder of this interval until a few days before this admission, when he complained of slight pain in the right lower quadrant There had been no nausea or vomiting but he had bled occasionally from his colostomy His stools, however, were normal in consistency

Physical examination showed a hernia in the lower end of the abdominal wound The abdomen was soft In the right lower quadrant there was a slightly tender movable mass approximately 4 centimeters in diameter

His chart was normal

Examination of the urine was negative The blood showed a white cell count of 13 800

On the third day through a right oblique abdominal incision a dilated, thickened adherent appendix was removed Exploration revealed that the mass felt before operation was in the cecal wall and mesentery forming a tumor approximately 5 by 3 centimeters The rectal tumor had completely disappeared except for induration in the pelvic floor At the point where the rectum passed through this there was a narrow stricture The liver was negative The ileocecal glands were enlarged and one was removed Histologic examination of the glands and appendix showed lymphoid hyperplasia and healed appendicitis respectively

He did fairly well postoperatively and was discharged two weeks later

*Final Admission, fifteen months later*

Following the last admission the mass in the right lower quadrant enlarged and receded in size and because of this the patient thought it was gas The pain, however, continued as a dull steady ache One week before admission he began having colicky pains in the right lower quadrant which lasted about fifteen to twenty seconds and recurred every five minutes His colostomy had continued to function satisfactorily although he did have some constipation close to the colostomy opening Abdominal examination showed, in addition to the colostomy and right lower quadrant scar, a hard, irregular, movable, egg-sized mass apparently intraabdominal but located just beneath the appendectomy scar.

The temperature was 97°, the pulse 80 The respirations were 20

Examination of the urine was negative except for an occasional white blood cell and many brown granular casts The blood showed a red cell count of 6,000,000, with a hemoglobin of 80 per cent The white cell count was 10,900, 79 per cent polymorphonuclears Two stool examinations gave negative guaiac tests A smear was negative for tubercle bacilli A Hinton test was negative

X-ray examination was unsatisfactory because the patient expelled the enema

On the fourth day operation was performed, and the cecum, ascending colon and terminal foot of ileum were resected He did poorly postoperatively, developed signs of bronchopneumonia and died on the fifth postoperative day

### DIFFERENTIAL DIAGNOSIS

DR ARTHUR W ALLEN This is such a typical story of carcinoma of the rectum that, except at these clinico-pathologic conferences, almost any other possibility would be precluded

Of course this is a fairly young man, only thirty-five, but carcinoma of the rectum may happen in the twenties and I believe cases have been reported in the teens, thirty-five is not too young an age to have such a disease appear He had been well until he started to bleed from his rectum He bled a little for a few days and then stopped and then bled intermittently up to three months before he came in, when he began to bleed daily and had tenesmus requiring relief at the toilet many times a day That is a very typical story for carcinoma of the rectum This growth was easily felt by the examining finger and some lumen was still present, but it was not possible to get a proctoscope or finger through it Such tumors are hard and indurated and frequently there is so much infiltration, either inflammatory tissue or malignant disease, around them that it is often impossible to reach the top of the growth The pain on urination would lead one to suspect that the metastases had perhaps encroached upon the urinary tract, and further confirms the suspicion of a very advanced carcinoma of the rectum with marked pelvic metastases

He had lost fifteen pounds in weight, probably due to diarrhea

At operation the liver was free of metastasis It is not at all uncommon in carcinoma of the rectum where the pelvis may be full of metastatic nodules to find that the disease has not reached the liver Obviously the operator felt that the tumor was not removable and did a colostomy above the growth which in itself probably would not have affected the tenesmus very much A point which I think one might speak of with colostomy above a low growth, one that is creating constant desire to defecate, is that colostomy does not always relieve tenesmus very

much. It does help if in addition to the colostomy one divides the sphincter muscles so that there is a continuous discharge, thus eliminating the urge to evacuate the rectum.

The fact that we had a negative pathologic report from the lymph node and from a biopsy from the rectum seems a little queer and makes us wonder, that is, if it was negative so far as malignant disease is concerned, and makes us wonder what type of lesion we could be dealing with if it is not carcinoma. I am not worried about the biopsy from the rectum because in these growths where there is more or less stricture it sometimes is not possible to get a specimen from the growth itself. One may easily take a bit of mucous membrane where it is folded over the edge of the growth and that naturally would not show any of the disease, for this reason occasionally rectal biopsies do turn out to be negative so far as malignant disease is concerned even if the diagnosis is clinically evident. The fact that the lymph node was not involved makes me a little bit more suspicious because one would expect the lymph node to show metastatic disease. However I believe that I will so far have to conclude that this man had carcinoma of the rectum. He was treated at the Huntington Hospital with radium. I believe that he would not have had six months of radium treatment at the Huntington Hospital if the Huntington Hospital as well as this hospital had not thought that this man had malignant disease.

"A histologic examination of a piece of tissue from the region of the tumor showed no evidence of neoplasm." One wonders how that specimen was removed, whether from the tumor itself or whether again they got a piece of normal mucosa.

The dilated appendix is an important factor and means that he had obstruction beyond the cecum somewhere because the appendix is distended with gas only where there is obstruction beyond the cecum.

It is a little disturbing that we have no note about the rest of the abdominal exploration. To what was his large bowel pain due? Was it due to a poorly functioning colostomy which might have given him backing up in the rest of the colon or has he a lesion which was not palpated somewhere else in his colon between the cecum and colostomy? We know that he had bled several times through the colostomy. If that is true it is an important statement but practically all colostomies have a tendency to ooze a little bit from the exposed mucosa at times. Often there will be a little blood on the dressing. It may be an accurate story. If it is accurate, it is important, because if he has bled he has a lesion somewhere else in his colon. The histologic examination of the colon showing lymphoid hyperplasia is again not necessarily

against the fact that this lesion in the bowel is carcinoma. Obviously the operator felt that this was not a malignant lesion in the cecum and felt it was an inflammatory lesion or he would have prescribed something more radical than appendectomy for relief of the tumor of the cecum in the presence of what appeared to be an apparently healed lesion in the pelvis.

"In the right lower quadrant there was a slightly tender movable mass approximately four centimeters in diameter." One would draw the conclusion from this description that this mass in the right lower quadrant had not increased tremendously in size during the past fifteen months, which is somewhat surprising.

His red blood cell count is put down in large figures, 6,000,000, and the hemoglobin 80 per cent, which coincides perfectly well with Dr. Adams' report on tuberculosis of the cecum but not very well with carcinoma of the cecum. We expect anemia associated with carcinoma of the cecum.

We have, then, a patient with a perfectly typical story for carcinoma of the rectum who apparently, after a colostomy, was successfully treated with radium so that he had a respite of four years. I am not sure how many inoperable carcinomas of the rectum are successfully treated with radium but my impression is that they are not very common. The percentage I am sure is very much less than the percentage of cures of carcinoma of the cervix treated by radium. Then he comes back four years afterwards apparently with a mass in the region of the cecum which again is negative to biopsy so far as malignancy is concerned and if we are to believe his story he probably has bled some from the colostomy. The statement that this growth in the region of the cecum did not seem to increase greatly in fifteen months may not give us a true conception of affairs because it may have been a slowly growing lesion of one sort or another. I would feel that this man had probably multiple polyps in his large bowel. The first one to become malignant being in the rectum afterwards another lesion in the colon, probably independent of the original tumor. Multiple malignant lesions in the colon are not too uncommon developing on polypi, so I should feel that that would perhaps explain the story better than any other condition and that he had in addition to this mass in his cecum something in the colon between that and his colostomy. I do not think that tuberculosis could possibly explain this picture. Time is short and I can not go into all the details on that. I do not believe I can explain it. I cannot imagine any type of inflammatory condition that would explain the original condition. It is possible that the second lesion could be non-specific granuloma (regional ileitis) but I think that is unlikely. Here is a man with a carcinoma tend

ency possibly, and there is no reason why he should not have multiple lesions. Lymphosarcoma has to be mentioned as a possibility and that might be the second best bet, but I should adhere to the diagnosis of carcinoma as the first

#### CLINICAL DISCUSSION

DR LELAND S MCKITTRICK I did not remember having seen this man until I was just shown the record. I saw him in 1924 and treated him with radium and I remember him because I thought he had a carcinoma of the rectum and later all evidence of disease disappeared, but he could not be recorded as a cure because we did not have a positive pathologic report. He had a fixed growth, very hard, which I had never at that time seen cured by radium, nor have I since.

#### CLINICAL DIAGNOSIS

Preoperative Hypertrophic tuberculosis of the cecum

DR ARTHUR W ALLEN'S DIAGNOSIS

Carcinoma of the large bowel (multiple)

#### ANATOMIC DIAGNOSES

Amebic granuloma of the cecum

Operation wounds    Resection of the cecum  
                             Ileocolic anastomosis  
                             Colostomy

Bronchopneumonia

#### PATHOLOGIC DISCUSSION

DR BENJAMIN CASTLEMAN The preoperative diagnosis at his last operation was hypertrophic tuberculosis of the cecum. The surgeon found a firm tumor which felt like carcinoma involving the cecum. The tumor was firmly adherent in the right flank. No metastases to the liver or tubercles on the peritoneum were seen. Some of the mesenteric glands

were enlarged. The surgeon's postoperative diagnosis was also tuberculosis.

The specimen consisted of the cecum, ascending colon and a portion of terminal ileum. Almost the entire cecum was replaced by an annular, very firm, ulcerated granulomatous mass about seven centimeters in length. The cut surface of the tumor was hard, white and fibrous. Histologic sections of the wall of the ulcerated area showed a layer of granulation tissue, the superficial portion of which was necrotic, while the deeper portions and the dense fibrous tissue below showed a marked chronic inflammatory reaction, the predominant cell being the eosinophil, although there were moderate numbers of lymphocytes and plasma cells. In a few places along the inner margin of the necrotic granulation tissue definite entamebae histolyticae were seen, one containing many red blood cells.

This case is quite similar to the condition called "amebic granuloma" by Gunn and Howard\* of Stanford University. They reported three cases of amebic granulomatous lesions of the large bowel, all giving symptoms, signs and x-ray appearances of carcinoma, and all called carcinoma clinically. Two of their cases showed involvement of the cecum and the other of the transverse colon. In this part of the country where amebic infections are so rare one almost always thinks only of the dysenteric form and rarely hunts for amebae in the stools except in cases of severe diarrhea. It certainly was not suspected in this case and no search of the stools was ever made.

This case also brings up the question of the reported cures of inoperable cancer of the colon by x-ray and radium. I feel certain that some of them, especially those in which a biopsy was not done, might well have been amebic or other types of granuloma.

Unfortunately we were not able to examine the rectum, but there is little doubt that the original lesion there was identical.

\*Gunn H and Howard N J. Amebic granulomas of the large bowel. J A M A 97:166, 1931.

# The New England Journal of Medicine

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## THE PREVENTION OF POSTVACCINATION ENCEPHALITIS

POSTVACCINATION encephalitis has been a subject of considerable interest in recent years and occasional cases have been reported in the American literature, seventy five in all, according to Bauer<sup>1</sup>, including his own case, a six year old girl who made a complete recovery. The course of the disease is stormy and the prognosis grave although, when not fatal, complete mental and physical recovery is the rule. This seems surprising in view of the pathologic picture, consisting of adventitious and periventricular round cell infiltrations distributed throughout the brain and cord with myelin degeneration about the smaller vessels.

Of especial interest however, is Bauer's advice as to the prevention of postvaccination encephalitis, divided, according to clinical evidence, under three heads. First, the rarity of postvaccination encephalitis in infants under one year of age indicates that infants are not

apt to be sensitive to virus in these early months of life, and the same holds true of secondary vaccinations at any age.

Secondly, if further desensitization to virus has been accomplished by other immunizing agents, such as diphtheria toxoid, there is still less chance of developing encephalitis. Vaccination performed too soon after the toxoid infection, however, particularly if alum precipitated toxoid is used, will probably not be successful, at least a month must be allowed to elapse.

Thirdly the single short scratch or puncture method of vaccinating should be employed, as this allows the minimal effective amount of virus to enter the skin and desensitize the individual before its multiplication reaches the amount of the large doses administered by other methods.

## REFERENCE

1. Bauer, L. L. J. Pediat. 6: 61 (April) 1935

## THE BOSTON CITY HOSPITAL

THE way in which a large and loosely organized public institution may be exploited for private gain is suggested by the recent charges of the Boston Finance Commission against the City Hospital. Apparently there have been gross waste and theft of materials, equipment and food on a fairly large scale, and charges of lax discipline, excessive personnel and political interference in the hiring of employees have been made, whether or not those charges can be substantiated.

Certain figures, however, are difficult to explain. Thus it is stated that Bellevue Hospital in New York, feeding 1253 more persons daily than the Boston City Hospital, annually uses 50,000 pounds less meat and 25,000 pounds less butter. The Boston hospital has 13 employees for every 10 patients, as compared with 10 employees to 13 patients in similar institutions in other cities.

Further findings of the commission are as follows.

In order to stop the present thieving and to prevent interlopers from having the run of the hospital and use of the employees' dining rooms, a stricter control of the entrances and exits should be established.

Automobile parking on the grounds constitutes a fire menace.

Excessive personnel is due to the fact that many temporary employees furnished from the mayor's office are unfit or refuse to do their work, necessitating additional help. (This statement the mayor has denied.)

The labor turnover is greater than in any other city department except, perhaps the department of public works.

Long and unwarranted delay in the opening

of the new \$400,000 kitchen unit was partly responsible for the waste in foodstuffs

A business manager ought to be appointed with full responsibility and control over the business administration of the hospital

Authority over and responsibility for the employment of employes other than the surgical and medical staff should be vested in the various heads of the division of administration under the general supervision of the business manager

Efforts should be made to bring about a greater coordination of the operation of the various departments of administration, and also such new construction as may from time to time be in process

A system of adequate and accurate records for the business administration of the hospital should be established and maintained

The findings of the commission deserve serious consideration, and it is probable that they are substantially correct. There is no question that the trustees of the hospital are a body of able and honest men, receiving inadequate recognition and functioning to the best of their ability with inadequate authority to prevent abuses or effect a reorganization

The only real solution of the City Hospital's problems is the appointment of an able administrator who will be free from political influence and vested with enough power to keep the institution above politics

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

ELEY, R CANNON M D Department of Medicine, University of Virginia, 1925 Associate in Pediatrics and Communicable Diseases, Harvard Medical School and Harvard School of Public Health Associate Visiting Physician, Children's Hospital His subject is "The Control of Measles" Page 195 Address 319 Longwood Avenue, Boston, Massachusetts

MCDONALD, FRANCIS C A B, M D Harvard University Medical School 1929 Assistant to the Physician-in-Chief Boston Floating Hospital Instructor in Pediatrics, Tufts College Medical School Assistant Physician, Children's Clinic, The Boston Dispensary His subject is "Whooping Cough" Page 198 Address 370 Longwood Avenue, Boston, Massachusetts

ANDERSON GAYLORD W A B, M D Harvard University Medical School 1928 Deputy Commissioner and Director of the Division of Communicable Diseases, Massachusetts Department of Public Health Assistant in Public Health Administration, Harvard School of Public Health His subject is "The Present Status of

Scarlet Fever Prevention" Page 203 Address Room 546, State House, Boston, Massachusetts

ROBINSON, ELLIOTT S B A., Ph D, M D Yale University School of Medicine 1918 Director, Division of Biologic Laboratories, Massachusetts Department of Public Health His subject is "The Control of Diphtheria" Page 208 Address 375 South Street, Jamaica Plain, Massachusetts

SMITH, RICHARD M M D Harvard University Medical School 1907 Sc D Assistant Professor of Pediatrics and Child Hygiene, Harvard Medical School and School of Public Health Visiting Physician, Infants' Hospital, Boston Associate Visiting Physician, Children's Hospital, Boston He presents a "Summary" of the Symposium on the Control of Communicable Diseases Page 211 Address 66 Commonwealth Avenue, Boston, Massachusetts

BARNES, J ARTHUR A B, M D Harvard University Medical School 1899 F A C S Attending Surgeon, St Vincent Hospital, Worcester Address 390 Main Street, Worcester, Massachusetts Associated with him is

RICHMOND, EUGENE L A B, M D Cornell University Medical College 1929 Assistant Attending Surgeon, St Vincent Hospital, Worcester Address 390 Main Street, Worcester, Massachusetts Their subject is "Hyperinulinism" Page 225

NICKERSON, D A M D Tufts College Medical School 1933 Assistant in Pathology, Mallory Institute of Pathology, Boston City Hospital His subject is "Brain Abscess as a Complication of Septic Pleuropulmonary Disease" Page 228 Address Mallory Institute of Pathology, Boston City Hospital, Boston, Massachusetts

TOBEY, HAROLD G A B, M D Harvard University Medical School 1911 F A C S Surgeon, Massachusetts Eye and Ear Infirmary Visiting Otolaryngologist, Children's Hospital Otolaryngologist, New England Baptist Hospital His subject is "Experiences in Ionization of the Nasal Mucous Membrane" Page 230 Address 270 Commonwealth Avenue, Boston, Massachusetts

### MISCELLANY

#### DECISIONS OF THE SUPREME JUDICIAL COURT

Appeal, by the insurer in proceedings under the workmen's compensation act, from a decree entered by order of Whiting, J, in the Superior Court

Pierce, J This is an appeal by the insurer from a decree entered in the Superior Court after certification from the Industrial Accident Board, by which payment for services of a physician, George

W Blood, was ordered G L. (Ter Ed.) c. 152 s. 30 reads "During the first two weeks after the injury and if the employee is not immediately incapacitated thereby from earning full wages then from the time of such incapacity and in unusual cases or cases requiring specialized or surgical treatment, in the discretion of the department, for a longer period the insurer shall furnish adequate and reasonable medical and hospital services, and medicines if needed together with the expenses necessarily incidental to such services. The employee may select a physician other than the one provided by the insurer and in case he shall be treated by a physician of his own selection or where, in case of emergency or for other justifiable cause, a physician other than the one provided by the insurer is called in to treat the injured employee, the reasonable cost of his services shall be paid by the insurer subject to the approval of the department. Such approval shall be granted only if the department finds that the employee was so treated by such physician or that there was such emergency or justifiable cause, and in all cases that the services were adequate and reasonable and the charges reasonable.

The reported evidence which, in the main is not disputed by the appellant insurance company discloses the following facts. One Katherine Zombric on October 7 1930 was twenty-two years of age and was then employed as an operative in the mill of the United Rayon Company of Fall River. On that day shortly after she began work in the morning her hair was caught in a revolving shaft and her scalp and back of neck were torn off. She was immediately taken to St. Anne's Hospital. This hospital was incorporated under the provisions of R. L. c. 125 "for the purpose of maintaining homes or hospitals for the care of persons who are ill disabled, invalid or convalescent, and furnishing them with medical and surgical treatment, support and nursing and of maintaining schools for the training of nurses." Shortly after the arrival of the employee at the hospital some one called Dr. George W. Blood "to go down to the hospital on an emergency as quickly as possible." Dr. Blood was a member of the staff of the hospital but was not "on service" that week. However he was subject to call from the hospital for the treatment of emergency cases.

Dr. Blood testified that it was one of the conditions under which he took service at the hospital that he would be subject to calls by the hospital in the event of an emergency arising that the case of the employee was an emergency case and that he was called by the hospital and not by the employee nor by any member of her family that after he treated the employee at the hospital her father came to see him at noon time and he had some conversation with him that he told the father all about the case, how long she would be in the hospital, and that he was perfectly free to get any doctor he wished that the father's first reaction was that he wanted a specialist that Dr. Blood said that he specialized in surgery and the father told

him to keep on and do the best he could with the case. The evidence is not disputed by the insurer that the skin was torn over the right side and back of the neck nor that the severity of the injury necessitated several skin graftings and manipulations of the neck muscles at different intervals nor that the entire recovery of the patient required several months treatment. It is not disputed that the insurer has paid the compensation due the employee under the statute as well as the bills for her hospital treatment from October 7 1930 until November 7 1931 when she was discharged from the hospital.

On October 14 1930 Dr. Blood wrote the insurer Arrow Mutual Liability Insurance Company informing that company of the fact that Katherine Zombric had been injured at the United Rayon Mills on October 7 1930. This letter stated the cause and the result of the injury and concluded "This is a very serious and unusual accident and will probably require several months of treatment and possibly several skin grafting operations. I would appreciate a note from you authorizing such treatment." The insurance company on October 20 1930 acknowledged receipt of Dr. Blood's letter in these words "The accident to the above employee was an extremely unfortunate affair and we are eager to do everything to make possible her recovery. We know that Miss Zombric had been sent to the surgical service of St. Anne's Hospital but had no knowledge as to what member of the hospital staff was in charge of this case. We are pleased to learn that the girl is being treated on your service and we will be happy to cooperate with you in any way. Several days after the accident the Mother Superior of the hospital called on Mr. Joseph A. Parks at the State House and at that time we assured Mr. Parks that we would accept liability because of the hospital care. Dr. J. Newton Shirley of this office is usually in Fall River each week, and I am asking Dr. Shirley to keep in touch with you and to give you any assistance you may need. The record does not disclose that the insurer furnished any medical attention to the employee following its letter of October 20 1930 nor that any physician other than Dr. Blood attended the employee. There is no direct evidence that the employee herself selected Dr. Blood as her physician nor that she authorized any other person to do so on her behalf but the employee's acceptance of the medical services of Dr. Blood for many continuous months clearly warranted the inference if it did not require a finding that the employee ratified and adopted the action of her father in this regard.

It is not contended or found that there was in fact any contract between the insurer and Dr. Blood to pay for the services rendered. The contention of the claimant and the decision of the board are predicated upon the finding or ruling that there existed justifiable cause under G L. (Ter Ed.) c. 152 s. 30 for Dr. Blood continuing his treatment

of the employee as a private patient. The insurer seasonably filed requests for findings of fact and rulings of law. These requests are numbered 1 to 20 inclusive. The reviewing board gave requests numbered 1, 2, 3, 4, 7, 8, 9, 10, 12, 14 and 18 but refused the others. The board in this connection specifically found the following facts under said s 30. On October 7, 1930, at about 7 a m., Katherine Zombric, a girl twenty two years of age and single, sustained a very serious scalp injury which arose out of and during the course of her employment when her hair caught in a revolving shaft. Necessity required that she be sent to the nearest hospital for specialized and surgical treatment. The nearest hospital was the St. Annes Hospital. Dr G W Blood was a member of the staff at the time and had been for a good many years, but he was not on service or duty during the period within which this accident occurred. On account of the exigency, Dr Blood was called by some one connected with the hospital and responded, *rendering emergency service*. Upon the same day, the employee, through her father, selected Dr Blood as her physician. Beginning October 20, 1930, the insurance company furnished no other treatment, and after conferring with the insurance company and receiving a letter from it, Dr J Newton Shirley, employed by the Arrow Mutual Liability Insurance Company, consulted with Dr Blood each week while the employee was under his care.

The board further found that in the circumstances disclosed by the evidence—that Dr Blood came in on the case in the emergency, was asked to continue on the case by the employee's father, together with his correspondence, talk and contact with the insurer or its representative,—there existed justifiable cause under s 30 for Dr Blood continuing his treatment of the employee as a private patient, that the treatment rendered was adequate and reasonable and a reasonable fee for the services of the physician is \$826.

The insurer contends that there was no evidence to support the finding that "upon the same day, the employee, through her father, selected Dr Blood as her physician." The contention is met by the inference, as above stated, that the action of the father was ratified by the conduct of the employee. The insurer further contends that there is no evidence to support the finding that "beginning October 20, 1930, the insurance company furnished no other treatment, and after conferring with the insurance company and receiving a letter from them (above quoted) Dr J Newton Shirley employed by the Arrow Mutual Liability Insurance Company, consulted with Dr Blood each week while the employee was under his care." This contention is based on the position that "The question here involved is whether a physician on the staff of such a general public hospital is entitled to compensation from the insurer for his services to a patient in such hospital in the absence of any contract therefor with the insurer." The insurer further

contends that the following paragraph in the decision of the Industrial Accident Board that "The Board, under the circumstances disclosed by the evidence—that Dr Blood came in on the case in the emergency, was asked to continue on the case by the employee's father, together with his correspondence, talk and contact with the insurer or its representative,—find that there existed justifiable cause under section 30 for Dr Blood continuing his treatment of the employee as a private patient," was unwarranted in fact and in law. This contention rests upon the fact that the employee was sent to the nearest general public hospital for emergency treatment, which was rendered by a physician on the staff of the hospital called by the hospital authorities, that there is no evidence the treatment began as that of a "private patient", that the treatment continued in the same hospital by the same staff surgeon, and the hospital bills were paid by the insurer. As contended, the treatment did not begin as that of a "private patient," but it was continued as such following the employment of Dr Blood at noon on the day of the accident. The insurer relies on Allen's Case, 265 Mass 490. That case is distinguishable in its facts from the instant case in two respects (1) the employee did not select the physician, and (2) there was no emergency or other justifiable cause which gave a right of recovery to the physician for services rendered. *In the case at bar there were both an emergency and a selection of a physician after the employee had recovered consciousness, the exact moment of such selection being immaterial.*

Decree affirmed

E Field, (R. H Field with him,) for the insurer  
W C Crosley, for the claimant

Messrs Cenedella, Gleason, Clark and Mrs Tousant—  
for physician.

Affirmed by Supreme Judicial Court.

Opinion filed March 27, 1935

#### DECREE OF THE SUPREME JUDICIAL COURT

CARROLL, J. In this proceeding under the workmen's compensation statute Dr Spellman, a member of the staff of the hospital to which the employee was taken following his injury, seeks to recover compensation for his services as a physician in the treatment of the employee at the hospital. The employee was paid the compensation due him under the statute and the insurer paid the hospital bill amounting to \$63 00.

The Industrial Accident Board found that the injured employee consulted a doctor, who bandaged his hand, that he then went to St Elizabeth's Hospital where a nurse asked him if he had a doctor, and he said he knew no doctor at the hospital, *that the nurse "suggested the name of Dr Spellman and he said that Dr Spellman would be all right"*. The board further found that the employee did not choose a physician as the statute con-

templated that the insurer fulfilled the obligation placed upon it by the statute and furnished adequate and reasonable hospital services to the employee and denied the claim of the physician for services in the care of the employee. In the Superior Court a decree was entered for Dr. Spellman in the sum of \$45. The insurer appealed.

G. L. c. 152 § 30 so far as material provides that during the first two weeks after the injury the insurer is to furnish adequate and reasonable medical and hospital services that the employee may select his own physician or in case of emergency a physician other than the one provided may be called to treat the patient at the expense of the insurer subject to the approval of the department. As we construe the findings of the Board the insurer complied with the statute and did all that was required of it—it furnished the employee with adequate and reasonable medical and hospital services. Physicians as well as nurses are generally expected to be in attendance at a public hospital. A patient who has been taken to such an institution if he has no physician of his own to treat him naturally expects that he will receive treatment from someone on the staff. When an injured employee under the compensation act goes to such a hospital and does not select a physician the payment to the hospital of its charges includes the expenses of nurses and physicians and the insurer is not required to pay the physician who is a member of the staff for his services.

The Board found as a fact that the employee did not choose a physician. The finding was warranted. The employee was at the hospital for treatment. His response to the nurse's suggestion concerning Dr. Spellman was not a selection of a physician under the statute. The employee was willing to accept such facilities as were offered including nurses and physicians. He accepted the suggestion of the nurse but did not make such a selection as the statute contemplates when a patient selects a physician other than the one provided by the insurer.

There was no emergency which entitled the doctor to compensation under the statute. In case of an emergency a doctor called to treat a patient may recover compensation but this is subject to the approval of the department and in the case at bar there was no such approval.

Decree reversed

Opinion filed January 4 1929. Decree to be entered for the insurer.

#### IDENTIFICATION OF CRIMINALS

According to current reports Dr. Carleton Simon former Deputy Police Commissioner of New York City in association with Dr. Isador Goldstein ophthalmologist at Mount Sinai Hospital New York has after a year's study of the method of measuring the network of structures in the retina of the human eye devised a system which supplants other methods of identification.

Criminologists have found that chemicals and

surgery may invalidate fingerprints and physical peculiarities of suspects as has been found in some important cases.

The Simon method employs a retinal camera which records the distances of branching blood vessels from the optic nerve through a meshed screen.

It is claimed that anyone can learn how to use the system in two hours and that medical knowledge is not required.

The destruction of finger marks and blemishes has aided criminals in several cases. Enemies of society will not be likely to have their eyes removed.

#### THE REGISTRATION OF OSTEOPATHS IN GREAT BRITAIN

The Committee of the House of Lords (England) has recommended that the bill for the registration of osteopaths be not further proceeded with.

This action is the result of an intimation by the supporters of the measure that the bill if enacted would place osteopaths on a par with doctors and also because further consideration be given to the scientific basis of osteopathy.

The Committee also reported that "no definition of osteopathy had emerged which satisfactorily differentiated the osteopathic sphere of activity."

There are reported to be from two thousand to three thousand osteopathic practitioners in Britain of whom only about one hundred and seventy can claim to be qualified—Digest of a report in the *New York Times* July 21 1935.

#### NOTICES

##### REMOVAL

HAROLD BEECHER HARRIS M.D. announces the removal of his office to 465 Columbia Road Dorchester Massachusetts.

#### LAWRENCE CANCER CLINIC

Established 1928

Lawrence Mass

July 20 1935

To the Physicians of the North Half of Essex County

Dear Doctor

The regular Lawrence Cancer Clinic to be held at Lawrence General Hospital 1 Garden Street Lawrence upon Tuesday August 6 at 10 00 A.M., will be a Demonstration Clinic with Channing C. Simmons M.D., of Boston, Surgeon-in-Chief to the Collis P. Huntington Memorial Hospital and member of the Cancer Commission of Harvard University Boston present as consultant. You are invited to accompany any of your patients whom you desire shall have this service, or to send them with a note and a report will be returned to you. This



service is gratis Your attendance at the Clinic is always welcome

This Clinic is endorsed by the Committee on Postgraduate Instruction of the Massachusetts Medical Society

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JOHN J McARDLE, M D,  
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THOS V UNIAC, M D,  
J FORREST BURNHAM, M D, *Chairman*

#### CITY OF NEW YORK, MUNICIPAL CIVIL SERVICE COMMISSION

This Commission will in the near future conduct an examination for the position of Associate Director of the Bacteriological Laboratories, Health Department.

The salary of the position is \$6,000 per annum and the duties of the incumbent will be to assist the director of the laboratories in the executive supervision of one of the largest and most important laboratories of its kind in this country

WM H ALLEN, *Secretary*

Municipal Building, Manhattan,  
Centre and Chambers Streets, Fourteenth Floor

### NOTICE OF MEETING

#### ELEVENTH CLINICAL CONGRESS OF THE CONNECTICUT STATE MEDICAL SOCIETY

NEW HAVEN, SEPTEMBER 17, 18, 19, 1935

The registration fee for the 1935 Clinical Congress will be \$2.00 Luncheons are not included in this fee, but will be available at a low cost.

More than 600 physicians from 9 states attended the 1934 Clinical Congress

To increase the value of the Congress, a Commercial Exhibit of some 25 carefully chosen exhibitors has been added this year The Exhibit will be held in the new Tompkins East I of the New Haven Hospital and will be open throughout the Congress

Afternoon sessions each day will be devoted to demonstrations and round table discussions on the subjects that have been presented at the morning sessions

All papers presented before the Congress will be abstracted in the October issue of the *Yale Journal of Biology and Medicine*

Free parking of automobiles for members of the Congress will be available near the meeting place Continuous telephone service will be maintained so that members can be reached at any time by calling New Haven 51161, Clinical Congress extension

Early registration will facilitate the work of the Committee on Arrangements If you expect to attend the congress, please send your check for \$2.00, made payable to the Connecticut Clinical Congress Names and addresses of all who register before

August 25 will be published in the final program to be distributed about September 1 Complete program may be secured by addressing

Creighton Barker, M D

Chairman of the Committee on Publicity  
and Registration

129 Whitney Avenue, New Haven, Connecticut

### SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

#### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, AUGUST 5, 1935

Wednesday, August 7—

†12 M Clinico-Pathological Conference Children's Hospital.

Saturday, August 10—

\*10-12 Staff rounds at the Peter Bent Brigham Hospital

\*Open to the medical profession

†Open to Fellows of the Massachusetts Medical Society

August 6—Lawrence Cancer Clinic See page 243

August 29 September 5—Latin American Congress of Physical Therapy, X-Ray and Radium For information address Dr Madge C L McGuiness, 1211 Madison Avenue, New York City

September 5, 6, 7—American Congress of Physical Therapy will meet at the Hotel Kansas City, Missouri Program and circular of information may be secured by addressing American Congress of Physical Therapy, 30 North Michigan Avenue, Chicago, Illinois

September 17, 18, 19—Eleventh Clinical Congress of the Connecticut State Medical Society See notice elsewhere on this page

October 7 10—American Public Health Association will meet in Milwaukee Wisconsin For information address the American Public Health Association, 50 West 50th Street New York City

October 21 November 2—1935 Graduate Fortnight of the New York Academy of Medicine See page 898 issue of May 9

October 28 - November 1—The Twenty-Fifth Clinical Congress of the American College of Surgeons See page 1065 issue of May 30

### BOOK REVIEW

**The Modern Method of Birth Control** Thurston S Welton 168 pp New York Walter J Black, Inc \$3.00

This little book gives a clear explanation of the modern concept of the physiology of reproduction It is, however, merely another paraphrasing of the work previously published by Ogino and Knaus It does not differ essentially from Lutz's book "The Rhythm" except in the use of a series of diagrammatic charts, of which there are sixty seven, together with a celluloid calendar wheel to be used with them Actually there are only seventy four pages of text in addition to the short explanations that go with the charts To your reviewer the use of these charts seems to add an unnecessary complexity to what is probably going to be a very satisfactory method of birth control As has been said, in reviewing other books on this same subject, to date we lack sufficient information to give this advice in cases of serious illness Another objection to this book is its price Three dollars seems a rather large amount for the information given

# The New England Journal of Medicine

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## ON PERFORATING INFLAMMATION OF THE VERMIFORM APPENDIX WITH SPECIAL REFERENCE TO ITS EARLY DIAGNOSIS AND TREATMENT\*

BY REGINALD FITZ, M D †

THE history of appendicitis is of especial interest to all physicians of Massachusetts. At the first meeting of the Association of American Physicians on the 18th of June, 1886, R. H. Fitz, a Bostonian, the Shattuck Professor of Pathological Anatomy in Harvard University read a paper entitled "Perforating Inflammation of the Vermiform Appendix with Special Reference to its Early Diagnosis and Treatment." This paper was discussed at length by

ures reflect very fairly the attitude of the entire medical profession toward appendicitis. Almost universally appendicitis has come to be regarded as a surgical ailment, a disease taught by surgeons to medical students and practitioners. It is a bold medical man who raises his head in public and claims more than a bowing acquaintance with disorders of the *appendix vermicularis*.

It is not to be wondered at that the disease at first appeared of so great surgical interest for eventually, the treatment is apt to be surgical rather than medical in nature. Naturally therefore, surgeons have done most of the observing, writing and talking about the diagnosis and treatment of appendicitis, its opera-

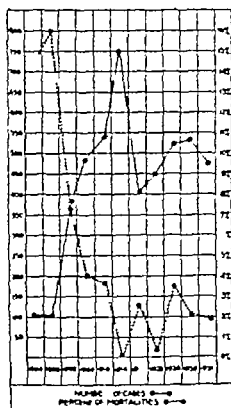


FIGURE 1. Appendicitis in the Massachusetts General Hospital.

William Pepper of Philadelphia, E. G. Janeway of New York, and by several others of the members present, and may fairly be said to mark the beginning of the general clinical recognition of the disease in this country.

Described first by a pathologist at a meeting of physicians, the disease soon was claimed by the surgeons. In the past fifty years but five papers on the subject of appendicitis have been presented at meetings of the Association of American Physicians whereas in the same period of time approximately ten times as many papers on this topic have been read at the meetings of the American Surgical Society. These fig-

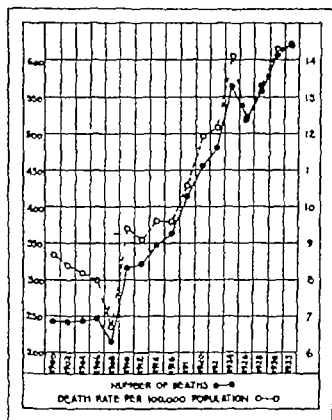


FIGURE 2. Appendicitis as an increasing health hazard. (From the Vital Statistics of Massachusetts.)

tive technique, and postoperative complications and, in fact, have done all in their power to make appendicitis as safe a disease as possible. They have accomplished a great deal. The records of the Massachusetts General Hospital serve well to illustrate what has taken place all over the country.

In the early days when the diagnosis of appendicitis seemed relatively difficult, but few cases were operated on and their mortality was high. Little by little the surgeons grew famil-

\*Presented at the Fiftieth Meeting of the Association of American Physicians, Atlantic City, May 7, 1935.

†Fitz, Reginald—Physician to the Peter Bent Brigham Hospital, Boston. For record and address of author see "This Week's Issue," page 280.

lar with the disease, operated earlier and with increasing temerity and thus succeeded in reducing to a very low figure the operative mortality in any large group of cases

During these years of improving surgical technique, however, a peculiar phenomenon has taken place. The total number of deaths from appendicitis has steadily increased. Each community with a collection of vital statistics duplicates the curious figures which have been observed in Massachusetts.

Here, for example, the death rate from appendicitis has increased from 8.7 per 100,000 population in 1900 to 14.4 in 1933. In 1900 only 243 fatal cases of appendicitis were recorded, in 1932 there were six hundred and twenty-three. Automobile accidents and appendicitis as unnecessary causes of death appear nowadays to loom very large.

It is well known that medical progress advances by cycles. The appendicitis cycle, it seems to me, began at the first meeting of the American Association of Physicians, rotated at once from the pathologist through the hands of medical men to the surgeons who developed satisfactory operative treatment most skillfully, and now at the end of fifty years revolves again to the pathologist and internist in the paradoxical condition I have mentioned, a common disease of low operative mortality in the hands of competent surgeons but in spite of this each year steadily proving fatal to an increasing number of people. During the next fifty-year cycle can pathologists and medical men add anything to the prophylaxis or treatment of appendicitis by which this disease may be jugulated?

Fitz pointed out in his original description of appendicitis that the disease occurred most frequently among healthy young adults, especially males, though it might afflict persons of either sex and any age. The diagnosis, in most cases, was comparatively easy. Sudden severe abdominal pain was the most constant first decided symptom, occasionally accompanied by a chill or nausea and vomiting. The temperature rarely was very high. If general peritonitis developed, it began on the second, third and fourth days after inflammation of the appendix was established. In fatal cases more than two-thirds died during the first eight days of the disease, and two-thirds of these died between the fourth and eighth days inclusive.

If the question of operative treatment arose, such treatment must be applied early. If delay in operation was warranted, this delay must be maintained until abscess formation took place, and then the abscess should be incised as soon as it became evident.

The initial medical treatment, essentially consisted in leaving the patient alone. To keep the bowels quiet was the first and last thought of the physician. Absolute rest in bed, and liquid diet in small quantities often repeated

were indicated, above all, sufficient opium to neutralize pain. A cathartic or laxative might be demanded by the patient or his friends and an enema be thought desirable. It appeared that the stirring up of peristalsis by such means was strongly contraindicated. Such a procedure might be the means of at once exciting a general peritonitis. If operation was decided against and recovery ensued the bowels opened spontaneously a few days after the discontinuance of the opium. Recovery from an attack of acute appendicitis often proceeded quickly, steadily and without disturbance, the appetite and sense of well-being returning long before the bowels were opened.

Such, in brief, were the ideas concerning acute perforative appendicitis in the days when the disease was in its infancy. They were based on sound clinical judgment and common sense and still stand the test of time.

Appendicitis remains much as it was, a disease occurring most frequently among healthy young adults, especially males, though it may afflict a person of either sex and any age. In a series of 2600 cases in adults\* treated at the Peter Bent Brigham Hospital sixty-eight per cent occurred in men and thirty-two per cent in women. The age distribution of these cases shows that nearly two-thirds were in people under thirty, and that only six per cent occurred in individuals past fifty.

The overwhelming majority of the Brigham Hospital case reports are to be found in the surgical records. Here appendicitis has been divided into five groups:

APPENDICITIS	CASES	DEATHS	MORTALITY
UNQUALIFIED	64	0	0
CHRONIC	808	1	1%
SUBACUTE	256	1	.4%
ACUTE	947	7	.7%
ACUTE WITH ABSCESS	551	61	11%

FIGURE 3. A classification of appendicitis to illustrate the dangers of the perforated appendix.

This classification merely serves to illustrate what everyone knows: the chief mortality from appendicitis occurs in those cases which have perforated and have developed general peritonitis.

Assuming that the Peter Bent Brigham Hospital's experience with appendicitis is not abnormal, one can estimate in round numbers from its figures and the reported deaths in the State that in 1932 at least 20,000 cases of appendicitis in adults were treated in Massachusetts. This gives some idea of the prevalence of the disease and its importance as a problem in public health.

Another interesting feature is brought forward if one estimates the age group in which

\*Since the Peter Bent Brigham Hospital does not treat any significant number of children all cases under ten years of age have been excluded.

occurs the chief mortality from appendicitis. The older the patient with appendicitis, the poorer is the prognosis. This fact is illustrated in graphic form by figure 4. The data support the viewpoint of many clinicians that appendicitis in young people is easily recognized, but that in the elderly it may present a peculiarly baffling diagnostic problem. Frequently this is forgotten.

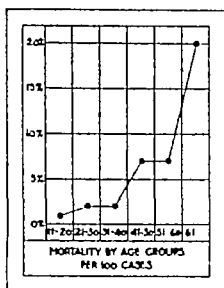


FIGURE 4. A tabulation of fatal cases to illustrate the dangers of appendicitis in elderly individuals.

The surgeons, and with much to be said on their side, blame two factors as chiefly responsible for the increasing gravity of appendicitis: they claim that too often the disease is not recognized with sufficient promptness, and that all too often cases are mistreated with laxatives or cathartics. The experience of the Peter Bent Brigham Hospital bears out these claims. Of sixty-five fatal cases of acute perforative appendicitis, but eleven per cent were operated on within twenty-four hours of the onset of acute abdominal pain, and but thirty-seven per cent within the first forty-eight hours. No case was given the benefit of surgery within the first twelve hours. On the other hand, in 100 cases of acute perforative appendicitis which recovered, twenty-five per cent were operated on within twenty-four hours of the onset of acute abdominal pain and fifty-two per cent within the first forty-eight hours. Eight per cent received the benefit of surgery within the first twelve hours of the onset of symptoms. Evidently it is well still to be reminded that if the question of operative treatment arises, such treatment must be applied early to be effectual.

The cathartic situation is equally striking. In sixty-five fatal cases seventy-four per cent had taken some sort of cathartic before entering the hospital, while in a hundred cases that recovered only fifty-one per cent had taken a laxative. Of the fatal cases thirty-one per cent had utilized multiple laxatives like salts, enemas, and castor oil combined and often repeated, whereas in the recovering group only thirteen per cent had employed such drastic treatment. Surely in the early management of appendicitis, to keep

the bowels quiet should still be the first and last thought of the physicians.

These remarks, admittedly, are trite and bring out nothing new or original. Every doctor recognizes that appendicitis is a common disease, more serious in elderly people than in the young, that it must be treated early by surgery or else left to recover spontaneously, and that laxatives are likely to be injurious. But in spite of this general knowledge, the deaths from the disease continue to climb each year. I raise the question as to whether concerted action on the part of the medical profession to combat appendicitis is not indicated. Such an effort has been attempted locally with some success in Philadelphia under the stimulus of Dr. John O. Bower. Similar efforts might well be made in other parts of the country.

There are at least three logical lines of attack on a public health problem of this nature. The first is in our Medical Schools. Appendicitis should be taught as a medical disease, more stress should be laid on the fact that it is the family doctor who almost invariably is called in to make the diagnosis and instigate treatment. Men going into practice must be taught more of the life history of appendicitis, of its diagnosis of its initial medical treatment of its dangers. In brief, more responsibility must be placed on the shoulders of the general practitioner for the early recognition and treatment of this disease.

Secondly, local medical societies must maintain a constant interest in appendicitis. Most doctors learn by repetition. The story of appendicitis must be repeated over and over to men in general practice and it apparently cannot be too strongly emphasized that appendicitis as a rule is an easy disease to recognize, that it begins with abdominal pain and usually with very slight fever, that almost any acute attack of painful indigestion is likely to be an early symptom of appendicitis, that stomach aches must always be taken seriously and not be treated over the telephone, that laxatives of any sort are always contraindicated and that the proper time to remove the acutely inflamed appendix is as early as possible after the diagnosis is established.

Thirdly, and perhaps nowadays this is of most importance, a campaign of popular education must be instituted. The public at large appears eager to learn about disease. Certainly those who "tune in" on their radios each evening are learning the names and uses of several laxative drugs which can be readily purchased at almost any drug store to be taken in case of need. Medical authorities who arrange programs for laymen appear to be too little interested in the increasing importance of the appendix problem and should do something to combat laxative propaganda. If men, women and children can be taught to respect their intestines

and to abandon the habit of using cathartics on the least provocation, many unnecessary deaths from appendicitis will be prevented

Appendicitis, as its recognized fiftieth birthday approaches, remains a peculiar disease. Its surgical treatment on the whole is satisfactory. Its medical treatment, simple as it is before the

surgeon sees the patient, has fallen into desuetude. May appropriate action be taken by medical men within the next fifty years to relegate appendicitis to the rank where it belongs, a disease easily diagnosed, of no great danger, and when recognized early and submitted to proper treatment, readily amenable to cure!

## VISUAL DISTURBANCES WITH DIGITALIS MEDICATION\*

BY WILLIAM H. ROBEY, M.D.†

**D**IGITALIS or foxglove as used in medical practice is the dried leaves of *Digitalis purpurea*. It grows wild in Europe, Australia and Oregon and is cultivated in the United States, England and Germany. It may be seen as a beautiful, blue-flowered plant in New England gardens. It was named by Linnaeus because of its finger-shaped corolla. More has been written about digitalis than almost any other drug. Withering, who first noted the benefits of digitalis effusion upon edematous patients, supposed it was a diuretic and did not realize that the action of the drug caused a slowed and strengthened ventricle which was sending more blood through the kidneys. The writer worked in his early days with the instructor in therapeutics at the Harvard Medical School who always gave his cardiac patients the tincture of digitalis but used the effusion if there was edema. More than a hundred years after the time of Withering there were many discussions continuing up to my student days upon the effects of digitalis on the cardiac muscle and the kidney. Many fears gripped physicians concerning its use, one of the most fixed being its supposed cumulative action. This belief was strong up to thirty-five years ago and while there is an accumulative effect, as has been amply proved, it need not occur with harmful results if the physician has the cardiac case under ordinary observation. As a matter of fact, in the old days so little digitalis was given a patient in each twenty-four hours and often the preparation was so nearly impotent that it made little difference. To-day, thanks to the physicians (J. H. Pratt and others) who have shown pharmaceutical concerns and dispensing druggists how to make potent preparations, we have an active drug competent to produce results. The dose has been standardized and if carefully weighed amounts of the leaves are given in tablet or pill form the physician can regulate the daily intake with reasonable accuracy even in office and ambulatory patients. The drop dose is much more inaccurate and at the Bellevue Hospital in New York a large number of glass droppers have been collected showing the great variation in the size of the drops and

therefore the difference in amounts of digitalis in single doses. The writer has not used liquid preparations of digitalis in the last fifteen years for this reason. We have worried through the anxiety over frog and cat units but since reliable pharmaceutical houses have learned how to dispense carefully weighed and properly aged and dried leaves we no longer feel the necessity of hurrying to a laboratory with the digitalis purpurea. We have decided to employ in our practice. Furthermore, if the physician has selected a preparation which has proved efficacious it is useless to keep moving from one to another. In my early years as a teacher, I found many graduates who resorted to digitalis upon the slightest suspicion of what they considered a cardiac abnormality. The discovery of a simple systolic murmur in an otherwise perfectly functioning heart was sufficient for its use. To them a systolic murmur seemed to indicate something wrong and something wrong required digitalis. As a student I was taught not to give digitalis in mitral stenosis because the drug was supposed to slow an already overloaded left auricle and delayed still more the passage of blood through a narrowed mitral valve. It was adding insult to injury, again, we were cautioned about the use of digitalis in aortic regurgitation because an overworked left ventricle might be stopped during diastole but we gave it in heart block and coronary thrombosis and all this was because we did not understand the effects of the drug upon various circulatory structures. It was not until laboratory experiments upon animals showed that digitalis exerts its influence principally upon the conducting tissues of the heart that we began to use it intelligently.

Digitalization is produced by an amount of the drug which in twenty-four to seventy-two hours will achieve the desired effects upon cardiac rate and the general circulation. The drug when necessary may be given at the rate of one grain for every ten pounds of body weight but in many cases one-half this or about four and one-half to six grains in twenty-four hours will produce the results in one or two days after which a maintenance dose must be given. This maintenance dose is very important and can be continued for several months or even years in selected cases. Formerly the mistake of not giving a maintenance dose was not appreciated

\*Presented before the Dorchester Medical Club March 14 1935

†Robey William H.—Clinical Professor of Medicine Emeritus Harvard University. For record and address of author see This Week's Issue page 250

or there was the fear of a cumulative effect and the results of digitalization were lost.

The difference between "digitalization" and "toxic effects" must be appreciated. They are sometimes thought to be the same but they are not. Digitalization may be obtained in many persons without toxic effects while, in some, toxic effects may be produced by small doses before digitalization has been secured. At any stage in the process of digitalization the onset of toxic symptoms is the indication for a cessation of the drug. It seems to make little difference how the drug is administered and it is undecided whether the untoward effects are a reflex from the heart or emanate from the medulla.

The unpleasant symptoms of digitalis are well known to clinicians. In some patients a certain amount of digitalis often not enough for digitalization, whether in one dose or repeated doses, causes nausea or vomiting. It must be remembered, however, that in heart disease the almost constant nausea may not be due to digitalis and mouth doses may be discontinued and some other method such as intramuscular or rectal administration may be tried.

There are certain well known indications for the discontinuance of digitalis such as nausea, vomiting and occasionally diarrhea, a cardiac rate below sixty or a sudden slowing of the rate, the onset of extrasystoles or coupled beats, the change of regular rhythm to arrhythmia, complaint of headache, dizziness or disturbed vision.

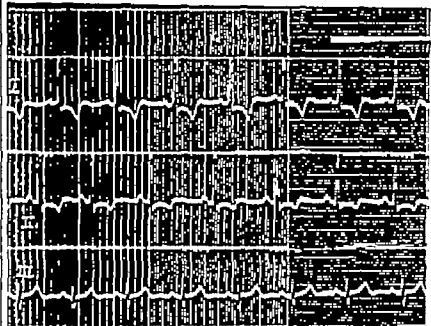
The object of this paper is to report two cases of disturbed vision occurring without other symptoms of toxicity.

**CASE I.** A physician sixty-two years old came to my office on November 8, 1925 because of an attack of paroxysmal tachycardia one week before. His childhood history was not remarkable. Between the ages of twenty-five and thirty he had an acute tonsillitis each winter but none since. At thirty-two he fell on some slippery steps and the physician who examined him thought because of pain in the precordial region that he had either "endocarditis" or "pericarditis." About this time he applied for life insurance but the examiner declined to accept him. He could not remember having been ill in thirty years except for a mild attack of influenza in 1910. He considered his general condition good enough for his age and usual activities and would not have thought of consulting a physician if he had not had the tachycardia. He had always had a quiet rather comfortable mode of life with a small practice visiting his patients by walking or using street cars. His general strength was good, he always slept well and his digestion was satisfactory. Nocturia occurred once usually between 4 and 5 in the morning. There was no breathlessness at any time except after climbing three flights of stairs, no head ache, edema nor any precordial nor allied pain even with exertion. When not having an attack of tachycardia he was unconscious of his heart action except for an occasional premature contraction which he considered compatible with his age.

On November 1, 1925 he had a sudden attack of rapid heart action unaccompanied by pain or

dyspnea which lasted five minutes and ceased as suddenly as it had begun. He had not hurried before the attack and had been as comfortable as ever. Two days later while reading the paper after breakfast he had a similar attack and on the evening of November 7 one which lasted an hour and ended suddenly.

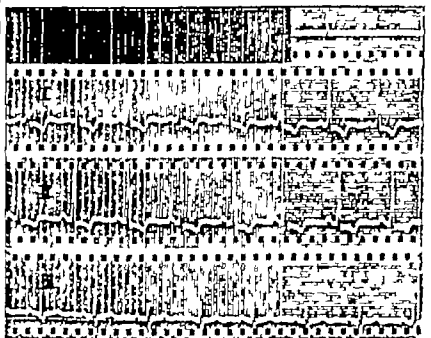
The physical examination was not remarkable. His heart by fluoroscope showed a moderate enlargement to the left; the rate was sixty-eight and regular. The pulse was synchronous with the heart.



M T T No. 1 November 4, 1925. Note the high takeoff of QRS and the marked downward deflection of T1 and T2.

and the radials somewhat atheromatous. A blowing systolic murmur was heard over the precordia. The blood pressure was 135/90. The lungs were clear. The liver was slightly palpable but otherwise the abdomen was normal. The leg vessels showed some sclerosis but were without circulatory symptoms.

In view of the physical findings a diagnosis of arteriosclerosis and coronary sclerosis was made. Paroxysmal tachycardia in this patient was in the

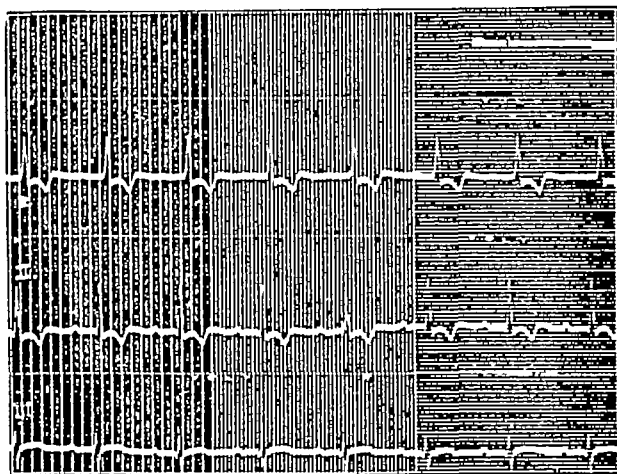


M T T May 27, 1929

same class with angina pectoris or nocturnal breathlessness. No drugs were prescribed at this visit but attention was given to diet and habit of living. He returned on May 27, 1929 with the statement that he had been quite free of cardiac symptoms since his visit in November but recently the tachycardia had recurred with greater frequency, occasionally there was a sense of fullness in the neck but it was not like the nuchal compression of which angina pec-

toris patients complain. Breathlessness did not occur with the tachycardia but came only on climbing three flights of stairs. On the other hand such exercise did not produce tachycardia nor precordial distress but once when romping with his young son he had an attack of tachycardia but no angina pectoris. The rate was seventy two, the rhythm regular and the blowing systolic murmur was heard as at the previous visit.

Digitalis was prescribed, gr jss three times daily and a tablet of nitroglycerine gr 1/100 to be used at the onset of tachycardia. He came again on June 26, 1929 with the statement that he had been entirely free of tachycardia and had felt about as well as usual. He discontinued the digitalis after taking it for two weeks because of a visual abnormality



M T T November 13 1931 Note the slowing of conduction in the P-R interval and the slurring of the R waves.

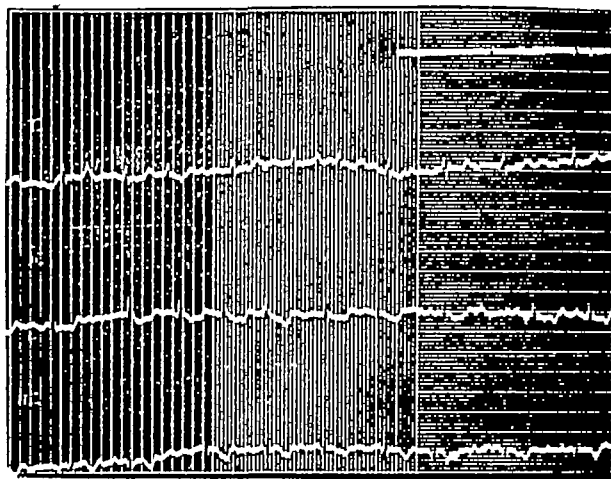
which he thought might be due to the drug. When ever he looked at a distant object it appeared to be dazzling white. This was not preceded by green or yellow vision. Red brick buildings across the street lost their red color and became a brilliant white. After cessation of the digitalis for a week normal vision returned. There were never any gastrointestinal symptoms. I telephoned to him several times during the succeeding months but he reported that he was comfortable except for an occasional brief attack of tachycardia.

On May 7, 1930 he reported that he had had an attack of tachycardia which started at 1 A M and lasted until 4 A M. Digitalis gr j was again tried but white vision appeared after a few doses. On June 11, 1930 he stated that he had a tenderness near the cardiac impulse area with a little continuous pain which was only slightly relieved by nitroglycerine. Auricular fibrillation appeared about September 11, 1930 and digitalis was given, gr j, five times daily but had to be discontinued because of the distressing white vision, however the rhythm soon became regular. He continued quite comfortably until the summer of 1931 when he suffered from attacks of paroxysmal dyspnea even when at rest. From then until September 1932 he had occasional attacks of paroxysmal tachycardia and dyspnea when he died in a few days of general cardiac and circulatory failure. At all times he was relieved by small doses of digitalis which were discontinued as soon as the vision became disturbed. It is interesting to note that while his electrocardiograms were similar to those of other patients having angina pectoris he was almost entirely free from this distressing symptom. Undoubtedly his death was due to painless coronary occlusion. If

one reviews his history and physical signs one sees the succession of cardiac events which often end in occlusion.

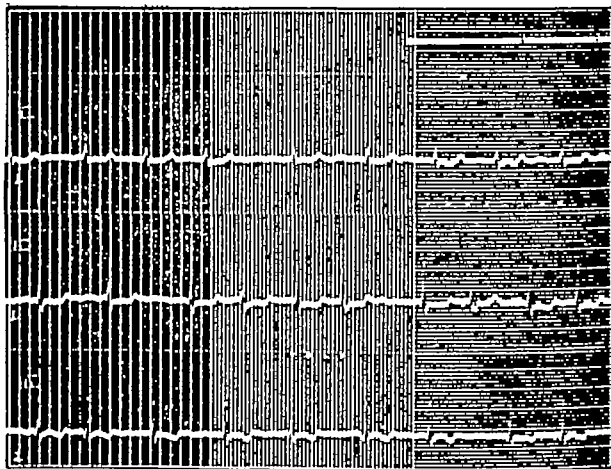
The second case illustrates the visual changes produced by digitalis with a slight difference in manifestation.

H F L aged thirty nine, married, having a healthy husband and two daughters. She was first seen on February 20, 1933 with her physician. The family



H F L June 22 1934 Auricular fibrillation.

history was unimportant. In her youth she had been singularly free of the infectious diseases. There was never a recognized attack of rheumatic fever but she had tonsillitis at fifteen years of age and in the same year an attack of chorea. At the age of twenty four a physician discovered signs of



H F L November 2 1934 Improvement in auricular fibrillation even with small doses of digitalis.

a cardiac valvular lesion. For the last twelve years she has been conscious of cardiac disturbances and the year before I saw her she had spent two months in bed and later another month.

She did not have headache but occasionally suffered from vertigo if the heart was irregular. There was breathlessness on exertion.

She was healthy in appearance. The heart showed a mitral presystolic murmur with heaving impulse and a rate of seventy-six. The pulse was of small volume but fair quality and the blood pressure 100/80.

On June 22 1834 she came to the office and was found to be in auricular fibrillation with some dyspnea. Digitalis gr Jas was prescribed to be taken at bedtime. The drug was used regularly until July 1 when it was discontinued because of a flashing white light which she said was very much like pulling a window shade up and down rapidly on a bright, sunlit day or sometimes as though the eyelids were closed and opened with great rapidity. Two days after the digitalis was discontinued the white light ceased. She never had green nor yellow vision. When we discussed the symptoms she said that it had occurred once before I saw her when she took digitalis near and far vision were equally affected. During the last twelve months the patient has been very well. She has a very slight auricular fibrillation and her heart has been well controlled by taking digitalis gr Jas daily for four days and then omitting it for a similar period.

The visual disturbances are usually so marked

that it is necessary to discontinue the digitalis. In our two cases enough digitalis could be taken prior to the onset of white vision to produce a considerable effect upon the heart and that effect could be maintained by small doses taken and omitted for similar periods of time. If one finds that complete idiosyncrasy exists then of course may be had to other members of the digitalis group but most of them have been shown to be of small value and to produce toxic symptoms easily. Strophanthus should be tried if digitalis must be discontinued. The other members of the group may have the same effect as digitalis but they are more uncertain. The toxic symptoms of digitalis are probably induced by action of the drug upon the autonomic or involuntary nervous system.

## THE NATURAL HISTORY OF SOME RENAL TUMORS\*

BY E. ROSS MINTZ, M.D.†

It is not uncommon to find in the literature cases of patients who had renal neoplasms and who complained of intermittent hematuria over periods of five, ten, fifteen, twenty and in some instances, twenty five years. However the literature contains relatively few reports of nephrectomies for renal carcinomata where a definite diagnosis was made of the lesion five or ten years previously, either by pyelograms, the palpation of the tumor mass by exploration or by biopsy of a metastatic process. Four such cases form the basis of this report. They truly show the natural history of the disease in some renal tumors when left to itself and not interfered with by surgery or physical agents.

### CASE 1

C. E. S. (Massachusetts General Hospital, No. 309915) a native white married male thirty seven years of age was admitted to the Urological Out Patient Department of the Massachusetts General Hospital for the first time in 1920 complaining of intermittent hematuria of one month's duration. Cystoscopy at that time showed a normal appearing bladder and a bloody jet coming from the right ureter. The kidney on that side was not palpable and no costovertebral tenderness was elicited. A right pyelogram was made the report of which is as follows: "Kidney appears large on this side and the calices very deep. It is apparently low in position. The middle calyx appears to be of unusual shape. There is a small area of increased density near the tip of the twelfth rib which may be a stone. There is another small faint shadow low down in the kidney about 3 cm. from the shadow of the eleventh rib which may be a small particle of dense material in the kidney." The patient was asked to return for further study but did not.

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do so. In September 1930 ten years later the patient reentered the Out Patient Department complaining of right lower quadrant pain. He had had several attacks of pain recently but was perfectly asymptomatic for almost ten years. A week before the second entry the patient noticed some blood in the urine. This lasted for two days finally clearing but reappearing again the day of entry to the hospital. There was no history of burning on urination diurnal frequency or dysuria. No mass was palpable in the right loin. A flat abdominal plate showed a dense shadow in the region of the pelvis of the right kidney. The kidney outlines were quite distinct. Both appeared large. The five dense shadows scattered throughout the kidney might be due to localized areas of calcification. Cystoscopy was done and a right pyelogram was made. The bladder appeared normal. The report of the right pyelogram was as follows: "The smaller shadows are arranged in a rounded mass at the lateral margin of the renal pelvis. After injection there is a concave defect in the middle calyx of the right kidney." Intravenous pyelography was suggested and done. "The pelvis of the kidneys are well visualized. The pelvis of the right kidney shows an irregular moth-eaten appearance at its edges with one calyx distorted and running down into the lower pole of the kidney. The upper two calices are large also distorted, and appear to run up to the pole of the kidney. The outline of the entire pelvis has a slightly moth-eaten edge and the pelvis is distinctly deformed by a rounded tumor mass having the diameter equal to the width of the kidney and producing a distinct bulge in the outline of the middle portion of the kidney. The tumor mass contains enormous areas of calcification. The pelvis calices and ureter of the left kidney are negative. The findings are suggestive of a tumor mass deforming the pelvis of the right kidney."

The patient was admitted to the House for operation. Physical examination was essentially negative. The urine was loaded with red blood corpuscles and numerous white blood corpuscles. The Hinton test was negative. The blood non protein nitrogen was 37 mg% / 100. X-ray of the



chest was negative (There was no history suggestive of pulmonary tuberculosis)

**OPERATION**—(November 11, 1930) J D Barney and E Ross Mintz Ether

Through the regular oblique right loin incision the kidney was exposed. A soft, circumscribed mass the size of a golf ball was noted near the upper pole. It was definitely encapsulated and no invasion of the perirenal fat or renal pedicle was present. The kidney was removed.

Four weeks later the patient was discharged from the hospital after an uneventful convalescence.

**PATHOLOGICAL REPORT**—(30 2829)

The specimen consists of a kidney twelve by six by four cm. There is a lobulated round soft mass about four cm in diameter over one pole of the kidney. There is a small cortical cyst near the other pole which contains clear colorless, thin fluid. The cut surface shows



Photograph of the kidney removed in Case 1—Adenocarcinoma

a round, red, soft mass about four cm in diameter near the superior pole. It is definitely encapsulated, the wall of the capsule being formed by a dilated, thinned out calyx. At the constricted neck of the above calyx a small mulberry-like, elongated calculus protruded into the pelvis. There are small, fine, calcified areas within the tumor mass. The rest of the kidney is normal.

Microscopic Examination shows an adenocarcinoma composed of poorly differentiated pale, vesicular cells with marked papillary formation. Many areas show definite tubular arrangement of the cells. Mitoses are moderate in amount.

Anatomic Diagnosis Renal cell adenocarcinoma

**FOLLOW UP**

The patient has been followed for four years. X-rays of the chest and spine fail to show any evidence of metastases. His health is excellent and he has no complaints.

**CASE 2**

F H H, a white native, married, prison officer, aged fifty three, entered the Urological Out Patient Department of the Massachusetts General Hospital May 3, 1924, complaining of hematuria and left loin pain of three days' duration. Five months ago the patient was seized with a dull pain across the lumbar region which lasted for two weeks. He attributed this to a "cold in his kidneys." Three days ago at three o'clock in the afternoon he noticed hematuria for the first time. Later in the day he passed a clot six inches long per urethrum. One hour following this he was suddenly seized with a sharp, severe pain in the left lower quadrant which radiated to the small of the back and was accompanied by nausea and vomiting. The pain lasted all night and was not relieved by morphia. The family physician referred him to the hospital.

Physical Examination showed the patient to be well nourished and well developed. There was slight left costovertebral tenderness, but neither kidney was palpable. The abdomen was moderately distended. The urine showed a rare red blood corpuscle and many bacteria. The blood nonprotein nitrogen was 40.5 mgs per 100 cc. Patient had a slight rise in temperature (100°).

A cystoscopy was done May 7, 1924. The bladder appeared normal. Both ureters were easily catheterized. A left pyelogram was made, the report of which is as follows: "Unusual amount of gas in the colon. No shadows suggestive of stones. After the injection of the opaque mixture the shadow of the pelvis and calices on the left is visible. They are distinctly pathologic in appearance. The pelvis itself is small and narrow, calices usually long and deep without the usual cupping. The upper calyx has lost all of its normal appearance." (George W Holmes)

A plate of the chest and spine was negative for metastases.

Operation was advised but the patient decided against it and went home.

**INTERVAL HISTORY**—May, 1933

The patient's health was excellent until one and a half years ago. He again had an attack of hematuria but this "passed off in a few days." One week ago he again noticed spontaneous, insidious total hematuria and consulted a surgeon who referred him to the Palmer Memorial Hospital for study. During the patient's entire illness there never has been any dysuria, frequency, weight loss, asthenia, pain, hemoptysis or cough.

On physical examination nothing remarkable was found. The abdomen was a little large without any abdominal tenderness. Neither kidney was palpable but the patient did not relax. Rectal examination showed a smooth, elastic enlarged benign prostate. The urine showed an occasional white blood cell and one or two red blood cells. The blood nonprotein nitrogen was thirty-one mgs per 100 cc. Hinton, Kahn and Wassermann were negative. The red blood count was 5,150,000. The white blood count was 9,200 and the hemoglobin 80 per cent (Tallqvist). The blood smear was essentially negative.

Cystoscopy was performed May 20, 1933 (George Gilbert Smith). The bladder appeared negative. Both ureters were catheterized with ease. A left pyelogram was made which showed a deformed renal pelvis, fairly typical of a renal

neoplasm. Intravenous skiodan failed to be visualized on the left side. The right kidney pelvis calices and ureter were normal. The kidney on the left was definitely enlarged.

**OPERATION** April 22 1933 (George Gilbert Smith and E. Ross Mintz.) Gas and ether.

Through a left oblique incision the kidney was exposed and found to be malignant. The ureter was clamped, cut and tied. The kidney was easily freed, delivered and removed together with the perirenal fat and a portion of the adrenal. There was no evidence of any invasion of the renal pedicle.

The patient made an uneventful recovery and was discharged from the hospital May 8 1933.

#### **PATHOLOGICAL REPORT (18726)**

The specimen consists of a kidney weighing 670 grams and measuring sixteen by eleven by twelve cm. Apparently three-fourths of the



Photograph of the kidney removed in Case 1.—Hypernephroma.

mass consists of tumor tissue. It is lobulated, soft, encapsulated, and contains many hemorrhagic necrotic areas. The capsule does not seem to be invaded. The perirenal fat is negative.

*Anatomic Diagnosis*—Hypernephroma.

#### **FOLLOW UP**

Up to the present time March 1935 the patient is in excellent condition and there is no evidence of any metastases.

#### **CASE 3**

F. M. H., a native white married jewel worker aged forty-seven years, was first seen by a Boston surgeon January 1928 for bleeding from the rectum. Examination revealed an ulcerated new growth on the left lateral and posterior walls of the rectum about three inches above the sphincter. After a thorough negative physical examination a one-stage abdominoperineal operation was performed under spinal anesthesia (August 22 1928). An excerpt from the operation sheet follows: "In what was taken to be the right kidney there was a definite dense tumor occupying the region of the pelvis and which suggested either a dense hydronephrosis or a cyst. The kidney itself was movable. The tumor did not feel like malignant disease."

The patient had an exceedingly uneventful convalescence and was discharged twenty-one days after operation. Microscopic section of the rectal tumor showed it to be a well-differentiated adenocarcinoma.

The patient was followed in the Out Patient Department at intervals of six months to a year and at no time were any urinary symptoms present or any abdominal mass palpated. The colostomy worked well and the patient gained rapidly. On January 8 1934 almost five and a half years following his operation, the patient noticed that his urine was dark red. No other symptoms were complained of. Examination of the urinary sediment showed many red blood cells. The abdomen was negative. Cystoscopy was done two days later and showed an essentially normal bladder. Intravenous injection of skiodan showed the left kidney pelvis calices and ureter to be well visualized and normal in appearance. On the right side only a deformed upper calyx was shown. The lower calices were not visualized. The shadow of the right kidney appeared quite large. The enlargement appeared chiefly in the upper pole. A diagnosis of renal neoplasm was made. A plate of the chest and spine was negative for metastases. The patient went home to get his affairs in order.

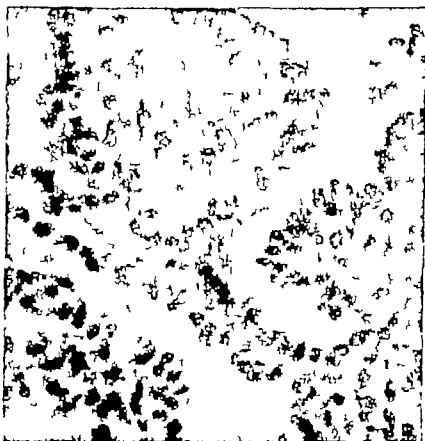
**OPERATION** Gas and oxygen April 21 1934 (George Gilbert Smith and E. Ross Mintz.)

Through a right oblique incision the kidney was exposed. The twelfth rib was resected. The lower half of the kidney was the site of a round rather firm smooth tumor five inches in diameter. The fatty capsule and the pedicle were apparently not invaded. The kidney together with all the perirenal fat was removed.

The patient was discharged from the hospital after an uneventful postoperative course.

#### **PATHOLOGIC REPORT — ("1566)**

Specimen consists of a right kidney weighing 350 grams. There is a rather firm round tumor



High power micro-photograph of kidney removed in Case 3.—Adenocarcinoma.

mass eight by eight by seven cm at the lower pole of the kidney. On section it is moderately firm and well encapsulated. The pelvis is slightly dilated. The renal vein is not invaded.

Microscopic section of the tumor shows it to be an adenocarcinoma.

## FOLLOW-UP

The patient has been followed and up to the present time there is no evidence of a metastasis. The chest and spine are negative for metastases by x-ray examination.

## CASE 4

F L M A white, native, married male, aged fifty-nine, entered the Massachusetts General Hospital Urological Out-Patient Department May 13, 1924, complaining of severe and distressing pain over the sternum.

Approximately twenty eight months ago the patient was seized with a severe pain over the sternum after a very vigorous sneeze. This forced him to stop in his tracks and hold his breath. In a few minutes the pain disappeared and for two months he was symptom free. At that time "influenza" confined him to bed. Following this malady his wife noticed a small lump over the midsternum the size of a walnut. This is the site of the present lesion. The mass was neither hard nor noticeably soft, non pulsatile and the overlying skin was normal. The "lump" grew slowly but steadily until two years ago it reached the size of a "good sized peach". The patient consulted his doctor who referred him to a specialist for luetic treatment. Treatment was given for two and a half months, following which the patient's face became edematous. Therapy was then stopped.

During the past year the tumor has not grown perceptibly but it has taken on a definite pulsating character and has caused considerable pain. A vice-like constriction was felt about the growth with each heart beat. This sensation has been constantly present and varies in intensity from time to time. Exertion or any physical movement increases it. Radiation of the pain to both breasts and arms in the region of the biceps muscles occurs at times. The pain not infrequently interferes with the patient's sleep and makes him very introspective and suspicious of his condition. No symptoms referable to the respiratory tract are present.

*Physical Examination* shows a well developed and well nourished male in no apparent distress. The left pupil is slightly less dilated than the right. Both react normally to light and accommodation. There is a large dome shaped tumor ten by twelve cm over the upper sternum. It is exactly in the midline and covers the area from the insertion of the fourth rib up to the interclavicular notch, and laterally over the costal cartilages on both sides. It pulsates synchronously with the heart beat and transmits a systolic murmur which is propagated along the great vessels to the right side of the neck. This murmur cannot be heard over the heart itself. The diagnosis lay between a pulsating new growth and aneurysm of the aorta. Fluoroscopic examination of the chest showed the aortic arch to be normal in size and shape. No mediastinal tumors were visible. In the lateral view the outline of the sternum is well shown. The bone in the upper portion of the sternum is continuous with the shadow of the tumor. The lesion was interpreted as probably a malignant tumor of the sternum.

OPERATION May 21, 1924 (Drs C A Porter and E P Churchill)

An attempt was made at excision of the pulsating sarcoma and the removal of the entire mass

was considered impossible. A finger inserted behind the sternum failed to reveal an aneurysm. Microscopic section of the tissue removed (24-5-108) showed it to be a metastatic hypernephroma.

*Postoperative Course* The wound became infected but finally healed. The patient was discharged June 23, 1924. Cystoscopy was decided against as the patient was very suspicious of his condition.

*Second Reentry* Seventeen months later the patient was admitted for question of an alcoholic injection of the nerves to the tumor, but this idea was given up. In the interval between admissions the patient was given deep x-ray treatments. This seemed to have little effect. At present his strength has returned to some extent and he is able to be about, exercising moderately and taking long rides in the country. The pain is now described as constant and dull. The tumor mass is the size of half a tennis ball. It is soft, pulsatile and circumscribed. A bruit is heard all over it and for one or two inches around it. The manubrium and upper sternum are apparently invaded and eroded by this tumor. There has been no urinary sign or symptom present. The urinary sediment is negative. The red blood count is 4,888,000 and the hemoglobin 90 per cent. The patient was discharged November 3, 1924.

*Third Reentry* About four and a half years later the patient was readmitted to the House (May 11, 1929) for one day. He was presented at one of the surgical meetings. For two years after his second discharge from the hospital he felt in "pretty good shape", but for the last two and a half years he has been progressively bothered with low back pain, especially in the region of the left sacroiliac joint and left hip.

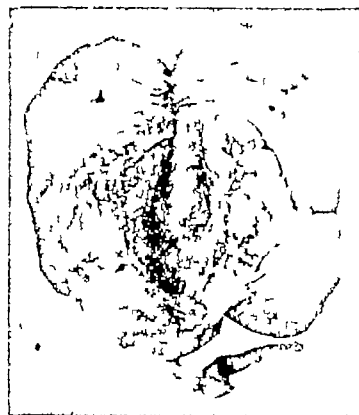
During the past year he has been troubled with difficulty in starting his stream, diurnal frequency, some dribbling and nocturia. Rectal examination revealed a moderate sized, benign, elastic prostate. No residual urine was present. The sternal mass has increased slightly in size. Overlying the left sacroiliac joint there was a roughly rectangular area 10 x 12 cm of telangiectasis. The skin was indurated and there was slight tenderness over this area. Both the sternal mass and the mass in the left lower quadrant gradually increased in size. The patient steadily went downhill and finally died one year later, May 5, 1930.

*AUTOPSY—(5830)* The body of a well-developed and fairly well nourished man, appearing to be about sixty five years of age. Over the upper portion of the sternum is a large bulging tumor which involves an area of skin eight cm in diameter. A large area of the surrounding skin, approximately twenty cm in diameter, shows a brownish pigment and extremely numerous telangiectases (X-ray Therapy). The left arm and hand show marked pitting edema extending upwards half-way from the elbow to the shoulder.

*Intestines* A movable, white, firm nodule two mm in diameter is in the mucosa of the jejunum.

*Thorax* The area underlying the telangiectatic radiated skin shows an extreme fibrosis of the subcutaneous tissues and also a peculiar appearance of the muscles which are unusually pale slightly edematous and, on section, show marked fibrosis extending in a closely visible net-

work between the muscle bundles. A large tumor is found which has completely replaced the manubrium and a small portion of the first and second ribs on each side. No trace of the bones remains in the infiltrated area. The clavicles are uninvolved. The tumor projects anteriorly from the face of the sternum for a distance of about three cm. It also projects posteriorly laterally and in one place superiorly where it



Photograph of autopsy specimen removed in Case 4—H per nephroma.



Sagittal section of sternum removed at autopsy in Case 4 showing the metastatic hypernephromatous mass.

passes up into the tissues of the neck through the sheaths of the right scalene muscles. The superior vena cava and particularly the innominate vein are pressed upon and to some extent surrounded by the tumor mass. On section the tumor consists of white to yellow occasionally orange, soft, very vascular tissue. There are extensive areas of necrosis.

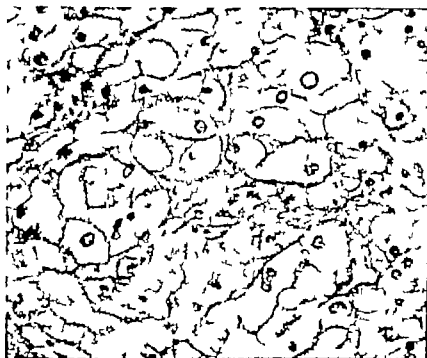
**Lungs.** Numerous small tumor nodules varying from two to fifteen mm in diameter are scat-

tered irregularly over the pleura and through out the substance of the lungs. There are also scattered areas of congestion and of increased consistency typical of bronchopneumonia.

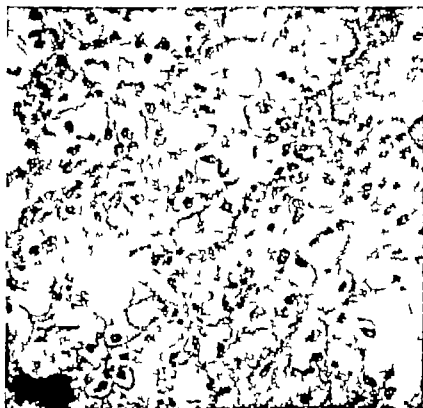
**Aorta.** Marked atheroma.

**Gall Bladder.** Mass of stones.

**Kidneys.** The right kidney is distinctly enlarged and feels cystic on external examination. On section a cyst 8 cm in diameter surrounded



High power micro-photograph of kidney in Case 4 showing the large vacuolated clear cells seen in hypernephroma.



High power micro-photograph of biopsy specimen from sternum in Case 4 removed in 1924.

tered by a shell of tumor tissue one to two cm. in diameter occupies the central portion of the kidney and projects from its medial aspect. The cavity is filled with thin blood-tinged fluid. The pelvis is distorted and also dilated as it passes anteriorly to the tumor mass. The tumor however does not involve the pelvis at any point. The left kidney is negative.

**Pelvis.** In the left lower quadrant of the abdomen and on the left side of the true pelvis a large tumor mass can be felt in the retro-

peritoneal tissues. On section it is found to involve the quadratus groups of muscles and also the entire crest of the ileum which shows extensive destruction of the bone and an infiltration with a tumor similar in appearance to that in the sternum.

**Tumors.** Sections from the primary renal tumors, the pulmonary, sternal and other osseous metastases all show the same structure. The tumor is composed of epithelial cells in alveolar arrangement, a high proportion are vacuolated, some finely, others coarsely. The differentiation is excellent, mitoses are scarce. It is typical of a hypernephroma.

**Anatomic Diagnosis.** Hypernephroma of the right kidney with pulmonary, sternal and osseous metastases.

Bronchopneumonia

Arteriosclerosis

Benign hyperplasia of the prostate

Cholelithiasis

#### DISCUSSION

It is not a generally accepted, appreciated and recognized fact that solid epithelial tumors of the kidney may be and sometimes are slow growing. In Cases 1, 2, 3 and 4, the patients went ten, nine, five and a half and eight years respectively after a diagnosis of renal tumor was made or after a secondary metastatic mass was palpated. Usually when patients with renal cancer are seen, the growths are relatively large, large enough to be palpated abdominally or to deform the renal contour and excretory passages by pyelogram. There is no way of knowing in these instances the duration of the pathologic process before it attained a size sufficient to be recognized by pyelogram or on physical examination. Unquestionably many of these tumors remain benign for a long period of time and some even when they do enlarge to a considerable degree and remain so for a long period of time may not give rise to any distinct metastases. Cases 1, 2 and 3 showed no evidence of visceral or osseous metastases or extension to the perirenal fat up to and after nephrectomy.

Rehn<sup>1</sup> called attention to the fact that unoperated hypernephroma frequently metastasizes late, and that on postmortem even though the renal vein and vena cava were found occluded with tumor no metastases could be found. Walters, in a series of forty-one inoperable renal tumors reported seven cases (17 per cent) who lived five years or more. Three lived five years, two eighteen years, and one fifteen years, one is still living and is beyond the five-year period. These patients had x-ray therapy but it is the belief of most urologists today that deep x-ray therapy for hypernephroma or adenocarcinoma has little or no effect. Berg<sup>2</sup> reported a case of a patient who went ten years after the tumor was palpated during an operation for acute gangrenous cholecystitis. Smith and Shoemaker<sup>3</sup> and Bland-Sutton<sup>4</sup> cite cases where the humerus was

amputated for malignant metastatic disease secondary to a renal neoplasm, and the patients lived five and six years respectively after the amputation. The primary growths in both cases were not removed, the patients refusing another operation. Albrecht<sup>5</sup> relates an instance of metastasis to the scapula from a renal growth. The secondary process was removed and four years later a nephrectomy was done. The patient was living and well two years and seven months after nephrectomy. Wolcott<sup>6</sup> describes a case of renal neoplasm found during an exploratory laparotomy. Nephrectomy was not performed and the patient lived six years after the laparotomy. One of the cases under carcinoma of the kidney in the Atlas of Pathological Anatomy<sup>7</sup>, was of a female patient who had a lump in the left groin for seven years. Barney<sup>8</sup> recently did a nephrectomy for cancer of the kidney on a female patient on whom he made the diagnosis by pyelogram ten years ago. The patient had intermittent hematuria for ten years.

It has been repeatedly stated that adenocarcinoma is more malignant than hypernephroma. This may be so, but so far as I know no conclusive evidence has been brought forth to substantiate this point of view. This question is intimately related to the natural history of renal tumors. If one exactly knew the "dates of birth" of a series of both of these types of tumors, and followed their growth for years, this question would be solved. Until then any statement in regard to their relative malignancy is a mere conjecture. In this small series two were adenocarcinomas and two were hypernephromas.

In Case 4 the patient presented a "lump" over the midsternum as the initial sign. This later assumed a pulsatile character. By and large, a pulsatile mass occurs in aneurysm, hemangio-endothelioma and metastatic processes from renal or thyroid malignancy. Berg<sup>2</sup> reported a case of a metastatic pulsatile mass low down in the pelvis which was felt on rectal examination and thought to be aneurysm. A small primary lesion was found in the kidney. Pasteur-Vallery-Radot<sup>10</sup> described a case of a pulsatile mass situated at the level of a fracture of the humerus. It was synchronous with the pulse and a systolic blow was heard over it. Many more instances of pulsatile metastatic masses can be given (Diesser<sup>11</sup>, Taylor<sup>12</sup>). It would be pointless to list them. The fact that hypernephroma can and sometimes does give rise to pulsatile metastasis is significant.

#### SUMMARY

Four cases of renal cancer are presented that were diagnosed ten, nine, five and a half and eight years previous to nephrectomy or, in one case, previous to autopsy. A pulsatile metastatic process to the sternum was present in one of them.

## CONCLUSION

- (1) Some renal cancers are very slow growing tumors
- (2) Renal cancer may be present for years without giving rise to metastases
- (3) Hypernephroma may give rise to pulsatile metastasis

## REFERENCES

- 1 Rehn (Quoted by Hyman, A.) Renal neoplasms. *Am. J. Surg.* 6: 120 (Aug.) 1928
- 2 Berg A. A. Malignant hypernephroma of the kidney: its clinical course and diagnosis with a description of the author's method of radical operative cure. *Surg. Gynec. Obst.* 17: 462 1913

- 3 Smith G. G. and Shoemaker A. B. End result of hypernephroma. *J. Urol.* 14: 222 (Oct.) 1925
- 4 Blund-Sutton J. Tumours Innocent and Malignant. London, New York, Toronto and Melbourne: Cassell and Company Ltd.
- 5 Albrecht, Paul. Beiträge zur Klinik und pathologischen Anat. mie der malignen Hypernephrome. *Verh. d. Dtsch. Ges. f. Chir.* 24: 6 0 1925
- 6 Wolcott (Quoted by Stoddard, Charles L.) Case of an epithelial disease of the kidney removal etc. *Mod. & Surg. Reporter Phila.* 1: 1 6 1921-4
- 7 Taylor R. A case of multiple pulsating tumors secondary to a hypernephroma. *Lancet* 1: 452 (Mar. 8) 1915
- 8 Atlas of Pathological Anatomy. *Brit. J. Surg.* (Supp.) 16: 37 1928
- 9 Personal Communication.
- 10 Pasteur Vall ry Radot; Kethelin, J., and Gauthier Villars, P. Epithélioma primitif du rein cliniquement latent avec métastases osseuses multiples. *Ann. d'Anat. Path.* 6: 690 (June) 1919
- 11 Dresser Richard. Metastatic manifestations of hypernephroma in bone. *Am. J. Roentgenol.* 13: 24 1915

## LATENT SYPHILIS

BY EDWARD WINSLOW KARCHER, M.D.\*

**L**ATENT syphilis is one of the great problems in syphilology, indeed, in all medicine. Many cases of it that formerly escaped detection are now being found as a result of the development of sensitive flocculation and precipitation tests and the commendable practice of having one or more of them performed routinely as a part of all physical examinations. The general practitioner who discovers a large percentage of these cases, will not find much light on the subject in the books in his library although the matter is adequately covered, to the extent of our present knowledge in the new literature on syphilis written for the specialist. It is my purpose therefore, to discuss latent syphilis, not with the idea of adding to what is already known to the few but in order to disseminate this knowledge more widely among those who only occasionally treat these patients.

In defining our subject we must distinguish between clinical pathologic and serologic latency, remembering that 'latency' is a relative term and that when it occurs during the first four years of the infection it is called "early", thereafter when the patient's natural resistance has become fully established it is "late".

By clinical latency we mean that syphilitic infection is present and frequently may be active though a careful study fails to reveal any evidence of activity. Pathologic, or true latency is a condition in which the spirochetes though present in the various lesions throughout the body are held in a state of absolute inactivity. Because the presence of pathologic latency is impossible to prove during the life of the patient many syphilologists doubt its existence and believe that the course of untreated syphilis is one of slow degeneration. While it is true that many patients, if they live long enough will develop grave lesions in the cardiovascular

or nervous systems, or benign lesions in the skin, mucous membranes, bones, or viscera, we do see many patients who seem to live in perfect harmony with their spirochetes and, except for a probable positive serum reaction show no clinical evidence of infection, and they eventually die from some unrelated cause.

Serologic latency means that the serologic tests on blood and spinal fluid are negative. It is usually accompanied by clinical latency. It must be remembered however, that there is considerable difference in the sensitivity of the various blood tests, and that a blood specimen may be negative by one test and positive by another. This fact has been most noticeable and at times disconcerting at the Massachusetts General Hospital where for a number of years every blood specimen was examined by the Wassermann and the Hinton tests. The latter was found positive in many of the treated cases after years of continued observation and persistently negative blood Wassermann tests and spinal fluid tests. As we had considered these cases as probably cured it is easy to see that "cure" like "latency" is a relative term.

In untreated syphilis the stage of latency follows the spontaneous disappearance of the secondary lesions and is probably due as Kolmer states to a combination of reduction of virulence in the spirochetes and a neutralization of their pathologic activities by cellular and humoral antibodies especially the latter, as anything depressing the tissue immunity and resistance like trauma or intercurrent infection favors renewed activity and the reappearance of lesions which in turn stimulate antibody formation. The lesions again disappear and the state of latency is reestablished. In some patients this appearance of lesions is repeated again and again with their redistribution and with intervals of clinical latency varying from months to many years throughout the remainder of their lives.

Infections relapses as a rule are confined to

\*Karcher Edward Winslow—Deceased February 18, 1925  
For record and address of author see "This Week" issue page 30

the first five years, and occur most often during the first two. Their lesions are frequently multiple and are prone to appear in the mouth or on the genitalia, and since they are the cause of more infections than are primary lesions, careful search should be made for them. The distinctive lesions (gummata) which usually occur later are considered allergic reactions. They are not infectious and are single, as a rule. Transmission of syphilis by intercourse during latency must be given consideration, as a number of investigators have found *Spirochaeta pallida* in the seminal fluid in the absence of any clinically recognizable genital lesions.

One must not infer, however, that because a patient does not develop any clinical signs of relapse that all is well. The true condition is, as Warthin pointed out and as Stokes stressed, that clinical latency is being maintained by antibodies developed in numerous spirochetal foci located in the capillaries of the visceral parenchyma and in the cardiovascular and nervous systems the so-called chronic inflammatory reaction. If enough natural resistance is not developed, or if the patient is insufficiently treated, these small, often microscopic, lesions tend to progress slowly but surely. They may be present for years without causing symptoms and may defy clinical recognition. Eventually, however, in many cases they produce serious lesions: hepatic cirrhosis, aortitis, aneurysm, and the various types of neurosyphilis. The pathology of these small foci is that of syphilis in general: chronic perivascular infiltration with lymphocytes and plasma cells, endarteritis, reduction of the blood supply with ensuing degeneration of the parenchyma and replacement with scar tissue.

In order to make a diagnosis of latent syphilis, it is essential that one should get a history of syphilis or a positive blood test, accompanied by a negative physical examination, or in the case of a female, the birth of a syphilitic child. One should be very critical of a history of syphilis as experience teaches us that many patients have been told, on insufficient evidence, that they have that disease. Of great help in determining the probability of infection is a letter from the physician who made the diagnosis, stating signs and symptoms present at the time, and whether they were confirmed by a darkfield examination, spinal fluid examination, or blood tests, if by the latter, how many specimens were found positive and by what laboratory. It is desirable, also, to obtain information regarding the age of the infection, the date treatment was started, the kind and amount of treatment given, and the character and severity of any reactions. These data bear directly on the possibility of cure having been achieved and aid us in determining whether further treatment or periodic examination is indicated.

On the other hand a negative history of syph-

ilis is of no value as many patients with late syphilis (estimated by Moore as thirty per cent of all males and sixty per cent of all females) give no history of infection. Some of these patients may have had lesions that, because of their insignificance or location, escaped detection, or were incorrectly diagnosed, as occurs so frequently with extragenital chancres, while others may have had a symptomless infection, which Moore thinks occurs with relative frequency and he hazards a guess that at least one man in every five and one woman in every three who acquire syphilis do so without ever developing any lesions recognizable as early syphilis.

It is customary to accept as clinically latent those cases which in the presence of a completely negative physical examination have a positive blood test. In fact it is often the only evidence of infection present. In such cases the blood test should always be repeated at least once, possibly in a different laboratory or by a different method. Serologists and syphilologists generally agree that a technically correct, repeatedly and unqualifiedly positive reaction with any of the standard tests means syphilis if we can exclude yaws, relapsing fever, trypanosomiasis, and possibly leprosy and malaria. After the primary stage, positive serology is the most trustworthy and sensitive indication of syphilitic activity. (A point to be remembered is that syphilis is not a respecter of class and the significance of positive serology should not be minimized, as is sometimes done, when found in a person considered "above suspicion.")

But repeatedly negative blood tests in untreated cases do not mean that syphilitic infection is not present as the spirochetes may be temporarily in check, or the foci may be so small that not enough reagin is being liberated into the blood stream to produce a positive reaction. Sometimes, as we have shown above, a blood specimen may be negative by one method and positive by a more sensitive one. Then, too, we have seen secondary syphilis and paresis, both of which we associate in our minds with positive tests, show repeatedly negative ones.

The physical examination should be performed thoroughly always and a search made for any clinical evidence of activity. Careful note should be made, also, of the presence of any concomitant disease. In the early cases the possibility of infectious recurrences should be kept constantly in mind, and a most thorough examination of the skin and mucous membranes made with special reference to mouth, genitals and anal regions, palms and soles. In the late cases attention must be given to the cardiovascular and nervous systems, liver, eyes and ears, as one or more of these parts are liable to be the site of crippling or killing lesions. Because

no one person can hope to master all these fields, the cooperation of specialists is desirable.

We have found the Hinton blood test very reliable in determining the absence of neurosyphilis. Although I have not tabulated our results, I venture to estimate that a negative Hinton test on the blood will be accompanied by a negative spinal fluid in ninety-eight per cent of cases. Since arriving at this conclusion I must confess that although a spinal fluid examination is always desirable, I have not so earnestly urged lumbar punctures if the Hinton test shows the blood persistently negative and there are no positive neurological signs or symptoms. If, however, the Hinton test is positive I am very firm in my belief that a spinal fluid examination should be made unless contraindicated by the presence of old age, pregnancy, advanced heart disease or arthritis. If the spinal fluid is found to be positive, the case is classified as neurosyphilis, and treated accordingly.

While the Wassermann is the only finding in the spinal fluid diagnostic of syphilis, the cell count, total protein, globulin, and gold sol tests should always be done as these assist in determining the intensity and type of involvement, and act as a check on the result of treatment. It must be understood that active vascular neurosyphilis and tabes are not infrequently accompanied by negative spinal fluid.

A large percentage of pregnant syphilitic women are in a clinically latent state and the presence of infection can be recognized only by positive serology or by the birth of a syphilitic child. It is because of this that in questionable cases, all the children should be examined. It is also well known that there is usually developed a degree of resistance much greater than that present in non-pregnant women and in men. Kolmer says of this that "it would appear that the enhanced immunity of the pregnant subject is due to a reinforcement and if such is true, one naturally suspects that the new tissues of pregnancy are actively concerned in the process, since it has been shown that they are frequently infected." At times, however, pregnancy may be accompanied by the most persistent lesions, suggesting a lowering of resistance.

If, after thorough study, we have arrived at a diagnosis of latent syphilis, the question naturally arises as to the proper course to pursue. Our decision rests on a critical evaluation of the factors presented in the individual case and not on the simple and too frequently used formula the patient's blood test is positive that means he has syphilis and the treatment of syphilis is arsphenamine. A discussion of these factors should give us all a better understanding of the indications for treatment.

The dangers of untreated latency and the fact that latency may be maintained throughout life have been discussed. It is interesting

to speculate on the probable outcome in a person with untreated latent syphilis. Moore says, "Assuming that the disease has existed for at least four years, so that the patient's own defense mechanism has had time to become firmly established, that searching physical examination has revealed no lesions especially of the cardiovascular and central nervous systems, and that the cerebrospinal fluid is negative, one is probably justified in predicting that a given patient if he receives no treatment at all at best has only about 2 chances in 10 of developing any serious trouble, at worst, not more than 3 chances in 10. If lesions do occur, there is probably not worse than an even chance that they will be incapacitating, and cardiovascular involvement is the chief serious risk which must be feared. The danger of the development of neurosyphilis (probably excepting only a more or less purely vascular involvement) is largely past by the time true latency is achieved."

The prognosis in untreated early latency, i.e., of less than four years' duration, is more indefinite as it is impossible to predict how adequately this defense mechanism will be developed. Until such time as we are able to determine accurately the outcome of the infection in each individual treatment in some form is usually indicated, and, as shown by Moore, it will reduce the probability of progression, relapse, and death from a probable twenty-five to thirty per cent to about five per cent, and the percentage of Wassermann positive but clinically latent cases from thirty-five to 75 per cent. The danger of death when the patient has had two years of modern treatment is estimated by Cole as 0.3 per cent.

And so, having decided that treatment is indicated, we must ask ourselves what we hope to accomplish and how to achieve the maximum good with the minimum harm. Most cases of primary or secondary syphilis occur during the years of sexual activity. The patients are usually in vigorous health and the spirochetes have not had time to barricade themselves behind fibrous walls or to cause any serious destruction in vital organs. Therefore an intensive routine attack is generally applicable and will result in a large percentage of what, to the best of our knowledge, may be regarded as cures. This therapeutic attack, an outline of which will be given, must be vigorous and continuous, our main reliance being placed on one of the arsphenamines, the most potent and dangerous drug used in the treatment of syphilis. The earlier treatment is started, the better the chance for cure, our dependence being on the drugs rather than on the patient's natural resistance. In this type of case, and early latency may be included, we are justified because of the possibility of eradicating the disease and because the age of the patient is favorable, in taking more chances than would be advisable in late cases.



Following the secondary stage, the probability of cure diminishes with the passage of time and after an indefinite period (placed by Moore at more than four years), biological cure is rarely achieved. This being so, we can in those cases where latency has been established temper our therapeutic attack to conform to the indications present. If we can prevent infection in others and maintain a state of latency throughout a long and uneventful life, even though at autopsy the pathologist finds a few spirochetal rests, we have accomplished all that is possible with our present knowledge.

As has been mentioned in early syphilis our therapeutic attack is led by one of the arsphenamines. In contrast, when treating late syphilis whether with obvious lesions or when the disease is considered latent, one should make a hard and fast rule to start with the less potent drugs such as mercury, the iodides, or bismuth. This is called preparatory treatment and should continue for one or two or three months, or even more as in cirrhosis of the liver, before arsphenamine is even considered. (If arsphenamine is finally given, not more than 0.1 Gm. should be administered in the first dose even though there appears to be no contraindication.) This rule, to be sure, is broken frequently and, in a vast majority of cases without any serious trouble ensuing, but serious accidents, including death, doubtless occur with more frequency than we can know as they are not generally proclaimed. They must be guarded against since they are in large part preventable, and adherence to the rule will do much.

These accidents are due to what is known as the Jarisch-Herxheimer reaction, or therapeutic shock which manifests itself by causing an exacerbation of syphilitic lesions associated with hyperemia and edema. The physician can do much to avoid such complications by refusing to allow himself to be hurried, and by working to promote a slow though steady resolution of the lesions and the establishment of the best possible collateral circulation.

While mercury and bismuth may cause mild reactions, arsphenamine, probably because of its greater spirocheticidal properties, is the chief offender. This trouble is caused, it is thought, by the rapid destruction of large numbers of spirochetes and the liberation and absorption of their endotoxins. There must be, however, another factor involved, since these accidents may occur with the treatment of late lesions which do not contain many spirochetes. This reaction, if it is to occur, will follow the first dose provided that the amount and the quality of the drug are correct. There will be noticed about two hours after the injection a constitutional reaction with a fever running from 100° to 103° or more and lasting from six to twenty-

four hours. Locally there will be an exacerbation of existing lesions and frequently the appearance of a roseola and urticaria-like lesions which may last a day or two.

The appearance of the reaction in primary or secondary syphilis is usually of no great import, whereas a similar reaction with edema involving lesions in some vital organ may result in serious symptoms or death. Coronary occlusion is probably the most common cause of death resulting from this complication, though aneurysmal rupture, cerebral hemorrhage, laryngeal occlusion, ascites, jaundice, or acute albuminuria may occur. The medical care should be along common sense lines.

In early latency the possibility of the infection being transmitted to others including the progeny should be borne in mind and precautions taken. As we depend in large part on the developed resistance in maintaining the state of latency, avoidance of injury, mental and physical strains will be helpful as will the usual hygienic measures such as fresh air, good food, and an adequate amount of sleep. Liquor in moderation to those accustomed to it may be allowed and smoking is permissible, except in the presence of recurrent infectious mouth lesions or leukoplakia. Focal infections, not overlooking the prostate, should be eradicated if possible as their products apparently are factors in the production of treatment reactions. Special attention should be given to the bowels and kidneys since they are the organs chiefly concerned in the elimination of the drugs used at this time. The condition of the kidneys was included in the physical examination. If albumin or other abnormal findings are present, this fact should be given due consideration in the treatment scheme, remembering that renal irritation is more likely to be caused by mercury than by bismuth or neoarsphenamine. In such circumstances the urine should be examined before each succeeding injection and future treatment determined by the findings. The prevention of stomatitis is also of great importance and may be accomplished by oral hygiene and dental care.

As with many things in life, the treatment of syphilis is a compromise. The physician, because it requires less time and skill, may substitute neoarsphenamine for the more efficacious arsphenamine, the patient because of expense, discomfort of injections, or inertia, may not be willing to come two or three times a week for an injection of soluble mercury or bismuth, though in his particular case one of these preparations may be especially indicated, again the patient may take an occasional mercury pill but may balk at injections. In spite of these difficulties, efficient treatment for latent syphilis can be planned which will require, except pos-

sibly during the first two weeks in early latency, only one visit a week and which will reduce the pain and discomfort and will minimize the cost. This will be of great assistance in maintaining regularity throughout the duration of the treatment period.

Detailed discussion of the drugs used in the treatment of syphilis is beyond the scope of this paper though for our purpose brief mention is necessary. Arsphenamine ("606") is generally admitted to be the most efficacious spirocheticidal agent we possess and is to be preferred in the treatment of early syphilis especially. Because of technical difficulties in its preparation and administration, as well as the greater frequency of reactions following its use, neoarsphenamine is used as a substitute by practically all general practitioners and many syphilologists. Therefore in outlining treatment in this paper, neoarsphenamine will be the arsenical used unless otherwise stated.

Believing as I do that large doses i. e. 0.9 Gm., besides being more toxic, exert a depressing effect on the patient's natural resistance and defeat in part the purpose for which the drug was given I suggest a maximum dose of 0.6 Gm. which I believe will accomplish all the good possible with less danger of harm. An arsenical course will consist of ten injections. The dosage in patients under 120 lbs. including children is figured on a basis of 0.1 Gm. to twenty lbs. body weight. I do not advise smaller doses in females as I have found that females weighing 120 lbs. or thereabouts generally have fewer reactions than do heavyweight prize-fighters or policemen weighing 200 lbs.

The initial dose in early latency should not be more than one-half the maximum dose for the individual. In late latency, to guard against serious reactions occurring in clinically unrecognized lesions, I repeat that the initial dose should always be small i. e. 0.1 Gm. 0.15 Gm. Each succeeding dose in the absence of contraindications may be increased approximately 0.15 Gm. until the maximum for the individual is reached. Though the maximum dose of 0.6 Gm. is used by many syphilologists in the treatment of pregnant women without ill effect, it has been our custom, because of the additional burden pregnancy places on the patient, to be content with a dose of not more than 0.45 Gm. unless the infection is in the primary or secondary stage in which case a dose of 0.6 Gm. is advisable.

Bismuth ranks next to the arsenicals as a spirocheticidal agent and has largely replaced mercury in the treatment of syphilis. There are many so-called soluble and insoluble preparations on the market. An insoluble oil suspension is suited for our purpose and of the many I personally use either bismuth salicylate or iodobismuthate of gumine in doses of 0.2 Gm. at weekly intervals for fifteen injections

(Larger doses produce no better clinical results and carry more danger of stomatitis.) Of the two preparations the latter is less painful, in fact I think it is the least painful of all bismuth preparations and is less likely to cause a bismuth line or stomatitis than the salicylate, probably because of a lower metallic bismuth content. The manufacturers claim the iodoquinone molecule exerts a synergetic action but I judge its therapeutic action about the equal of the salicylate. A desirable feature of the insoluble forms of bismuth, as with mercury, is that they are slower of absorption and their action is of longer duration than that of the soluble forms.

Mercury, except for its use in preparatory treatment and in old people with an infection of long duration, does not play any part in my treatment plans. It may be taken by mouth alone or with iodides and accomplish its purpose without the pain of injection and the time consuming messy injections though gastrointestinal upsets are more prone to occur. Any of the following tablets may be used three times a day, after meals. The dosage is for adults.

- R. Hydrargyri chloridi corrosivi gr 1/16  
Extracti glycyrrhizae qs  
R. Hydrargyri cum creta gr 11 to 111  
R. Hydrargyri protodididi gr 1/4 to 1/2

Of the iodides, potassium though not so well borne as sodium, has greater therapeutic value and is our choice. An ascending dose of gr. v. xxx well diluted with water or milk three times a day on an empty stomach, is usually well borne and sufficient for our needs. It may be used alone or in conjunction with any of the drugs mentioned. A common method is to take it for two months and then omit for two months. In the days when mercury and iodides were our only weapons in the attack on syphilis, the iodides were indispensable in treating the late manifestations. This is no longer true and today we need not be disturbed as a rule, if because of reactions we are forced to discontinue the use of iodides as both the arsenicals and bismuth will cause granulomatous infiltrations to be absorbed with even greater rapidity if this should be desirable as in gamma of the palate with impending perforation.

In contrast to syphilis with clinically recognizable lesions where a definite line of attack is clearly indicated late syphilis offers the clinician an opportunity to exercise his judgment to the fullest extent, and a marked difference of opinion regarding treatment may be found among those with equally extensive clinical experience. As a basis for comparison I submit the following treatment scheme which has proved satisfactory and applicable to the average adult with early syphilis. Every syphilologist has his own favorite scheme but the opinion is practically unanimous that continuous

transmitting the disease has passed and I have never seen an unquestionable case of third generation syphilis

Positive serology plays a large part in the detection of latent syphilis and its frequent persistence, (in the so-called Wassermann-fast or serologic-fast cases) despite intensive treatment, causes the patient and the physician much concern. As has been mentioned, this positivity varies with the sensitivity of the test employed. My experience with routine Hinton, Kahn and Wassermann tests on private patients, examined in Hinton's laboratory during the past five years, has shown the Hinton test to be the most sensitive and without loss of specificity, the Kahn rates next, but it is so unusual for either the Kahn or Wassermann to be of any help that this procedure has been discontinued as a routine measure and reliance placed on the Hinton alone. Serologic fastness can be prevented in practically all cases if the treatment outlined for early syphilis is given during the primary or secondary stages. Faced with its presence, we must search thoroughly for lesions especially of the cardiovascular and nervous systems, viscera and bones, as involvement of one or more of these structures is frequently found to be the cause of this persistent positivity. If none is found, one must assume their presence though they are too small for clinical recognition.

I believe with Kolmer that fixed positivity means the presence of active foci and I advise treatment as outlined for late latency followed by reexamination at least once a year. I feel that it is a mistake to lay much stress on the result of blood tests as the patient is likely to exaggerate their importance and if one becomes negative, to stop treatment in early syphilis, or to worry unnecessarily if it remains positive. Moore states that the studies of the Cooperative Clinical Group have shown that in latency, Wassermann-fastness is not of grave significance, that relapse and progression are no more frequent among Wassermann-fast patients

than in those with more easily reversible tests and that the tendency toward spontaneous reversal of the Wassermann after treatment is the rule.

Operations on a patient with a positive blood test, except in an emergency, should be delayed until after one or two months' treatment has been given. Treatment should, of course, be resumed after the operation. Surgeons often refer patients for treatment with the remark that they will operate when the blood becomes negative. This is entirely unnecessary and in many with late latency would mean that the patient would forever be deprived of the benefit of surgery as it may be impossible to reverse his blood to negative. The danger lies in operating on gummatous lesions as it is unusual for uninvolved tissue to show any indisposition to heal.

It must be remembered that there is no positive test during life to determine the presence of cure or pathologic latency and that all patients who have had syphilis should be examined at least once a year throughout the remainder of their lives. I wish, also, to call attention to the fact that we do not know the exact amount of treatment necessary to accomplish our purpose in each or any individual. One-half of the treatment outlined may cure a given case and twice as much may not prevent progression in another. To some the treatment herein outlined may seem excessive, but experience has shown that it will accomplish more good than markedly lessened amounts without increasing the incidence of serious complications which after all usually occur at the beginning or early in the course of treatment.

#### REFERENCES

- Kolmer, John A. *Principles and Practice of Chemotherapy with Special Reference to the Specific and General Treatment of Syphilis*. Philadelphia and London: W. B. Saunders Company.
- Moore, Joseph Earle. *The Modern Treatment of Syphilis*. Springfield: Charles C. Thomas, 1933.
- Stokes, John H. *Modern Clinical Syphilology*. Philadelphia and London: W. B. Saunders Company, 1926.

## MYXEDEMA HEART WITH CONGESTIVE HEART FAILURE AND POLYSEROUS EFFUSIONS\*

BY LEWIS M. HURXTHAL, M.D.†

**S**UFFICIENT evidence has accumulated in the literature to show conclusively that the heart in high grade myxedema undergoes physiological changes which may be demonstrated by circulatory, roentgenologic, and electrocardiographic studies. In 1929 observations were begun in this Clinic on the heart in cases of myxedema before and after treatment. Our findings were in accordance with previous and subsequent papers which demonstrated a shrinkage in the size of the heart shadow after administration of desiccated thyroid<sup>1 2 3 4 5 6 7 9 12 13 14 15 16</sup>. Since so few of the recorded cases in

the literature have shown such striking evidence of congestive heart failure as was present in one of our cases, it is being herein reported.

That the enlarged heart shadow found in cases of myxedema is not entirely due to dilatation, in some instances at least, has been demonstrated by Gordon<sup>7</sup> and Freeman<sup>15</sup>, both of whom withdrew large amounts of fluid from the pericardium. Pericardial effusion was suspected in our case. A pericardial tap was attempted but no conclusion as regards the presence of pericardial effusion could justifiably be made although there was no doubt that the pericardium had been punctured. In both cases reported by Gordon and Freeman there was also evidence of dependent edema and in one the

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liver was enlarged Zondek<sup>1</sup> and Fahr<sup>5</sup> have reported instances of congestive heart failure in myxedema

#### CASE REPORT

The patient was an American born woman sixty three years of age. She had been married forty years and had two children one of whom was living and well. Her husband was living but in poor health. She entered the Clinic on October 2, 1929.

The chief complaint was shortness of breath and swelling of the abdomen. In January of the same year she had had an acute illness called "flu." Four months later she began to notice dyspnea. In August the dyspnea had increased and while having a dress fitted she noted that her abdomen was enlarged. From August until October dyspnea further increased and orthopnea appeared. She further stated that she had always felt colder than other people and as a consequence had worn more clothes. Perspiration had been practically absent for a long time and her speech had always been slow. During the year before admission she felt that she had slowed down both mentally and physically. She was referred to the Clinic by Dr. E. R. DeRoma of Walpole, Massachusetts who made the diagnosis of myxedema. Upon advice of her physician she had taken desiccated thyroid but not according to directions omitting it frequently. She felt that it upset her stomach made her constipated and increased the stiffness of her joints.

Her past history revealed that she had had scarlet fever and typhoid fever. In 1889 one tube and ovary had been removed. The menopause occurred at forty-nine years of age and there had been no flow since that time. Her average weight was approximately 145 pounds. One year before admission it was 151 and in September 1929 two months before admission it was 163. In 1926 she had had "eczema" and for years had had "rheumatism."

On physical examination there was no question as to the presence of myxedema. The bloated faces, the dry skin, the retarded mental state were all present. The neck veins were prominent, the thyroid could not be palpated. The heart appeared enlarged to percussion, the rhythm regular, the

sounds distant and of poor quality. The blood pressure was 155 systolic 110 diastolic, there was a paradoxical pulse, the rate was 60. There was a hydrothorax on both sides apparently more marked on the left. The margin of the liver was down low as revealed by palpation and there was tenderness in this area. The abdomen was distended and it was thought that a definite fluid wave could be elicited. There was pitting edema of the lower legs, thighs and sacral region. The patient breathed comfortably only when propped up in a semi-reclining or sitting position.

The patient was sent to the hospital and the accompanying observations were made the following day.

The basal metabolic rate was -36, the pulse 60 to 72, the blood pressure 172/100 and the weight 152½ pounds. The red blood count was 3,760,000, white blood count 6,600 and hemoglobin 65 per cent by the Sahli method. The differential count showed 60 per cent polymorphonuclears, 29 per cent lymphocytes, 6 per cent monocytes, 3 per cent eosinophiles and 2 per cent basophiles. The blood smear appeared normal. The blood nonprotein nitrogen was 33 milligrams per 100 cc. The Wassermann reaction was negative. Phthalein excretion was 35 per cent in two hours with a urine volume of 290 cc. The urine contained no albumin or sugar, showed a specific gravity of 1.008 and a neutral reaction. The sediment was negative. Other twelve-hour specimens of urine varied in specific gravity from 1.007 to 1.018.

The seven-foot roentgen-ray exposure of the heart and the electrocardiogram taken on October 26, 1929, as well as subsequent observations are shown in plates I and II. The clinical course as shown by the clinical chart is reproduced in fig. 1.

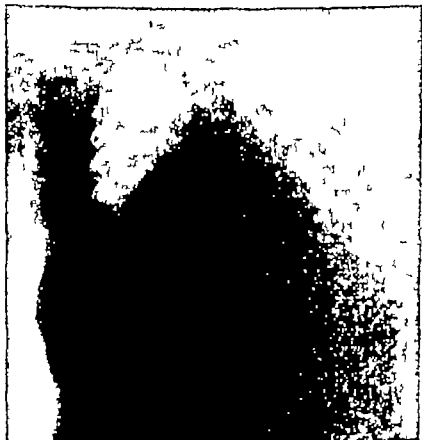
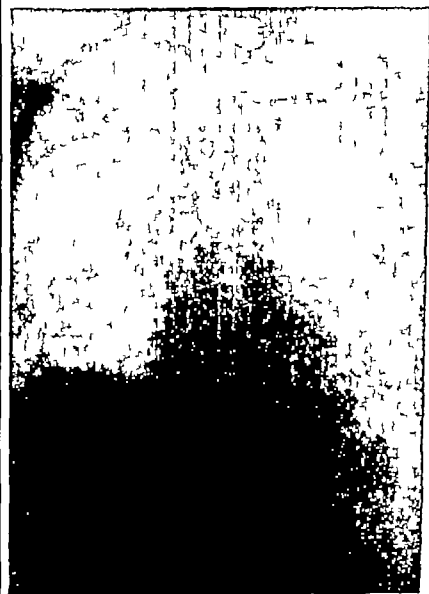


PLATE I

A. Seven foot roentgenogram, taken October 6, 1929, before treatment.

B. Seven foot roentgenogram taken November 6, 1931, roentgenograms taken a month after treatment as well as a recently (1934) are essentially the same as shown above.

On the third day of the hospital stay paracentesis of the pericardium was attempted. A moderate-sized needle was inserted through the chest wall at a point lateral to the usual position of the apex. Fluid was immediately encountered but after a few cubic centimeters were withdrawn the flow ceased. The needle was then pushed in a little farther when it was apparent that it was touching the heart muscle. No fluid could be obtained and the needle was withdrawn as it did not seem desirable to poke about especially if the heart was dilated. No conclusions could be made from this attempt because I am not certain that the fluid came from the pleural

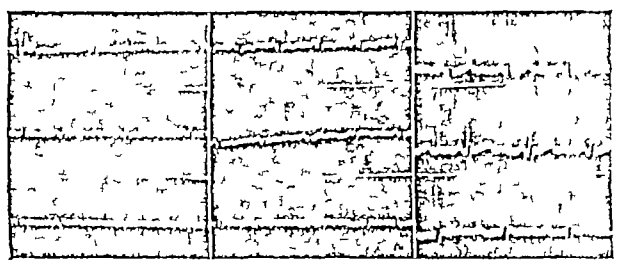


PLATE II Leads I, II, and III (top to bottom) of electrocardiograms taken before 10 days and 30 days after treatment

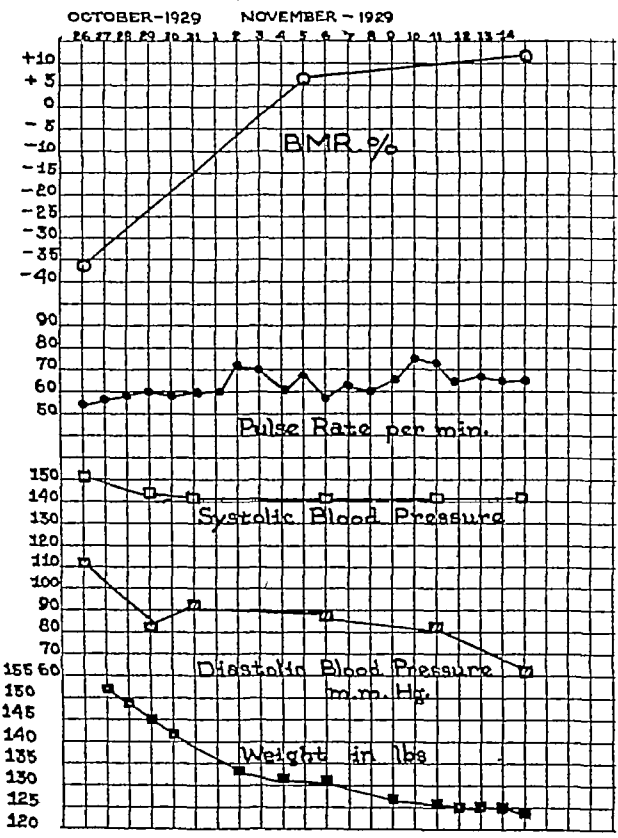


FIGURE I. Chart of Basal Metabolism, Pulse, Blood Pressure, and Weight during treatment with 1/80 grain thyroxin (Squibb) daily beginning October 27, 1929.

or from the pericardial cavity. The amount withdrawn was not sufficient to determine the specific gravity. Thyroxin (1/80 grain) was given daily after the first metabolism was determined. No other medication was administered. During the first four or five days in the hospital, the patient slept a greater part of the time. This lethargy gradually passed away so that by the end of two weeks she was mentally alert. All evidence of edema had disappeared and there remained only a small amount in the left pleural cavity.

The patient was incapacitated for a few weeks after leaving the hospital but by the end of two months was able to resume her normal activities. About eight months later she developed pain in the back and rather severe attacks of sciatica. Following tonsillectomy on August 26, 1930, physiotherapy, and the wearing of a fitted corset, these complaints ceased. The patient now considers herself in fairly good condition for her age, which is sixty-eight. She does most of her housework. She sleeps well, eats normally, and is not bothered with dyspnea or palpitation. The optimal dose of thyroxin has been established at 1/80 grain five times a week.

The blood pressure has not changed remarkably throughout, although there has seemed to be a lower average diastolic pressure since taking thyroxin. In a roentgen plate taken at the time she had sciatica,

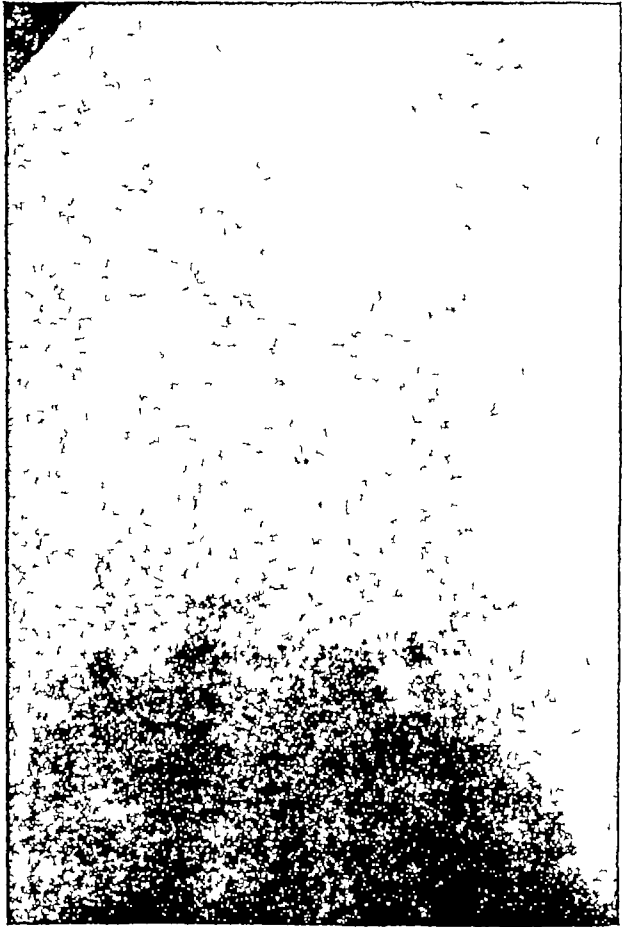


PLATE III. Roentgenogram of abdominal aorta showing extensive calcification.

evidence of marked arteriosclerosis was found as shown by calcification of the abdominal aorta and iliac vessels (Plate III).

Observations of the Basal Metabolic Rate, Pulse, Blood Pressure, and Weight after leaving hospital:

Date	1-11-30	8-27-30	3-3-31	3-5-32	4-1-33	3-31-34
BMR	-2	+1	-5	-4	+4	+6
Pulse	70	74	75	64	64	72
B P	184/76	180/90	170/60	134/73	196/90	160/80
Weight	118½	131	145	133	135¾	139
Dose of 1/80 grain Thyroxin Tablets per week	3½	4	4	4	5	5

## DISCUSSION

There can be little doubt that this case was one of severe myxedema with the usual clinical features of congestive heart failure. Whether the fluid as found in the pleural, pericardial, and abdominal cavities in such cases is the direct result of congestive heart failure or is partly an exudative accumulation from myxedema per se is not as yet proved. In the case described by Freeman, diagnosed as chronic pericarditis and effusion, withdrawal of the fluid alone was followed by marked improvement for three months. This observation, I believe is the most important one yet recorded in relation to this question. Had the heart failure and consequently the patient's disability been entirely due to myxedema alone, it would seem unlikely that he would have received so much benefit from the pericardial tap without administration of thyroid. I believe, therefore, that one is justified in concluding that the end result as illustrated by the case reported here comes about as follows: first, the absent or diminished secretion of thyroid causes the heart to dilate and become sluggish, secondly, in severe cases serous fluid accumulates, probably as an exudate, in the various cavities, and thirdly, the combined effect of a sluggish heart and the mechanical embarrassment of the heart by the serous fluid produces the clinical picture of congestive heart failure.

From a therapeutic point of view, it makes little difference which theory is correct as the administration of desiccated thyroid or thyroxin alone suffices to relieve the patient entirely. This subject has, however, an important bearing on the recent therapeutic procedure of total thyroidectomy<sup>17</sup> for congestive heart failure. If such an extreme state of circulatory failure can result from marked myxedema, it would seem that the production of myxedema might well defeat the purpose for which it is intended. The reported cases of myxedema which show congestive heart failure have apparently been of severe type. Thus, it would appear that

following total thyroidectomy, only a mild or moderate degree of thyroid deficiency should be allowed to develop and that a small amount of desiccated thyroid should be given to prevent severe myxedema.

## CONCLUSION

A case of severe myxedema is presented in which there were the usual signs of congestive heart failure and polyserous effusions. The patient has been under treatment for six years and continues to be well. It is suggested that the appearance of congestive heart failure is the result of myxedema heart and the mechanical embarrassment of the circulation occasioned by the accumulation of effusions which are the result of myxedema and not of heart failure. The possible relationship of this syndrome to total thyroidectomy is discussed.

## REFERENCES

1. Zondek, H.: Das Myxödem. *München. med. Wchnschr.* 65:1150 (Oct. 27) 1915; 64:481 (June 30) 1919.
2. Asmann, Leipzig II.: Das Myxödem. *München. med. Wchnschr.* 66:9 (Jan. 3) 1919.
3. Melsner, R.: Zur Klinik des Myxödemherzens. *München. med. Wchnschr.* 67:1318 (Nov. 12) 1919.
4. Theodor, C.: Electrocardiogram in cretinism and in mongolian idocy. *Am. J. Dis. Child.* 28:125 (July) 1924.
5. Fahr, George: Myxedema heart. *J. A. M. A.* 84:215 (Jan. 31) 1925. *Am. Heart J.* 3:14 (Oct.) 1927.
6. Duden, C. W.: Myxedema with cardiac decompensation and hypertension which disappeared under thyroid medication. *J. Missouri M. A.* 5:28 (Jan.) 1929.
7. Gordon, A. H.: Some clinical aspects of hypothyroidism. *Canad. M. A. J.* 20:7 (Jan.) 1929.
8. Reid, W. D. and Kenway, Florence L.: Electrocardiographic signs associated with low basal metabolism. *Endocrinol.* 9:123 (Mar. Apr.) 1929.
9. Hollman, J. E.: Myxedema heart. *Am. Heart J.* 4:151 1929.
10. Blumgart, H. L., Gargill, S. L. and Gilligan, D. R.: Studies on velocity of blood flow; circulation in myxedema and thyrotoxicosis. *J. Clin. Investigation* 9:21 (Aug.) 1930.
11. White, P. D.: Heart Disease. New York: The Macmillan Company. P. 337 1931.
12. Davis, J. C.: Myxedema heart with report of one case. *Ann. Int. Med.* 4:733 (Jan.) 1931.
13. Hallock, P.: The heart in myxedema, with a report of two cases. *Am. Heart J.* 9:284 1932.
14. Lerman, J., Clark, R. J. and Means, J. H.: Heart in myxedema: electrocardiograms and roentgen ray measurements before and after therapy. *Ann. Int. Med.* 6:1261, 1932.
15. Further observations on heart in myxedema. *Ann. Int. Med.* 8:5 1934.
16. Freeman, H. D.: Chronic pericardial effusion in myxedema: report of a case. *Ann. Int. Med.* 7:1070 1934.
17. Ohler, W. R., and Abramson, J.: Heart in myxedema. *Arch. Int. Med.* 53:185 1934.
18. Blumgart, H. L., Levine, R. A. and Berlin, D. D.: Congestive heart failure and angina pectoris: therapeutic effect of thyroidectomy on patients without clinical or pathologic evidence of thyroid toxicity. *Arch. Int. Med.* 51:1866 (June) 1932.

## CANCER EDUCATION IN MEDICAL SCHOOLS\*

BY ROBERT B. GREENOUGH, M.D.†

I WANT to thank you for your courtesy and your indulgence in inviting me to deliver the Eleventh Lewis Linn McArthur Lecture of the Frank Billings Foundation of the Institute of Medicine of Chicago, an honor of which I am deeply sensible.

\*The Eleventh Lewis Linn McArthur Lecture of the Frank Billings Foundation of the Institute of Medicine of Chicago held February 1, 1935.

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ble and which I fear I shall find it hard to justify.

Let me first, however, record the fact that the death of Lewis Linn McArthur, which occurred since the lecture was last given in 1934, is a loss which the surgical profession of the whole country, and indeed of other countries, shares with you who lived with him and experienced daily that unparalleled combination which he possessed of keen judgment and exquisite surgical skill tempered by modesty even to the point of diffidence and humanized by

the milk of human kindness. Such were the striking features of his professional career. May this unique influence long endure as an example to us who follow him, and let us believe that it was with this intent that Doctor Billings established the McArthur lectureship as a part of the foundation.

Many different influences have contributed to the determination of the changes which have taken place in the undergraduate medical curriculum since the turn of the century. Among these may be mentioned, perhaps first, the great advances of medical science which have made it necessary to discard much of the empiric instruction of the 80's and 90's, and to replace this by the more rational scientific methods which have contributed in such great degree toward these same advances. Other considerations, however, have influenced the instruction in our medical schools, such as the varying educational requirements for licensure in the different states of the union and the elimination of the low-grade and proprietary medical schools and the development of the strong university schools along the lines of the sound educational principles already established in the other graduate schools of the universities. Since these influences have been felt to be of somewhat unequal significance in different localities, it is not surprising that wide differences should still exist between the different schools in the general educational policies adopted and in the details of the curriculum offered to the prospective student.

During this same period also, the requirements in the way of premedical instruction have been extended to at least two years of college education in all of the approved schools and, what is of very great significance, the number of candidates for admission to these schools is so greatly in excess of the number of students which can possibly be admitted that a process of natural selection has taken place, with the result that the intellectual and scientific qualifications of the medical student of today are vastly greater than they were twenty-five years ago.

These considerations have also affected the technical form of instruction given, as well as the content of the curriculum. Thus the didactic lecture has been almost completely abandoned. Its place has been taken by laboratory work, conferences, and clinical instruction, and the tendency here has been progressively to deal with smaller and smaller groups of students, and to have the student actually take part in the exercise and not remain an observer on the side lines. This clinical instruction is supplemented by collateral reading from textbooks and from contemporaneous medical literature and by conferences of smaller groups. More time is spent both in the laboratories and in the clinics in

teaching principles and methods than in acquiring a mass of uncorrelated facts. The concept of preparation of the student for a life-time continuance of the study of medicine, through school, hospital, and practice, is set up, and the discipline of self-instruction is the objective rather than the acquirement of isolated facts which too frequently will be forgotten before the need for their use occurs.

With this change in the medical curriculum has come about a more widely accepted recognition of the fact that the four-year course in medicine, and the M.D. degree which indicates its successful conclusion, can no longer be considered sufficient without an additional year or years of hospital training, to ensure the qualifications of the graduate to engage in the general practice of medicine with safety to the public. Under these circumstances it becomes necessary to consider first what absolute essentials of knowledge must be acquired in each department of the medical school to serve as a firm and substantial foundation on which to base subsequent hospital experience, in order that the student may consolidate the whole into such a structure of coordinated knowledge and experience as to qualify him for the actual practice of his profession.

It is of course to be expected that each department of the school should regard its own subject as of greater importance in this composite foundation than that of other departments, and only a wise and impartial authority and one endowed with force and tact, can bring these divergent units into a freely cooperative group. When this is accomplished, however, and the medical course is viewed as a composite period of learning in which all departments must contribute to the desired end, the first and foremost difficulty is overcome.

Since it is instruction in the subject of cancer that concerns us here, let us consider first the basic knowledge of that subject which we may agree is needed by the student when he completes four years of medical school and clinical instruction and qualifies for his hospital intern service and his degree. Let us consider also the further knowledge which he should acquire in his intern training in order that on graduation he may give efficient service to the community as a general practitioner, and finally, that minimum of knowledge of cancer which will make it safe for him as a surgeon or a radiologist to undertake the actual treatment of cancer in the individual patient. We can then judge the extent to which cancer instruction, as commonly given today in our medical schools, conforms with those ideals. In doing this, however, we must always bear in mind that cancer, though undoubtedly of great importance in mortality statistics, is only one, and by no

means a common one, of the multitude of diseases with which the practicing physician must be familiar and further, that however desirable it may be that the practicing physician's working knowledge of cancer should be increased this end will have to be attained under present day conditions by increasing the efficiency of the instruction given to him as an undergraduate rather than by any material addition to the hours in the curriculum allotted to this subject.

The unique and practical feature of cancer as a disease is, of course the fact that while readily cured in many situations by removal or destruction in its early local stages in its later disseminated stage it has a 100 per cent mortality. This is not true of any other disease which afflicts so large a percentage of the population as cancer. It is for this reason that the early diagnosis of cancer assumes a significance far greater than that of many other conditions the majority of which are definitely designated as self limited diseases because of the fact that the natural protective processes of the human body, once set in motion, not infrequently can operate successfully to overcome the disease. This does not occur with cancer. It is a fact furthermore that the early diagnosis of cancer is established only with the greatest difficulty whereas the later symptoms are too often unmistakable. Much has already been accomplished in the way of education of the public to secure prompt consultation by the patient with a physician on the recognition of any suspicious symptoms, but a great deal more remains to be done along this line. Unless, however the physician is alert to recognize the possibility of the presence of cancer as a cause of the symptoms of the patient who consults him and unless he immediately takes steps to obtain a positive diagnosis, whether by roentgen ray or instrumental examination or biopsy or by consultation the chances of that patient being permanently cured of cancer diminish steadily day by day. Studies made by Dr G. A. Leland at the Huntington Hospital indicate that cases of cancer of the cervix of the uterus require on an average only four weeks' time to progress from the early favorable to the more advanced class, with a corresponding diminution of the percentage of five year cures of 16 per cent or 4 per cent a week. Under these circumstances we may fairly insist that no student should reach the end of his fourth year in the medical school without having the overwhelming importance of the early diagnosis of cancer so firmly fixed in his mind as to make him ever after feel a sense of personal responsibility for any cancer patient who progresses from the local to the extended stage of the disease by reason of his failure to secure a prompt diagnosis in a suspected case which has consulted him.

Undergraduate instruction in cancer begins in almost every medical school as a part of the

course in pathology and usually in the second year. Instruction is given by lectures and in the laboratory. The student learns the general features of the cancer process such as the histological and gross appearances of cancer in its established stages, and the different methods by which cancer of different cellular composition and arising in different situations extends to other organs. Attention is given to precancerous conditions and to the study of material from the operating rooms, as well as from the autopsy table, in order that the student may become familiar with the disease in its early as well as in its more advanced and fatal stages. Emphasis is not infrequently laid upon the protean character of the disease, but the symptoms of cancer of different organs and the differential diagnosis in each situation must be left as a rule to the later clinical instruction of the third and fourth years. Contemporaneous clinical demonstrations are arranged in some schools as correlative exercises to the course in pathology, in order that the student may gain some idea of the appearances in the living patient of the disease which he is studying in the laboratory. Cancer and other tumors are, of course, included in these exercises.

The important knowledge of cancer which has been acquired by research workers studying transplantable, spontaneous and induced cancer in animals and the significance of heredity, together with the practical application of these facts to the etiology of cancer and to the prevention the diagnosis, and the treatment of cancer in human beings, are properly included in this portion of the course.

At this point also the public health aspects of cancer are commonly presented. The world wide and continued increase in the cancer death rate and its significance is discussed together with the necessity for the education of the public as well as of the medical profession to the importance of early diagnosis and the efforts which have been made to provide convenient consultation facilities by the establishment of cancer hospitals and cancer clinics in all civilized countries.

This basic instruction in pathology is further elaborated in many schools by a course in surgical pathology, given in the second or third year in which the clinical and the laboratory aspects of cancer as well as of other surgical diseases are brought together and correlated to such a degree as is possible with the clinical material available in the hospital and the resources of the laboratory which receives the operative material of the hospital for study and diagnosis. In such a course a practical but very elementary comprehension of the refinements of the histological diagnosis and the classification of tumors can be given. Such matters as the grading of malignancy can be discussed, and the subject of radiosensitivity, which is becoming a more and more important considera-



tion in radiotherapy, can be brought to the student's attention. Such a course in the surgical pathology of tumors must be acknowledged to be one of the most important features of the teaching of cancer in medical schools which have been developed in recent years, and may, as in some schools, be postponed to the third or fourth year.

During the third and fourth years of the medical school, when the student begins his clinical work in the wards and outpatient departments of the hospital, he first comes in contact with cancer as a disease in the living patient in its many different situations. Unfortunately, however, in the majority of our medical schools today this experience is obtained under the supervision and instruction of a large number of different teachers and in many different clinical departments of the school and hospital. Thus, while the main responsibility for clinical instruction in cancer rests undoubtedly upon the surgical department, medicine, gynecology, ophthalmology and otology, dermatology, genitourinary surgery, neurosurgery, and radiotherapy all present the subject of cancer to the student from one or another point of view.

Too often it is this part of the student's training that can be fairly criticized as lacking such correlation as to give to the student a clear and systematic comprehension of the cancer process as a whole, and of the general principles underlying its diagnosis and treatment in the many different situations in which it may develop in the human body. While this lack of coordination in the teaching of cancer exists in many medical schools today, it is found to be present also in regard to the clinical diagnosis and treatment of cancer in many of our hospitals. It is to correct this lack of coordination between the different clinical departments of our hospitals, and to tie them up more closely with the basic knowledge of cancer which is to be derived from the department of pathology and with the rapidly advancing knowledge of radiotherapy, that the movement for the establishment of cancer clinics in general hospitals has come about. In the past seven or eight years the development of clinics of this nature, staffed by representatives of all these different departments of the hospital but operating as a cooperative group for the discussion in conference of the diagnosis and treatment of the individual case, has been conspicuous. Many of the great university medical schools have been quick to see the advantages of this opportunity for the student to obtain a broader view of the subject of cancer by utilization of the experience and material available in the cancer clinic. Where such clinics do not exist, however, the student is obliged to attempt to correlate this knowledge for himself at a very considerable waste of time and with difficulties which are often almost insurmountable.

It may be maintained, as indeed has already been stated (in the report of the commission on medical education 1932), that the task of correlating information derived from different sources and representing different points of view is a desirable mental discipline and, as such, a necessary portion of the student's training, but that this can easily be carried so far as to be a waste of the student's time is evidenced by the notable development of "combined clinics" and group clinics in many different departments of medicine, including the "pathological conference" which has been so widely adopted and is so highly valued as an educational exercise by the student, the intern, the staff, and the postgraduate as well.

Cancer in its many different situations in the human body is often spoken of as being not one disease but a whole group of diseases. From the point of view of the clinician this is undoubtedly true, because its clinical manifestations are so varied in these different situations that there are few if any symptoms of the disease which are common and characteristic of cancer in all its different places of origin. Especially is this true of cancer in its early stages when its recognition is so difficult and at the same time of such vital importance to the success of the methods of treatment upon which we now are forced to rely—surgery and radiation.

Thus cancer is a new growth or tumor, but the clinical demonstration of a tumor may be impossible from the clinical examination, as in cases of cancer of the stomach or of the colon, and resort is necessary to examination by roentgen ray. Some forms of cancer present themselves as ulcerative lesions, as in the mucous membranes of the mouth, and others are detected not by any signs whatever indicating their site of origin but only by the secondary manifestations of their extension to lymph nodes or by metastasis to bone, as in occasional cases of cancer of the breast or hypernephroma. It is these characteristics of cancer which make the differential diagnosis of the disease in each of its different situations a matter of separate and special consideration. Knowledge of these peculiar features of cancer in its different locations and experience in applying this knowledge to the diagnosis in the individual patient are thus important matters of experience to be brought to the student's attention during the third and fourth year clinical instruction in the wards and outpatient departments of the hospital.

At present, as a rule, this instruction is given independently by each of eight or ten different departments in the medical school and by their affiliated departments in the hospitals. Not only must this instruction cover matters of differential diagnosis, but the natural course of the disease in each of its different situations must be learned as well as the appropriate treatment in

each case, whether by surgery, by radiation, or by a combination of these methods. Discussion of safe methods for exploratory operation and biopsy in different situations is essential, and a consideration of the clinical features of the pre-cancerous diseases and conditions is of great importance. In the relatively brief period of clinic or ward service allotted to each student, and with the limited clinical material available it is not unreasonable to suppose that many of the less common forms may not be brought to his attention. Deficiencies of this sort in the schedule of clinical instruction are inevitable, but they may well be expected to be minimized if a cancer clinic exists in the hospital where the student is receiving his instruction and he is able to be present at the daily or weekly tumor conferences, in which the different departments concerned are represented and join in the study and discussion of the collected tumor material of the hospital.

In the matter of treatment also advantages are to be obtained by the student when he can have the relative merits of surgical and radiation therapy discussed by representatives of each of these departments, in a friendly and coöperative effort to determine for the patient that method of treatment which best meets the requirements of his individual case. This is an advantage to the student which he can rarely obtain from the individual instructor in one or another department who with the most sincere belief that he is imparting the truth as derived from his own experience, frequently exhibits a lack of precise knowledge of the results of treatment by methods other than his own, and a certain degree of prejudice which leaves the student in a state of confusion and unable to obtain authoritative information in regard to these controversial matters.

Where no cancer clinic exists in which the clinical material of the hospital can be collected, studied, and discussed by the student, the next best method appears to be that of the combined clinic which brings the instructors of two or more departments together to participate in a joint discussion of cases of cancer in its different situations. Such a combined clinic can be made to demonstrate the same group study principle which is the characteristic of the cancer clinic but requires special organization and does not so readily cover the entire field.

The instruction given in our medical schools today in roentgenology and radiotherapy varies within wide limits. The universal necessity for the employment of roentgen rays in the diagnosis of many diseases and the great importance of roentgen ray and radium therapy in cancer as well as in other conditions, have been recognized only within a relatively brief time and the science of radiology is one which is advancing rapidly at the present time. The necessity for a general knowledge on the part of the phy-

sician of its values and of its limitations is becoming more and more universally appreciated. It is not to be supposed that every graduate should acquire a comprehensive knowledge of the physics of radiology, or of the technic of roentgen ray examinations, or of the employment of radium and of roentgen ray in treatment, but the subject is of far too great importance to be left to the chance introduction of these subjects in connection with the instruction of the clinical departments in the third and fourth years. Many schools acknowledge these facts by assigning hours in the curriculum for such instruction, but in many instances this assignment is too short for any comprehensive course and in some schools scarcely any hours at all are given to this department.

What has been said about the undergraduate hospital instruction in cancer applies also to that of the hospital intern service with which the four years of medical school instruction is now commonly, if not universally, supplemented before registration to practice is sought in the several states. Here, of course, is given a much wider opportunity than during the undergraduate years, both in time and in clinical experience, to supplement the instruction already received, but here again unless the intern service is taken in a hospital which has its cancer work coördinated and collected in a cancer clinic, the varying experiences and prejudices of the different department staffs cannot fail to leave confusion and doubt in the mind of the intern, and delay or prevent him from acquiring that correlation of knowledge of cancer as an important disease which is to be desired.

At the end of four years of undergraduate instruction the student should have acquired a general knowledge of the pathological nature of the cancer process. He should know something of its etiology as a problem in biology. He should have firmly fixed in his mind the significance of long continued "chronic irritation" as an exciting cause of cancer, and through this approach he should acquire a grasp of the nature of "precancerous lesions" and the importance of their diagnosis and treatment in connection with the prevention of cancer in those situations where such conditions are universally accepted as of serious significance.

In addition to these general biological facts about cancer the student should know of its public health aspects of the steadily mounting cancer mortality, and of the statistical studies of the disease, not only in regard to its morbidity and its mortality, but in relation to the results of treatment in its different situations. He should know of the campaigns for education of the public and of the efforts made to arouse greater interest and proficiency among the members of the medical profession in dealing with cancer, and for increasing the resources for ex-

pert consultation and treatment by the organization of cancer hospitals and cancer clinics throughout the world. He should know also what can be done to diminish suffering and give the greatest ease and contentment to the incurable case.

He should be informed of the trends of present day cancer research, of the artificial production of cancer in man and in animals of the biochemical and biophysical studies of normal and of malignant cells, and especially of the studies of the influence of different chemical and biological products, hormones, vitamins and enzymes upon cell growth—a field at this moment under most vigorous cultivation in the research laboratories.

With this comprehension of the nature of the cancer process and its importance in present day medicine, the student at the end of four years of medical school with the clinical instruction in the hospitals of his third and fourth years should be aware of the vital necessity for prompt and accurate diagnosis of cancer in its more common situations, of the possibilities and probabilities of successful treatment by surgery and by radiation of the methods of exploratory operation which are regarded as safe and of those which are to be avoided as involving danger to the patient, and of those conditions which are widely recognized as precancerous diseases and which require prompt diagnosis and treatment that the occurrence of cancer may be prevented.

In addition to this knowledge of cancer in general specific instruction in regard to the differential diagnosis of cancer in its more common situations, especially those of the early case, must be acquired if the student is to fulfill his function as a general practitioner in the protection of the health of that part of the community which he serves. This knowledge must to a great extent be acquired by experience, and constant repetition may be needed to ensure its retention in such form as to be instantly available in the interests of the patient. Thus the differential diagnosis of cancer of the skin, breast, mouth, uterus, stomach and intestine may perhaps be set up as the forms of cancer which are most important from the point of view of frequency, followed by those of the bones, muscles and deeper tissues (the sarcomas), cancer of the genito-urinary tract of the esophagus, and of the glandular organs, such as the salivary glands, thyroid, and the pancreas.

With knowledge sufficient to cover the differential diagnosis of cancer of the more common regions or at least to realize the possibility of the existence of cancer in lesions of these organs the general practitioner can best serve his community by obtaining consultation promptly in cases where he is unable himself to make a

positive diagnosis. In performing this function he will fulfill his duty to society better by far than by attempting to supply the necessary treatment for such cases, unless he is equipped with adequate resources and experience.

The four years of the medical school can hardly be expected to carry the student much farther in his knowledge of cancer than has been above described. In his hospital intern service, however, the student is frequently obliged to choose between the medical and surgical services of the hospital. In many hospitals also additional intern or resident appointments are available in special departments, such as gynecology, genito-urinary surgery, pediatrics, orthopedics, otolaryngology, and ophthalmology. The surgical intern early in his career comes in contact with those forms of cancer which require and receive surgical treatment with or without the addition of radiation therapy. He thus learns the technic of exploratory operations in cancer cases as well as the complete standard radical operations required for the surgical cure of cancer. He assists at operations in cancer cases and may even obtain opportunity to perform such operations himself under supervision. Here again, however, the intern may be at the disadvantage of serving under a preceptor who may or may not be sufficiently interested in the modern group study of cancer to work in close cooperation with the pathologist and the radiotherapist. Where a cancer clinic has been organized this objective is readily attained. Where such is not the case, however, the fancy of the individual surgeon determines the extent to which the clinic study of cancer cases is pursued. During the surgical intern service, and in the special services such as otolaryngology, ophthalmology, and gynecology, the clinical material of the hospital provides opportunity for study and for acquiring a certain degree of proficiency in the diagnosis of cancer in its more common situations, and for the handling of early and doubtful cases, as well as in the radical operative treatment of the disease.

The student who selects a medical intern service attains experience in the diagnosis of some of the more common internal forms of cancer, such as that of the stomach, colon, pancreas, lung, and of the leukemias and lymphomas, but his opportunity for the study of cancer of other regions is more limited. A combined medical-surgical service is thus of advantage to the student who expects to enter general practice. Hospital services limited to one or another of the specialties give little opportunity for general experience and when possible should be taken only after a general medical or surgical or combined intern service, instead of as a substitute.

That the experience of the surgical intern service should warrant the graduate in holding himself out as qualified for special practice in

cancer surgery however cannot readily be agreed. It is wiser for him to continue active work as a general surgeon and devote such time as he may either to the study of cancer in the laboratory and in the roentgen ray and radium department, or in the cancer clinic rather than to attempt to specialize in cancer work exclusively at the end of his intern service. The broader training of the general surgical service for a number of years at least is greatly needed by the surgeon who is desirous of making of cancer the chief interest in his professional career. If he cherishes this ambition however he should appreciate that he must train himself with the definite objective of becoming one of a group of individuals who are united in the purpose of securing to the cancer patient the best service which modern medical science affords—whether as a surgeon or an internist, a radiotherapist or a pathologist, or a representative of one of the specialties he must develop first such general proficiency in his own line as to qualify himself to represent that department adequately in consultation with representatives of other departments similarly qualified. He must add to this special training of his own an adequate knowledge of and a sympathetic appreciation for the essential principles of the other departments concerned with the cancer problem, especially the three departments, surgery, pathology, and radiotherapy. By this training he should succeed in preparing himself to take a place among the constantly increasing group of physicians who recognize the necessity for providing more adequate medical resources for the relief of the vast numbers of individuals in the community afflicted with cancer.

To summarize we may say that

1 Improvement in the instruction given in the medical school to undergraduates on the subject of cancer is to be desired.

2 This is to be obtained by improvement of the quality of the instruction rather than by addition to the amount of time devoted to this subject in the curriculum.

#### STRIKE OF CITY HOSPITAL ANNEX WORKMEN

The large addition under way at the Boston City Hospital is suspended because of the strike of union building trades mechanics.

#### DRIVE FOR FUNDS FOR THE CAPE COD HOSPITAL

Because of extensive improvements at the Cape Cod Hospital at Hyannis a campaign for funds has been started. This hospital serves a population of 32,000 living within an area of 444 square miles and has eighty-three beds.

3 The chief defect in cancer instruction in medical schools today is the lack of correlation of the instruction given by many different departments in the schools and hospitals.

4 This defect is best overcome by the organization of cancer clinics for the group study of cancer cases in hospitals and by their use for teaching undergraduates.

5 Where cancer clinics are not in existence and cannot be organized in teaching hospitals, an attempt should be made to obtain coöperative and coordinated plans for teaching the subject of cancer from the departments especially concerned in this instruction, i.e., surgery and its specialties, pathology and radiotherapy.

6 Every graduate of the medical school should obtain a general knowledge of cancer and in addition he should (a) recognize the supreme importance of early diagnosis, (b) recognize symptoms which indicate even the possibility of the existence of cancer in its more common situations, and (c) know what steps are to be taken with safety to the patient in securing an immediate and positive diagnosis as to the presence of cancer and if cancer is present what steps are to be taken to procure the most effective treatment.

7 The surgeon who desires to make cancer the chief interest of his professional career requires a period of years of preparation by post graduate study and the actual practice of general surgery. During these years he should pursue the pathological study of cancer in the laboratory to the extent of his opportunities. Some training and experience in radiotherapy should also be acquired. The radiotherapist has the same need for pursuing the practice of his own specialty and should add the pathological training also while making himself familiar with the diagnosis of cancer and its surgical treatment. Only with this experience can he fit himself adequately to join the representatives of the other departments of the hospital in the group study of the patient in the special cancer clinic or the cancer hospital.

During the past year 1124 persons were admitted and 1758 out patients were treated.

The hospital is approved by the American College of Surgeons.

#### THE APPOINTMENT OF MRS. J. P. SIMONDS

Mrs. J. P. Simonds, 25 East Walton Place, Chicago, Illinois, has been appointed Chairman of Press and Publicity for the Woman's Auxiliary of the American Medical Association to succeed Mrs. Robert E. Fitzgerald who will next June take office as President of the National Auxiliary.

# CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C CABOT, M.D

TRACY B MALLORY, M.D., *Editor*

CASE 21321

## PRESENTATION OF CASE

*First Admission* A sixty-seven year old American housewife entered complaining of right upper quadrant pain

About twice a year during the past several years the patient had attacks of mild intermittent right upper quadrant pain associated with light stools, dark urine and jaundice, the latter appearing usually within twelve hours after the onset. The attacks, which occasionally began half an hour after eating, usually lasted a week, although the pain itself lasted only a day or two and was followed by marked weakness and toward the end by chills and fever. The pain at first radiated to the midscapular region but recently had remained localized to the right upper quadrant. There was no vomiting. Two months before entry she had a very severe attack lasting about two weeks and three days ago another which lasted until admission. At this time, in addition to dark urine, light stools and jaundice, she vomited but had no chills or fever. The pain was present at night as well as during the day. During the past three months she had lost about fifteen pounds in weight.

Her family, marital and past histories are non-contributory.

Physical examination showed a well-developed and nourished woman in no acute distress. The skin and sclerae were icteric. Her teeth were false. There were a few crackling râles at both bases. The heart was not remarkable. The blood pressure was 110/60. The abdomen was moderately distended. There was diffuse tenderness with spasticity in the right upper quadrant. The liver edge was not made out because of the tenderness. No masses were palpable.

The temperature was 100.2°, the pulse 92. The respirations were 18.

The urine was dark amber in color and had a specific gravity of 1.004 to 1.015, a very slight trace of albumin and a four plus test for bile. The sediment contained several white blood cells and an occasional epithelial cell. The blood showed a red cell count of 3,500,000, with a hemoglobin of 55 per cent. The white cell count was 13,000, 86 per cent polymorphonuclears. The stools were brown in color. The icteric index was 50, the van den Bergh 12 milligrams

The bleeding time was 3 minutes, the clotting time 9 minutes.

She was given one liter of 10 per cent glucose intravenously and on the fifth day, following a transfusion of 500 cubic centimeters, operation was performed.

The gall bladder was found enlarged, acutely inflamed and adherent to all the surrounding structures. Pressure on the gall bladder caused a slight amount of bile to exude from this area of inflammation. The gall bladder was opened and about fifty stones were removed. It was not possible to remove the gall bladder because of adhesions and extensive bleeding. The common duct was opened and forty-seven stones were removed from both the common and hepatic ducts. The latter were distended and easily admitted a finger on each side. Several stones were also removed from the ampulla, which was then dilated and several stones pushed through to the duodenum. A catheter was sutured into the common duct and the duct closed around it. A large tube was sutured into the gall bladder.

Following operation the temperature rose to 102° for a few days but soon returned to normal. Her jaundice improved. An icteric index on the fourth postoperative day was 20 and a van den Bergh 6.8 milligrams. She continued to do well and was discharged approximately three weeks after admission.

## *Second Admission, nine months later*

Except for an occasional mild attack of abdominal pain without jaundice she felt perfectly well during this interval. She gained weight and had a sense of well-being. Two days before entry, following a heavy meal, she complained of intermittent cramplike epigastric pain followed by vomiting and the passage of dark-colored urine. Since then she vomited several times.

Physical examination showed a very sick woman with slight jaundice of the skin and sclerae. There were numerous moist fine inspiratory râles at the bases. There was spasm of the upper abdomen with a questionable area of fullness. There was tenderness below each costal margin, more marked on the left. The liver extended four fingerbreadths below the right costal margin. The blood pressure was 95/55.

The temperature was 98°, the pulse 118. The respirations were 25.

The urine was brown in color, contained bile and many white blood cells as well as numerous bacteria. The blood showed a white cell count of 25,000. The icteric index was 45. The non-protein nitrogen of the blood was 30 milligrams.

On the day following admission operation was performed.

## DIFFERENTIAL DIAGNOSIS

DR BETH VINCENT This case is that of a sixty-seven year old woman who entered in an acute attack of biliary disease with a history of several years pointing clearly to disease of

the gall bladder and to gall stones. This supposition is confirmed by the findings at operation, which consisted of removal of all the stones that could be found with drainage of the common duct and simple drainage of the gall bladder but not a cholecystectomy on account of the poor condition of the patient. The convalescence was normal. In a sense this might be looked upon as the first stage of a two stage operation because in our experience most cases of this type do have recurrence of acute symptoms and require a final and radical operation to accomplish a cure. This is what happened in this case, the patient came in the second time in another acute attack.

We know that this patient has chronic disease of the gall bladder. She had had a great many small stones and the presence of jaundice suggests that one of the stones was overlooked and that she has obstructing stones in the common duct. She also has symptoms that point to the other complication that frequently occurs in these biliary cases, that of pancreatitis. In addition there is a rather large liver. The patient has had biliary disease for a long time and it is quite possible that she should show some cirrhosis, what we call obstructive cirrhosis in such cases. While all the cases of gall stones of long standing of course do not develop malignant disease it is true that malignant disease of the gall bladder and biliary tract is almost always preceded by gall stones and although there are no specific indications in this case we must always be prepared to find malignant disease in cases of gall bladder disease of this sort. I know that the operator found a chronic diseased gall bladder. He may have found stones obstructing the ampulla. I should think it highly probable that she showed some acute process in the pancreas and I expect that she may have some cirrhosis of the liver.

#### CLINICAL DISCUSSION

DR ERNEST M DALAND. There were forty six stones taken out of the common and hepatic ducts. They were fairly large faceted stones. The hepatic ducts were dilated so that it was possible to insert the full length of the finger and shell out the stones, most of which were faceted and tightly packed. One thing that does not appear in the history is that at the first operation we definitely knew we had left some stones in the hepatic duct. We got out all we could and crushed several more which we could feel two or three inches up in the hepatic duct. We dilated the ampulla and after operation watched for passage of stones, but during the next four weeks no stones were passed.

This patient was a very feeble individual and having carried her through the first episode we did not dare to consider the second operation. She just barely made the grade the first time

and we did not think it wise to do anything in the interval. When she came in the second time she had tenderness in the upper abdomen, more marked on the left. We did not dare do anything for twenty four hours but then her white count rose from 25,000 to 44,000. We suspected that she had an acute pancreatitis and operated with that preoperative diagnosis. The previous operation was done through a right rectus splitting incision and the second was done through a midline incision, expecting to find something in the pancreas. The pancreas was normal—no thickening or other evidence of pancreatitis. We explored the gall bladder which was still enlarged but no stones were palpable. We opened the common duct, the bile there was under pressure and when the duct was opened it spurted three or four feet into the air. We drained out about a liter of bile at that time. As I remember, there were only two stones found in the common duct. The common duct and the gall bladder were drained.

She lived about a month after the operation. She drained well from the common duct. We could not get her to eat. We tried feeding her bile with some degree of success but half the time she refused it. She refused all sorts of fluids by elvis or by vein and she refused a jejunostomy which we wanted to do. She failed quite rapidly. At the end of a month she did allow us to do a jejunostomy for feeding purposes but it was too late and she lived only a few days after that was done.

#### CLINICAL DIAGNOSES

Acute cholecystitis  
Cholelithiasis

#### DR BETH VINCENT'S DIAGNOSES

Chronic cholecystitis  
Common duct stone  
Obstructive cirrhosis of the liver  
? Acute pancreatitis  
? Carcinoma of the gall bladder

#### ANATOMIC DIAGNOSES

Cholelithiasis, intra and extrahepatic  
Acute fibrinous bronchitis with pseudo-asthmatic paroxysm  
Cholecystitis, chronic  
Operative wounds—cholecystostomy, choledochostomy, jejunostomy  
Cirrhosis of the liver, obstructive  
Icterus  
Peritonitis, localized, acute and chronic  
Leiomyomata uteri

#### PATHOLOGIC DISCUSSION

DR TRACY B MALLORY. The autopsy showed a condition against which the surgeons were powerless. The entire biliary tract within the liver was filled with stones from end to end. We

did not count them but there must have been several hundred stones. They started in each hepatic duct, running up through every branch and as one got farther and farther out into the liver the stones became smaller and smaller. When one reached the finer terminal bile ducts the stones were almost microscopic in size, just a fine granular sand but there was not a duct within the liver that did not contain particulate inspissated material. This is a fairly rare condition. It has been claimed at times that gall stones are only formed in the gall bladder and if they are found in the hepatic ducts or in the liver they are supposed to have regurgitated from the gall bladder. I think cases such as this patient of Dr. Daland's provide strongly suggestive evidence that that is not the case. The gall bladder in this woman was rather thin walled, not markedly injected, and I find it inconceivable that all these stones were formed in the gall bladder. I think they must have formed locally in the liver. As would be expected with a high grade and long-standing biliary obstruction, the liver showed marked secondary changes. There was a very chronic well-marked biliary cirrhosis. There was also an acute terminal central necrosis so that an element of liver insufficiency might well have come in at the end.

A rather surprising terminal picture was the lungs which were acutely distended and looked exactly like the lungs of a case of bronchial asthma. On section, however, all the bronchi were found filled with plugs of polymorphonuclear leucocytes and fibrin,—no eosinophiles and no mucus. I believe she developed the equivalent of an asthmatic paroxysm because of diffuse bronchial obstruction from fibinous bronchitis. I have seen a similar picture in fatal pulmonary hemorrhage where casts of clotted blood obstructed the entire bronchial tree. There was no pneumonia, and in spite of the multiple operations there were relatively few adhesions, except in the right upper quadrant, and no signs of intestinal obstruction. There was a little localized peritonitis beneath the second gall bladder wound.

DR. DALAND. She had an attack of asthma three or four days before death which responded to adrenalin.

DR. MALLORY. I think there is no question that this terminal event was closely related to asthma but certainly not ordinary bronchial asthma.

## CASE 21322

### PRESENTATION OF CASE

A seventy-eight year old unemployed Maine carpenter entered with the complaint of vomiting of two months' duration.

The patient had always had a little indigestion with a tendency to belch and gag easily. Three or four months before admission this

became worse but he had no pain or vomiting. Two months before admission he began to vomit fairly frequently, usually one to two hours after meals. The vomiting was preceded by nausea but there was no pain. The vomitus consisted of food and occasionally small amounts of blood. He began to lose weight and to grow weak. For the past few weeks he had been unable to retain any solid food. He had been able to keep down one or two small egg-nogs and a few glasses of water each day. For the past five days however, he was unable to keep anything down. At no time had he complained of pain. There had been no massive hematemesis. Five days before admission he was forced to go to bed. He noticed at that time that his urine was dark. His son believed that his color had been poor although he was not certain that it had been yellow. About one week before admission his right leg began to swell and, within the past few days, enlargement of his abdomen was noted. He had been somewhat constipated during the past few weeks.

For the past twenty years he had drunk all sorts of alcoholic beverages and according to his daughter was moderately intoxicated fairly frequently. His family and past histories are otherwise irrelevant.

Physical examination showed an elderly, slightly jaundiced man with shallow and rapid respirations. He complained of some pain and numbness in his right leg. There was arcus senilis. The pupils were equal but slightly irregular. They reacted sluggishly to light. There was a cataract on the right. The fundus on the left showed moderate sclerosis of the vessels. The teeth were extremely dirty and carious. In the left supraclavicular fossa there was a firm slightly movable nodule 2.5 centimeters in diameter. The heart was slightly enlarged. The sounds were regular, faint and of poor quality. There was a questionable gallop rhythm. The blood pressure was not obtained. The apex rate was 90. The lungs showed dullness and suppressed breath signs at the left base posteriorly to 3 centimeters above the angle of the scapula. The abdomen was distended, with dullness in both flanks and a fluid wave. There was some tympany in the right flank. In the right upper quadrant there was a firm nodule 3 centimeters in diameter. In the midportion of the upper abdomen there was an indefinite hard ballotable mass. Peristalsis was present. The right leg was swollen as far up as the groin, and was blue tender and cold. Rectal examination was negative.

The temperature was 99.6°.

Examination of the blood showed a red cell count of 4,600,000 with a hemoglobin of 70 per cent and a white cell count of 25,700, 96 per cent polymorphonuclears.

The patient was put to bed and given two

doses of one sixth of a grain of morphia At 1 15 a m on the second day the nurse found him dead in bed

### DIFFERENTIAL DIAGNOSIS

DR RICHARD H SWEET This is an elderly person who comes in with a story which sounds like pyloric obstruction We know that the first symptom was vomiting He had had some indigestion but he had had it most of his life and therefore we do not attach much significance to it About two months before he entered the hospital he began to vomit quite frequently The vomiting came usually two hours or so after meals which would tend to suggest ulcer or some other trouble in the region of the pylorus As we read along we learn that the vomitus consisted of food and occasionally of small amounts of blood which suggests a bleeding lesion in the stomach although one might get bleeding because of the vomiting It is however suggestive of ulcer or of a carcinomatous growth in the stomach Then we find that whereas at first he was able to take solid food he goes through a period when he can take only soft foods until he finally reaches the point where he vomits even fluids so that we have a clearly progressive upset of the stomach Then another symptom arises five days before admission The urine becomes dark in color and there is some question as to whether he has slight jaundice Finally, he noticed a swelling of the right leg and also a rather recent swelling of his abdomen

Thinking back over the history it seems to me that it fits best of all some lesion of rather rapid development which has obstructed the pyloric outlet to the stomach probably carcinoma One might question that diagnosis as an explanation of jaundice but one not infrequently sees involvement of the common duct with a carcinoma of the stomach We are told that he had been a heavy drinker most of his life and was intoxicated fairly frequently which makes us wonder if he had cirrhosis since he had jaundice and vomited blood But to me the story sounds more like an obstructed stomach

In the physical examination we find that he had mild jaundice, pain and numbness An interesting finding is the firm hard nodule above the left clavicle When we are dealing with people who, we suspect might have carcinoma of the stomach we always feel in the left supraclavicular fossa because years of clinical observation have shown that many cases of carcinoma of the stomach show a metastatic lymph node in that region The cardiac condition apparently was not very satisfactory but he was seventy-eight years of age We do not know whether they made an effort to obtain the blood pressure

There are some signs in the lung which I am not able to interpret

The abdominal examination suggests that he had ascites Then we discover that he has two abdominal masses, one in the right upper quadrant 3 centimeters in diameter and another in the midepigastriac region which is described as being indefinite, hard and ballotable, I suppose because of the presence of fluid There was peristalsis

The red count showed no particular anemia although the hemoglobin was 70 The polymorphonuclears might have been dependent on a pulmonary condition if he had pneumonia

As I see this case, it seems to me that one can explain the entire picture on the basis of carcinoma of the stomach with perhaps a metastatic nodule in the liver and a metastatic lymph node above the clavicle, and also as I have said, it is not beyond the realm of possibility to explain the stenosis of the common duct by direct invasion or by extension or pressure from a neighboring involved lymph node There is this to say, however that we not infrequently see a carcinoma of the pancreas which will give a similar train of symptoms I know of one surgeon who has said—I do not know how he feels about it now—but he has said that in doing a cholecyst duodenostomy for obstruction of the common duct from carcinoma of the pancreas it was rational to do a gastroenterostomy as well because so many cases, if they live long enough would develop obstruction of the pyloric end of the stomach as well We have here the supraclavicular node and I do not believe that is found so often with carcinoma of the pancreas It seems to me that the train of events is more in favor of a primary lesion in the stomach than a secondary one

DR WYMAN RICHARDSON I wonder how Dr Sweet accounts for the cold blue leg

DR SWEET I meant to speak of that I think we often see in terminal malignant disease, swelling and edema of the leg and sometimes venous obstruction from involvement by metastases of the pelvic portion of the abdominal cavity I think that that might possibly have something to do with the edema and swelling of the leg The ascitic fluid is undoubtedly due to peritoneal metastases

### CLINICAL DIAGNOSIS

Carcinoma of the stomach with metastases to the liver and the peritoneum

### DR. RICHARD H SWEET'S DIAGNOSES

Carcinoma of the stomach with abdominal carcinomatosis and obstruction of the common duct by malignant disease  
Metastasis to supraclavicular node

### ANATOMIC DIAGNOSES

Carcinoma primary site undetermined, † gall bladder  
Hematocele in gall bladder



tions conducted by the Massachusetts Board and of this number forty-six (more than fifty per cent) are graduates from nonapproved schools in Massachusetts. Only four came from Class A institutions in this state.

The situation is deplorable in that the Old Bay State continues to be indifferent concerning the quality of medical education carried on within its borders. In comparing this last with previous reports, the situation does not indicate that the unaccredited schools are raising their standards and the inference is warranted that either the schools from which the rejected candidates come do not adequately prepare students to meet the standards adopted by the examining board or that the matriculants in these substandard schools are not intellectually fitted to profit by the instruction given.

Either of these hypotheses should arouse the interest of the citizens of this Commonwealth because it is unfair for a school to accept the price of tuition from students without giving to a reasonable degree, that which is sought. Neither is it right to encourage a young person to engage in an occupation for which he may not have the essential qualifications for success. There are already too many misfits in medicine. The specious argument that these substandard schools open the only way for the poor youth to enter professional life is not true for rarely do such institutions give any material assistance in enabling the needy student to meet the cost of living during the required four years of study.

On the other hand the better-class medical schools take an especial interest in capable students and provide needed assistance thereby generally insuring the completion of the scheduled courses of instruction.

In the early years of this century there were many commercial medical schools. Fortunately most have been driven from this field for it is well known that under present conditions the student fees cannot support a high-grade medical school.

The pertinent question before us is what is the matter with Massachusetts? Since all other states in the Union have gone beyond this Commonwealth in conferring authority to registration boards relating to the standing of medical schools, the situation is deplorable. The only explanation seems to be that there is no adequate appreciation of this situation throughout the state and, since it is fundamentally an educational problem relating to public health, the responsibility rests squarely with the medical profession.

Organized medicine has been emphasizing the responsibility of the doctor in disseminating information respecting the etiology and treatment of disease. It has done little effective work in Massachusetts in convincing the public of the benefits incident to a uniformly well-trained medical profession. At the present time

this is the great opportunity of the profession to show its devotion to the common welfare. If aroused and directed, the Massachusetts Medical Society could lead the electorate to demand of its legislature equal standing with her sister states.

### A MORE COMMON EMERGENCY IN SUMMER

EVERY general practitioner should read the letter contributed by Dr. Alexander Marble which appears on page 285 and especially physicians who care for children with diabetes.

Delay is dangerous in hypoglycemia and the inclusion in the doctor's emergency outfit of the properly constructed syringe and ampules put out by some dealers will give assurance of efficiency in dealing with this emergency. Every case of coma in a new patient calls for a differential diagnosis of the condition which may be responsible for this symptom.

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

FITZ, REGINALD M.D. Harvard University Medical School 1909. Associate Professor of Medicine, Harvard Medical School. Physician to the Peter Bent Brigham Hospital, Boston. His subject is "On Perforating Inflammation of the Vermiform Appendix with Special Reference to Its Early Diagnosis and Treatment." Page 245. Address: 721 Huntington Avenue, Boston, Mass.

ROBEY, WILLIAM H. Harvard University Medical School 1895. Clinical Professor of Medicine, Emeritus, Harvard University. Consulting Physician to the Boston City Hospital, Norwood, Milton and Marlborough Hospitals. His subject is "Visual Disturbances with Digitalis Medication." Page 248. Address: 202 Commonwealth Avenue, Boston, Mass.

MENTZ, E. ROSS M.D. Université de Paris 1928. Assistant Urologist, Massachusetts General Hospital. His subject is "The Natural History of Some Renal Tumors." Page 251. Address: 6 Commonwealth Avenue, Boston, Mass.

KARCHER, EDWARD WINSLOW M.D. \* Middlesex College of Medicine and Surgery 1916. Assistant Physician to Syphilis Out-Patient Department, Massachusetts General Hospital. Instructor in Dermatology and Syphilis, Harvard Medical School. Lecturer in Dermatology and Syphilis, Harvard Dental School. His subject is "Latent Syphilis." Page 257.

HURXTHAL, LEWIS M. M.D. Harvard University Medical School 1923. Senior physician,

\*Deceased February 18, 1935.

**Lahey Clinic** His subject is "Myxedema Heart with Congestive Heart Failure and Polyserous Effusions." Page 264. Address 605 Commonwealth Avenue, Boston, Mass

**GREENOUGH, ROBERT B. A.B., M.D.** Harvard University Medical School 1896 F.A.C.S. Consulting Surgeon Massachusetts General Hospital and Collis P. Huntington Memorial Hospital His subject is "Cancer Education in Medical Schools." Page 267. Address 8 Marlborough Street, Boston, Mass

## MISCELLANY

### TO PRESIDENTS AND SECRETARIES OF STATE ASSOCIATIONS AND DELEGATES TO THE AMERICAN MEDICAL ASSOCIATION

#### Important!

Information coming to the Committee indicates that the action of the House of Delegates at the Atlantic City Session in consideration of Sickness Insurance has in some instances not been fully understood. The misconception has to a degree been advanced by reports in some journals and headlines in public newspapers to the effect that sickness insurance has been given broad approval by the American Medical Association. Some groups are said to have planned to act on this supposition.

The report of the Reference Committee of the House of Delegates has been published in the Journal and the Special Report of the Bureau of Medical Economics will soon be available to members of the Association. It is urgently recommended that both the Special Report of the Bureau of Medical Economics containing an analysis of the various plans at present in operation and the report of the Reference Committee which were adopted by the House of Delegates be carefully studied before any plans are considered. No county society should consider the creation of any new social machinery for the extension of medical service or collection of compensation for such service before the existence of a real need for such change has been demonstrated and the requirements and available existing facilities have been carefully appraised. The report of the Committee states that Analyses show that the class for which special provision is necessary is far smaller than most lay writers and the results of so-called surveys would indicate. The economic problems of the individual cannot be adequately dealt with on the basis alone of his classification in the group of those who receive low income. Social workers have accordingly long recognized the necessity of the investigation of the problem of each individual. Upon this basis is the method of individual study or "case work" of social service founded. The problem of needed medical service to each person of the group is also an individual one, and one which cannot be met by group classification.

Based upon an investigation of the resources of the individual, an adjustment of fees for needed

medical services according to ability to pay in graduated installments in most instances meets the problem of the individual patient who is not wholly indigent. It is to this type of organization that the Legislative Committee referred in a previous communication as meeting public and individual requirements. If the individual is indigent, he obviously cannot be expected to pay for medical service on an adjusted fee basis nor is he provided for in proposed sickness insurance or any plan other than charitable or direct Government indigent relief. In that instance medical costs are only one phase of the individual's economic distress, and his problem requires more comprehensive measures than simple provision of medical services.

A group purchasing an undetermined amount of medical service upon a prepaid fixed premium basis offered to all within broad income limits who apply sooner or later will include a large percentage of individuals who can and have previously supported medical practice upon normal private basis. Experience has shown that prepayment medical service has not been salable on the basis of adequate fees for the physician as evident in experience here and abroad.

Some of the effects of such plans are as follows: (1) A large amount of medical work will be done on a financial basis which is inadequate to provide for maintenance of proper standards. (2) Those not included in the plan will be educated to demand medical services at correspondingly low fees. (3) The operation of such plans over a period of average conditions will not add to the sum total of fees derived from the income group insured, and aside from possible temporary changes in distribution will simply reduce more professional services to an inadequate financial basis. (4) The establishment of such plans will create a pattern which, although undesirable, it may be impossible to change or discard and may therefore lead to still broader adoption of objectionable practices. (5) There is reason to believe that some local plans even though now apparently satisfactory inherently possess the same weaknesses and destructive tendencies as have been evident in similar patterns of operation in foreign countries. (6) The questions of contract practice, legal responsibilities and state insurance regulations encountered as well as the drift to solicitation of patients and violation of medical ethics cannot be presented here. (7) Extensive systems of voluntary sickness insurance invite competitive offerings by irresponsible people, and in Europe have created conditions so chaotic as to advance the establishment of compulsory insurance by legislative act.

Less populous communities in which the medical and financial needs of the individual patients are known to physicians and public relief officers have no need of any cumbersome machinery.

It is to be noted that the action of the American Medical Association did not contemplate the operation of any plans, except by local constituent societies of the American Medical Association and that in so doing medical societies must be guided by the

Ten Fundamental Principles adopted in June, 1934

All proposed plans of county societies should be submitted to officers and appropriate committees of state medical societies. Before considering any program, it would also seem advisable to confer with the Bureau of Medical Economics of the American Medical Association which has the greatest opportunity to study the needs for any varying successes of the existing experiments.

Great responsibility rests upon state and local medical organizations and upon Delegates, who entered into the consideration and adoption of these reports, to see that the action of the House of Delegates be not construed as approving or encouraging the es-

tablishment of local sickness insurance units embracing the objectionable features against which the profession, as a national body, is making such a determined and effective fight.

COMMITTEE ON LEGISLATIVE ACTIVITIES OF  
THE AMERICAN MEDICAL ASSOCIATION

E H Cary, M.D., Chairman,

C D Wright, M.D.,

F S Crockett, M.D.,

R L Sensenich, M.D.

By—R L SENSENICH

203 J M S Building,  
South Bend, Indiana,  
July 15, 1935

BOSTON UNIVERSITY SCHOOL OF MEDICINE GRADUATES, JUNE 10, 1935

Names	Home Addresses	Hospital Appointments
Abbot, Edward A	Brockton, Mass	Mercy Hospital, Springfield, Mass
Aiello, Louis J	New Haven, Conn	
Baron, Leo	Dorchester, Mass	Muhlenberg Hospital, Plainfield, N J
Bernhardt, Henry M	Brookline, Mass	Massachusetts Memorial Hospitals, Boston Mass
Berresford, Arthur B	Cambridge, Mass	Waterbury Hospital, Waterbury, Conn
Biller, Samuel B	Watertown, Mass	Hahnemann Hospital, Scranton, Pa
Blaisdell, Irl H	Providence, R I	Massachusetts Memorial Hospitals, Boston Mass
Bradley, Joseph J	Belmont, Mass	St Elizabeth's Hospital, Brighton, Mass
Cincotti, John J	Boston, Mass	Boston City Hospital, Boston, Mass
Coffin, Raymond B	Boston, Mass	Binghamton City Hospital, Binghamton, N Y
Cohen, Samuel C	Brighton, Mass	Boston City Hospital, Boston, Mass
Connor, George M	Plantsville, Conn	St. Raphael's Hospital, New Haven, Conn
Curtis, Helen	Wilton, N H	New England Hospital for Women and Chil- dren, Boston, Mass
Devlin, William J	Jamaica Plain, Mass	Mercy Hospital, Springfield, Mass
Elia, Andrew D	Biddeford, Maine	Massachusetts Memorial Hospitals, Boston Mass
Felderman, Jacob	Providence, R I	Cumberland Hospital, Brooklyn, N Y
Fierman, Joseph H	Malden, Mass	Boston City Hospital, Boston, Mass
Foley, William H	Edgewood, R. I	Providence City Hospital, Providence, R. I
Forbes, Wilfred W	Brookline, Mass	Newton Hospital, Newton, Mass
Gavriluk, Olga A	Lawrence, Mass	New Haven Hospital, New Haven, Conn
Grodberg, Burton C	Malden, Mass	Beverly Hospital, Beverly, Mass
Halbstein, Bernard M	Chelsea, Mass	St Luke's Hospital, New Bedford, Mass
Hartwell, Constance G	West Newton, Mass	Massachusetts Memorial Hospitals, Boston Mass
Horenstein, M Mark	New Britain, Conn	Madison General Hospital, Madison, Wisconsin
Horowitz, S Franklin	Spring Valley, N Y	Mercy Hospital, Bay City, Mich
Hunt, Reginald S	Swampscott, Mass	Massachusetts Memorial Hospitals, Boston Mass
Hutner, Cyril I	New York City	Perth Amboy General Hospital, Perth Amboy, N J
Itri, Francis V	Brooklyn, N Y	St. Francis Hospital, Jersey City, N J
Kamens, Israel M	Chelsea, Mass	Jewish Hospital, Brooklyn, N Y
Karush, Aaron	New York City	Conemaugh Valley Memorial Hospital, Johns- town, Pa.
Kershaw, Beatrice R	North Adams, Mass	New England Hospital for Women and Chil- dren, Boston, Mass
Lawlor, Edward F, Jr	Lawrence, Mass	Salem Hospital, Salem, Mass
Lydon, Mark T	North Abington, Mass	St Vincent's Hospital, Worcester, Mass
Maguire, Richard A	Somerville, Mass	Carney Hospital, South Boston, Mass
Mazzarella, Lawrence A	Brooklyn, N Y	Massachusetts Memorial Hospitals, Boston Mass
Mutter, Frederick C, Jr	Brooklyn, N Y	Mary Immaculate Hospital, Jamaica, L. I., N. Y.

Nalchajian, Willard D	Chelsea Mass	Boston City Hospital Boston Mass
Payes Leon G	New York City	Binghamton City Hospital Binghamton N Y
Philbrook F Randolph	Randolph Mass	Massachusetts Memorial Hospitals, Boston Mass
Provenzano Joseph	Brooklyn, N Y	Misericordia Hospital, New York City
Ralsch, Frederick J	Grand Rapids Mich	Highland Park General Hospital, Highland Park, Mich
Sales, Louis	New York City	Beth David Hospital New York City
Saltzman Charles	Loch Sheldrake N Y	United Israel Zion Hospital, Brooklyn, N Y
Sorino, Arthur B	Cambridge Mass	Quincy City Hospital, Quincy Mass
Shuman Harold I	Brookline Mass	Boston City Hospital Boston, Mass
Silver Anron	Dorchester Mass	Beth Israel Hospital New York City
Singh, Harkishen	Punjab India	Massachusetts General Hospital Boston Mass
Smith Gerald R.	Portsmouth N H	Maine General Hospital Portland, Maine
Snider George E., Jr	New York City	Staten Island Hospital Staten Island N Y
Spaldo John L.	New York City	Medical Center Jersey City N J
Sullivan Charles L., Jr	Jamaica Plain Mass	Boston City Hospital Boston Mass
Swartz Morris	Dorchester Mass	St. Joseph Hospital Far Rockaway N Y
Vetromile Gerard	Merrick N Y	St. John's L. I. City Hospital, Long Island City N Y
Vinal Raymond G	Cleveland Heights Ohio	Methodist Episcopal Hospital Brooklyn N Y
Wenger Samuel	New York City	Metropolitan Hospital New York City

### COMPARISON OF DISEASE INCIDENCE IN CONNECTICUT WITH 1934 AND SEVEN YEAR AVERAGE

MONTH ENDING JULY 20 1935

1935

1934

Diseases	Week ending June 29	Week ending July 6	Week ending July 13	Week ending July 20	Average cases reported for week corresponding to July 20 for past seven years	Week ending June 30	Week ending July 7	Week ending July 14	Week ending July 21
Cerebrospinal Men	—	1	—	—	1	1	—	1	—
Chicken Pox	64	52	70	38	22	78	35	40	42
Conjunctivitis Inf	11	—	1	—	—	—	—	—	—
Diphtheria	19	11	9	7	9	3	1	—	12
Dysentery Bacillary	—	—	—	—	—	12	1	—	12
German Measles	66	33	38	21	3	1	6	1	12
Influenza	—	—	1	1	1	—	—	3	—
Malaria	—	—	—	1	—	—	—	2	—
Measles	301	223	167	70	70	105	118	65	44
Mumps	19	15	23	14	10	25	21	36	19
Paratyphoid Fever	4	—	1	—	—	—	—	1	—
Pneumonia (Broncho)	6	11	9	8	9	10	4	8	6
Pneumonia (Lobar)	15	12	12	3	8	7	6	8	7
Poliomyelitis	1	—	2	3	1	1	—	1	—
Scarlet Fever	50	23	33	6	14	12	14	12	—
Septic Sore Throat	—	2	4	3	1	4	3	1	1
Tetanus	—	—	—	—	—	—	—	—	1
Trichinosis	—	—	—	—	—	—	3	—	—
Tuberculosis (Pul)	19	15	17	17	30	22	20	33	28
Tuberculosis (O F)	2	4	1	5	4	1	2	3	6
Typhoid Fever	1	—	—	2	2	—	1	1	—
Undulant Fever	1	2	2	—	—	3	1	1	—
Whooping Cough	36	29	46	38	53	72	59	70	63
Gonorrhea	47	2	32	26	36	28	18	17	94
Syphilis	94	50	45	23	45	49	59	19	88

Remarks No cases of Asiatic cholera, glanders plague or yellow fever during the past seven years.

## CORRESPONDENCE

## A PLEA FOR DOCTORS' PENSIONS

July 20, 1935

Editor, *New England Journal of Medicine*,

It is with a sense of shame and deep mental anguish, that I read the editorial in this week's *Journal* and Mr Hobbs' letter explaining the conditions under which the ERA aid is offered to indigent physicians in our state, and the clause which excludes the unfortunate recipients of such aid, in case any member of his family earns from \$10 00 to \$20 00 a week, is adding insult to injury. That so bountiful a sum, brought in by some young son or daughter of an unfortunate physician should be considered sufficient to sustain the needs of one who has given so much of himself to the community, in itself speaks for the sweetness of charity.

But, that a society of 160,000 men and women of a proud and most useful profession should come to a pass, where some few hundreds of its members should be left in such misery, is even more painful.

I, therefore, respectfully submit to you for publication, a letter which I sent some time ago to our most esteemed *A M A Journal*, that so loudly proclaims itself sufficient to care for the profession in all its phases. Needless to say, my letter was not published because the trustees of our great American Medical Association could not be bothered with such trifles as the welfare of its members.

Since I wrote that letter, the crying need for some substantial and mutual aid has certainly increased manifold. The letter is self-explanatory and I hope that our members will see the soundness of the plan.

Very truly yours,

256 Bennington Street, R GURALNICK,  
East Boston, Mass

COPY OF DR GURALNICK'S LETTER TO THE AMERICAN  
MEDICAL ASSOCIATION

October 24, 1934

Editor, *American Medical Association Journal*,

In speaking to a patient friend of mine the other day, a letter carrier by occupation, and a man in the sixties, I was surprised to learn how well they are taken care of on retiring, by means of an old age retirement fund. According to the information I received from him, by withholding three per cent of his earnings through the period of his employment, the government is able to pay him one-half of his wages upon retirement, and not only that, but at the age of sixty three or thereabouts, retirement is compulsory, thus creating a job for a younger man.

On the other hand, it is no more a secret that a good many members of our organization, who are of advanced age, are at present on welfare lists. Boston alone has thirty such recipients. The number, however, must be infinitely greater only they are too proud to ask for aid.

I have spoken to many physicians about an old

age retirement fund and everybody seems to agree that the time has come when something should be done in this direction. It appears that with all our constant worries about giving better services to our patients and with our latest philanthropic inclinations to give those services at remunerations bordering on gratis, we ourselves are rapidly approaching the proverbial "Forgotten Man".

It is shameful to think that a profession consisting of about 160,000 men and women, one hundred thousand of whom are members of the A. M. A. (I am sorry I do not know the exact number) that with so large a membership, nothing has been done to provide such a fund which could easily have taken care of the few, that through old age find themselves in need of financial aid. With a fund of this sort, they could retire and live in comparative ease the rest of their lives. *Incidentally, the younger members of the profession would profit by such an arrangement.*

I realize that to establish such a retirement fund is fraught with difficulties, but such difficulties could be overcome, and the A. M. A. seems to be the only logical organization to take the necessary steps. *Again, a fund of this kind would rapidly increase in amount, through voluntary contributions and bequests of the more fortunate members of the profession, who at present divert such sums into other channels.*

At a payment of let us say, ten dollars a year per member, into the treasury of the A. M. A., within a short time a sufficient sum would accumulate so that any beneficiary wanting to retire at the age of sixty or thereabouts, would be assured of an income of about \$2000 a year, which amount should be sufficient for one to live in comparative ease.

This does not mean, however, that anyone would be asked or expected to retire at the above-mentioned age. *Retirement would be entirely voluntary* and the benefit extended to only such members as would have no other source of income, and only upon the complete surrender of the rights to practice in any remunerative or competitive capacity. On the other hand, membership in the various societies and the academic interest in medicine would still be one's privilege.

The scope of activities of the A. M. A. would undoubtedly be enlarged, and the membership would come to the realization that something substantial is at last being done by the organization.

R GURALNICK

## CHIROPRACTIC VERSUS CHIROPRACTICE

Editor, *New England Journal of Medicine*,

What a hideous word this "Chiropractic"! In English "ic" is usually an adjective suffix and the only way of making a noun of such an adjective is by adding the definite article as e.g., "That's the chiropractic in it".

But there is a fine word for them! Perhaps a century ago the "practice" of medicine was the "Praxis". There are some other similar Greek

words. Thus we have kept 'Sepsis' but have substituted 'Skepsis'. So there you are Mr Chiropractor! Say that you practice Chiropraxis or Chiropraxy.

And so, according to this new law that your Editorial quotes the definition reads adjustment by hand only. Just this very day a patient is telling me of a Chiropractor jumping on the back. Said he witnessed it.

All this manipulating tribe have always assumed an exceptionally erudite knowledge of anatomy to the disparagement of physicians. I had a youthful aspirant, as a patient who had had this idea pumped into him. There he was attending the 'Massachusetts College of Osteopathy' (same brood!) housed in two three-storied brick dwelling houses up on Huntington Avenue with the sign (blue?) paraded quite across them. And within a stone's throw the new Harvard Medical School with its century of tradition facilities and museum! What is worse the *Boston Transcript* gave them an Editorial echoing this claim.

It has always seemed to me that the very philosophy of their craft underwent spontaneous disintegration. Pretty much all things caused by pressure on the posterior roots as they pass through the foramina. Enquire a moment. So well protected are these roots that, except in the case of a diseased bone or very slack ligaments nipping is impossible. Have they dissected a chicken's neck?

The spine elongates can turn in the cervical and lumbar regions but even then maintains its relative adjustment of vertebrae. For the most part the dorsal region is a fixed column except for elongation. The cervical region they can play with to their hearts content. A young patient of mine attending one of their clinics saw stars and dropped to the floor. The relations of the atlas and axis were plainly disturbed (examination) and she could not turn her head for months. They were well scared. Dr Douglas Graham reported several such cases.

And furthermore how inaccessible to manipulation is the major part of a vertebra. The triangular space between spinous and transverse processes is filled up with strong muscular tissue and the bodies of the vertebrae at a depth of two or perhaps more inches. One cannot manipulate the spine much or relieve pressure on the deep lying lateral roots by wiggling spinous processes, whether by hand or by foot. The spine really should be approached from in front, which of course, speaking by and large is impossible.

I think it to be a pity that, in a weak spirit of Catholicity many men adopt an indulgent attitude toward this third generation, Chiropraxis. All claims for cures (with which the public is fairly bursting) we doctors ought to know should run the gamut of logical investigation so great is the opportunity for coincidence, false data, and the operation of credulity.

SAMUEL DELANO M.D.

New Britain, Connecticut,

July 4 1935

## THE TENDENCY TO HYPOGLYCEMIC ATTACKS IN SUMMER

July 31 1935

Editor *New England Journal of Medicine*,

For most people — young and old — the summer time is a season of added physical activity. The average person is able to spend much more time out of doors exercising at work or at play. The modern, well-controlled diabetic approaches the normal so closely that practically all types of activity are possible for him. This is fortunate because exercise can and should be used to the fullest extent in treatment. That exercise increases the blood-sugar lowering effect of insulin is well recognized.

Because of this beneficial effect, diabetics are apt to do better in the summer time. Temporarily tolerance for food is often increased and need for insulin lessened. Unless physicians are on the watch for this and take care to decrease dosages of insulin (as indicated by tests of urine and blood) severe insulin reactions may occur. We have had this fact impressed upon us recently by the remarkable reductions in dosages which have been possible with diabetic children in summer camps. Until stabilization on the new level is secured, hypoglycemic attacks may be frequent unless the physician and patient take care to avoid overdosage with insulin.

We have found it helpful on many occasions to have at hand a suitable syringe and needle and ampules containing 20 cc. of 50 per cent glucose properly buffered for intravenous use. Particularly in children insulin reactions may be sudden and severe and at times may result in unconsciousness. In such a situation the anxious parent or attendant may experience great difficulty in getting the child to open tightly-closed jaws or to swallow orange juice or even syrup. For a child to remain in hypoglycemic coma for hours is without doubt a potential source of danger to the integrity of nervous centers. To relieve the condition promptly the physician should be equipped to give glucose intravenously. Usually 20 cc. of 50 per cent glucose suffices for immediate return to consciousness. As a second best epinephrine, 1/1000 may be given subcutaneously in dosage of 0.5 cc. and followed by carbohydrate orally when sufficient return to consciousness has been obtained.

Since reactions are most apt to occur in the late forenoon, mid morning lunches of from ten to twenty grams of carbohydrate should be the rule for diabetic children in summer camps. Particularly if this lunch is not taken, swimming and horseback riding should not be engaged in during the latter part of the morning by a child whose blood sugar is known to fluctuate easily. Likewise for adults who take sizable doses of insulin a mid morning lunch is advisable if strenuous exercise or driving an automobile is planned for the latter part of the forenoon.

This letter is written not to present new facts but to call attention to the need for careful supervision

of the diabetic who at this season is leading a much more active life than is usual for him

Yours very truly,

ALEXANDER MARBLE, M D

81 Bay State Road,  
Boston, Mass

## RECENT DEATHS

**BRYANT** — FREDERICK BRYANT, M D, of 858 Main Street, Worcester, died at Hull, Mass, July 29, 1935, after an extended illness

He was born in Montville, Maine, in 1871, the son of Alonzo and Ariadana (Bean) Bryant. He graduated from Colby College in 1905 and from the Harvard Medical School in 1910

He was a Fellow of the Massachusetts Medical Society and the American Medical Association, also of the Harvard Club of Worcester and the Boston Medical Library

Dr Bryant is survived by his widow, Mrs Mary Bryant, and a son, Frank Bryant, of Worcester

**BUTLER** — DAVID MATHEW BUTLER, M.D, of Cambridge, with an office at 371 Commonwealth Avenue, died at the Cambridge Hospital, August 1, of injuries caused by an accident.

Dr Butler was born in 1890, graduated from the Brockton High School, and later from the Tufts College Medical School in 1915. He practiced in Brockton for several years and after preparing him self for special work in eye, ear and nose diseases opened an office in Boston

He was a Fellow of the Massachusetts Medical Society and the American Medical Association

He is survived by his mother, Mrs Annie S Butler, of 12 Bassett Road, Brockton, and two sisters, Mrs Charles A. Weiner and Mrs Joseph Stone, both of Brockton.

**HANLEY**—FRANCIS JOSEPH HANLEY, M.D, of Whitman, Massachusetts, died suddenly, August 2, 1935. Dr Hanley was born in Hinsdale, January 10, 1869. After a premedical education at Monson Academy, Georgetown University, he entered Jefferson Medical College and graduated in 1893 and settled in Whitman the following year

During the war he served at Fort Oglethorpe, Georgia, with the rank of Captain. He was a Fellow of the Massachusetts Medical Society and the American Medical Association, and was a member of the Hatherly Medical Association

He was affiliated with the M C O F and Whitman Council, K. of C, and was a former trustee of the Whitman Town Library

He is survived by his widow, Mrs Mary Hanley, and two sons, Dr F J Hanley of Whitman and Edward J Hanley of Schenectady, New York

**KEEFE** — JOHN W KEEFE, M.D, of Providence, R I, aged seventy-two, died at his summer home at Narragansett Pier, August 4, 1935. He was well

known in Massachusetts and was a member of the New England Surgical Society, the American Society of Obstetricians, Gynecologists and Abdominal Surgeons, and other scientific bodies

He was a former President of the Rhode Island State Medical Society, a Fellow of the American College of Surgeons and the American Medical Association

## NOTICE

### REMOVAL

JOSEPH DANIEL FERRONE, M D, announces the removal of his office to 860 Beacon Street, Newton Centre, Massachusetts

## SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, AUGUST 12, 1935

Wednesday, August 14—

112 M. Clinico-Pathological Conference Childrens Hospital.

Saturday, August 17—

\*10-12 Staff rounds at the Peter Bent Brigham Hospital

\*Open to the medical profession

†Open to Fellows of the Massachusetts Medical Society

August 29 September 5—Latin American Congress of Physical Therapy, X-Ray and Radium. For information address Dr Madge C L McGuinness, 1211 Madison Avenue, New York City

September 5, 6, 7—American Congress of Physical Therapy will meet at the Hotel Kansas Citian, Kansas City, Missouri. Program and circular of information may be secured by addressing American Congress of Physical Therapy, 30 North Michigan Avenue, Chicago, Illinois

September 17, 18, 19—Eleventh Clinical Congress of the Connecticut State Medical Society. For details address Dr Creighton Barker, 129 Whitney Avenue, New Haven, Conn

October 7-10—American Public Health Association will meet in Milwaukee, Wisconsin. For information address the American Public Health Association, 50 West 50th Street, New York City

October 21-November 2—1935 Graduate Fortnight of the New York Academy of Medicine. See page 898, issue of May 9

October 28-November 1—The Twenty-Fifth Clinical Congress of the American College of Surgeons. See page 1065, issue of May 30

## BOOK REVIEW

Researches Published from the Wards and Laboratories of the London Hospital During 1934. London H. K. Lewis & Co, Ltd. Price 7s 6d

The collected papers of researches published from the London Hospital during 1934 continue, as they have in years past, to set a high standard. Of particular importance in this volume are the following papers: B F Byrom on "The Nature of Myxoedema", Hugh Cairns and Charles Donald, "The Diagnosis and Treatment of Abscess of the Brain", William Evans and Clifford Hoyle, "The Prevention and Treatment of Individual Attacks of Angina Pectoris", Otto Leyton, "Multiglandular Disease", and Janet M Vaughan on the anemias. With such a volume at hand, much that might be missed in the diffuse medical literature of the time is easily available.

# The New England Journal of Medicine

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## VOLVULUS OF THE CECUM

### Acute and Chronic With Reports of Eight Cases

BY RICHARD H. SWEET, M.D.\*

**V**OLVULUS of the cecum as one of the causes of acute intestinal obstruction has been recognized for many years. According to Faltin the first case report was by Rokitsansky in 1841, but no thorough consideration of the subject appeared until Zöge Manteuffel in 1898 published the first study of the condition. Since then many articles have appeared, most of them presenting case reports and several giving thorough discussions of the etiology, symptomatology and treatment. In all, several hundred cases have been reported, mostly in the foreign literature. In the experience of a single surgeon, however, cases of volvulus of the cecum must be relatively rare. The truth of this assumption is suggested by the fact, in the first place, that there appear in the records of the Massachusetts General Hospital (not including the author's two cases here reported) only six cases of volvulus of the cecum. Secondly, of these only two were operated upon by one surgeon, the other four having been treated by four different operators.

All of these cases and in fact almost all of those reported in the literature were of the acute type with total obstruction of the bowel and its attendant acute symptoms necessitating emergency surgery. There is, however, a type of subacute or chronic partial volvulus of the cecum which has been discussed by others, notably Jacobsen and Tryman, and which is illustrated by one of the cases to be presented here. It is because of this relative rarity of the disorder and especially because of the opportunity to present for comparison two cases representing the two clinical types that this report is submitted.

#### ACUTE VOLVULUS OF THE CECUM

The diagnosis of volvulus of the cecum is rarely made before operation or autopsy. As a result of this, many cases of partial volvulus producing transient attacks of complete obstruction with quick spontaneous relief occur without recognition. This fact is amply borne out by reviewing the reported case histories, many of which give evidence of repeated less severe attacks over varying periods of time before the serious total obstruction which brings the patient to operation or the autopsy table. The re-

sult of this is an abundant knowledge of the acute severe, emergency cases and relatively little knowledge of the chronic recurring type.

As a cause of acute intestinal obstruction, volvulus of the cecum is undoubtedly relatively infrequent. The American writers, Pratt and Fallis state that volvulus of the cecum makes up 5 to 6 per cent of all cases of intestinal obstruction, but this figure seems unduly high. For example at the Massachusetts General Hospital from 1873 to 1930 there were 520 cases of acute intestinal obstruction exclusive of those resulting from strangulated external herniae. Of these, six were due to volvulus of the cecum. This means that out of all cases of obstruction not including strangulated herniae 1.15 per cent were due to volvulus of the cecum. In marked contrast European writers on the subject almost uniformly quote much higher percentages. For example Jacobsen out of fifty three cases of acute ileus, exclusive of herniae, finds volvulus to be the cause in 36 per cent. And of these 36 per cent due to volvulus the distribution of cases according to the portion of the intestine involved was as follows:

Volvulus of the cecum 4* per cent of all cases of volvulus.
Volvulus of the sigmoid 11 per cent of all cases of volvulus.
Volvulus of small gut 47 per cent of all cases of volvulus.

In other words, according to Jacobsen, volvulus of the cecum is the cause of 11.6 per cent of all cases of acute intestinal obstruction exclusive of strangulated external herniae as opposed to 1.15 per cent in the Massachusetts General Hospital series.

Analyzing the Massachusetts General Hospital cases in the same way one finds that of 520 cases of acute intestinal obstruction exclusive of strangulated external herniae there were fifty three cases of volvulus and of these there were

Volvulus of the cecum 6 cases
11.3 per cent of all cases of volvulus
Volvulus of the sigmoid 10 cases
18.8 per cent of all cases of volvulus
Volvulus of the small gut 36 cases
67.9 per cent of all cases of volvulus

Although volvulus of the cecum seems to be

\*Sweet, Richard H.—Assistant Surgeon, Massachusetts General Hospital and Palmer Memorial Hospital, Boston. For record and address of author see "This Week's Issue," page 331.



rather a common cause of intestinal obstruction in Europe it would seem that in this country as suggested by the series here presented it is an infrequent occurrence and that furthermore it is the least common form of volvulus

In the card index of the records of the Massachusetts General Hospital which extends as far back as 1873, there appear six proved cases of acute intestinal obstruction resulting from volvulus of the cecum. To these a seventh is added here, making in all only seven cases during a period of fifty-seven years in a large hospital clinic. Brief reports of these cases are as follows

CASE 1 E J A Aged forty eight years, married, colored laundress

Admitted October 18, 1906

*Present Illness* Two days before entry the patient was seized with generalized colicky pain in the abdomen followed by diarrhea and bloody stools. She vomited once. On the day of admission the pain became localized in the right lower quadrant and opposite the umbilicus where it was quite severe.

*Physical Examination* Temperature 98.6°, pulse 96. The tongue was moist but coated. The abdomen was distended and tympanitic everywhere. Every few minutes a mass became visible in the right lower quadrant (4 x 3 inches in diameter). This mass was tympanitic on percussion. There was visible peristalsis accompanied by severe pain.

*Past History* During the past ten years she had had frequent attacks of abdominal pain with constipation followed by diarrhea and the passage of blood and mucus. These attacks occurred at intervals of one or two months and lasted about two days.

*Operation* Ether anesthesia

"A left rectus incision was made. A much distended purple colored loop of intestine presented. Exploration showed this to be the cecum which had a very long mesentery. The lower end lay against the spleen. The entire cecum was twisted upon itself. The cecum and terminal ileum were resected and a Mixer tube was inserted in each end of the bowel and these brought out through the wound. The wound was drained. Condition at the end of operation poor."

*Course* The patient died on the evening of the fifth day of what appears from the text of the record to have been peritonitis.

CASE 2 S B B Aged sixty two years, male, white, married "flier"

Admitted December, 1908

*Present Illness* There was no antecedent history preceding three days before entry when he began with sharp abdominal pain, recurring ever since and associated with vomiting. His bowels failed to move in spite of several enemata. The pain was severe enough to require morphine.

*Physical Examination* The patient lay in bed with knees drawn up. His tongue was dry and coated, his breath foul. The abdomen was tympanitic everywhere with asymmetrical right sided meteorism, no mass was felt. Tenderness was evident on pressing over the right side of the abdomen.

*Operation* Ether anesthesia, median incision

There was a small amount of clear fluid. There was a portion of large bowel presenting which was distended and reddened, the diameter being about three and one-half inches. This was found to be the cecum which had undergone a volvulus of two and one-half turns. Detorsion of the cecum was done

and a Mixer tube cecostomy was performed through a right lower quadrant stab wound. A large amount of gas and fluid was evacuated.

*Course* There was a good recovery, but the patient died on the sixteenth day of pulmonary embolism.

*Autopsy* A fibroma of the colon was found at the point where the volvulus occurred. The cause of death was pulmonary embolus.

CASE 3 M R Aged forty eight years, female, white housewife

Admitted in 1911

*Past History* (1) In 1907 the patient was operated upon for acute intestinal obstruction for which an enterostomy was done and a Mixer tube put into the sigmoid which was found to be twisted. (2) In 1908 an exploratory laparotomy was done and a volvulus of the sigmoid found. This was corrected and a colostomy done. (3) Three months later the colostomy was closed.

*Present Illness* The patient had not had a bowel movement for five days before entry. The night before entry she had severe abdominal cramps. Glycerine and turpentine enemata were given without result. Next morning she was seen at the Out Patient Department where she was given a dose of magnesium sulphate solution (oz 1½). Six hours later she was brought into the hospital in collapse.

*Physical Examination* There was marked tympanitic distention of the abdomen. Temperature 97.6°, pulse 88. An enema was given without results.

*Operation* Ether anesthesia

The cecum was found to be distended and "as large as a fire hose." A cecostomy was done using a Mixer tube which was brought out through a lateral stab wound.

*Course* The patient recovered but continued to evacuate her bowels by cecostomy only. Six weeks later a second operation was done and the terminal ileum was sutured to the sigmoid and the ends of the isolated colon between the ileum and the ileocolostomy, were brought out through the abdominal wall. The patient recovered and was discharged with bowel function restored to the normal channel but with two intestinal fistulae from the isolated loop of colon. Nothing appears in the record about the final outcome of this case.

CASE 4 Male, aged 48 years, white shipper

Admitted in 1911

*Present Illness* There was a history of four days' duration beginning with griping abdominal pains which continued. On the evening before entry he vomited. There had been frequent hiccoughs. His bowels had not moved since the onset of pain.

*Physical Examination* The patient appeared quite ill and was suffering from severe pain. The abdomen was greatly distended, peristalsis was audible, no masses were felt.

*Operation* Median incision

Blood tinged fluid was found on opening the peritoneum. A large distended cecum "the size of a musk melon" was discovered in the epigastric region. This was delivered through the wound and found to be twisted one-half turn on itself. The cecal mesentery was long. The peritoneal coat of the cecum was found to be split in several places. A cecostomy was performed using a Mixer tube. The wound was drained.

*Course* The patient recovered but required a secondary operation to close the cecostomy. A note dated 1915, four years after operation, states that the patient was alive and well and had not had a recurrence.

CASE 5 Female, aged seventy-one years, white

Admitted in 1913

**Present Illness** The patient had not had a bowel movement for seven days preceding entry but had experienced severe colicky pain at intervals. She vomited all day the day before admission. Enemas failed to produce results.

**Physical Examination** The patient was emaciated. The abdomen was tensely distended and tympanitic. A large mass was felt in the right side. Visible coils of intestine were evident.

**Operation** Local and "Anesthol" Left rectus in cision.

A much distended and dilated cecum was found. The entire cecum and ascending colon were freely movable on a long mesentery. There was a complete turn upon itself of the ascending colon near the hepatic flexure. On the internal surface of the cecum was an area of gangrene. This area was in folded the cecum was untwisted and a cecostomy was done with a Mixer tube. The cecum contained half a basinful of liquid contents and much gas.

**Course** She was discharged on the seventeenth day with the cecostomy closed. One year later the patient was reported to have died suddenly apparently of other causes.

#### CASE 6 Female white unmarried, feeble-minded

**Present Illness** The patient ate heavily at a party the day preceding entry. At night she was nauseated and vomited. Next day she became much distended and began to have generalized abdominal pain. Emata were given without result.

**Physical Examination** The abdomen was enormously distended more so in the right lower quadrant than elsewhere. A large mass was felt in the right lower quadrant.

**Operation** The cecum and ascending colon were enormously distended occupying the entire right half of the abdomen. It was found to be twisted one complete turn at the hepatic flexure and was black and gangrenous. There was cloudy malodorous fluid in the abdomen. The cecum was untwisted and then excised. The open ends of the colon and ileum were brought out through the wound and a tube fastened in each.

**Course** The patient died at the end of twenty-four hours.

**Autopsy** Streptococcus and B. Coll were cultivated from the blood. There was a terminal bronchopneumonia. Examination of the cecum and ascending colon showed gangrene and infarction.

#### CASE 7 W B C. B. M 1358 October 4-28 1930

A married salesman aged forty-seven years

**Present Illness** Two days before entry the illness began with colicky pain in the lower abdomen. It became quite severe and was accompanied by nausea. He slept little that night. The day before entry he vomited. The pain continued until admission to the hospital. Enemas produced a little gas and some fecal result.

**Past History** Twelve years ago he had a strangulated left inguinal hernia, operated upon which recurred five months ago. At that time he was operated on for what he thought was diverticulosis of the colon and had the hernia repaired again. At this time he is said to have had a cecopexy done. Since then he had had four attacks similar to the present one which subsided after a few days. He has always had some degree of indigestion and gas in the intestines.

**Physical Examination** The patient was a fairly well-developed and poorly nourished man of middle age. On admission he was sick looking and drowsy. His temperature was 98 F., pulse 96. This later rose to 110. Respirations were 20. The blood pressure was 160/100. **Abdomen** There were lower

mid line and left groin incisions of previous operations. The abdomen was immensely distended, more on the right than on the left. Peristalsis was visible and audible.

**Preoperative Diagnosis** Acute intestinal obstruction

**Postoperative Diagnosis** Acute intestinal obstruction and volvulus of the cecum

**Operation** Spinal anesthesia.

The abdomen was opened through the previous operative scar medial to the left rectus muscle. On opening the peritoneum a large very much distended portion of the large intestine presented. This was found to be cecum which because of an anatomical anomaly was not attached to the posterior abdominal wall and was fully one foot in length. It was tremendously dilated with a diameter of at least six inches. It was found to be completely rotated with a point of kink in the ascending colon well above the ileocecal valve. This volvulus had carried the terminal ileum around underneath and at about twelve inches from the ileocecal valve the ileum was adherent. A two inch segment of the ileum at this point was very badly damaged and dark purplish in color. When the volvulus was reduced the contents of the cecum emptied into the ascending colon. A small right rectus incision was made and a cecostomy done at this point using a large rubber tube. The median incision was then closed without doing anything to the damaged ileum as it was judged to be viable.

**Postoperative Course** The patient withstood the operation well and recovery was uncomplicated. During the first 24 hours the drainage from the cecostomy tube was 74 ounces the day following it was 36 ounces from then on it gradually decreased in amount to about 15 ounces in 24 hours. He remained in the hospital three weeks at the end of which time his wounds were well healed save for a small granulating area in the cecostomy wound. His bowels were moving normally. There was no fecal drainage from the cecostomy wound.

**Subsequent Course** The patient has been seen on an average of twice a year since operation. He has not had any attacks of abdominal pain but has rumbling of gas in the abdomen after eating certain foods or after eating a large meal. His bowels move regularly. He states that in general his abdomen feels more comfortable than it ever has before.

#### DISCUSSION

**Anatomical Considerations** All modern writers on the subject have emphasized the fact that volvulus of the cecum occurs only in cases where there is a congenital lack of fixation of the organ including in many cases the ascending colon. A long mesentery is often found but in many cases the cecum itself is almost devoid of any attachment.

Certain statistical studies have been made of the occurrence of a long mesentery and unattached cecum. V. Thun for example found 19 per cent of cases out of 388 cadavers where the cecal mesentery was long enough to allow the occurrence of volvulus. Wandel reported the same condition in 10 per cent of 600 cadavers.

The twist in the bowel always occurs at a point of fixation below which the bowel is unattached. This is often at the hepatic flexure but may be at any level in the ascending colon.

Occasionally the terminal ileum is adherent posteriorly and serves as a fixed point below which the cecum rotates. In one of the Massachusetts General Hospital cases (Case 2) the volvulus occurred at the point of attachment of a tumor, said to be a fibroma of the colon. Below this the bowel had rotated. In the majority of instances where the direction of rotation was stated it has been described as clockwise. This was true in the author's case, but no mention of the direction of the twist was found in the remaining six Massachusetts General Hospital cases. One exception to this assertion is a case reported by Littlewood in 1899, who found a counter-clockwise rotation of the cecum. Furthermore, Jacobsen says in his series of 20 cases the direction of the twist was equally right or left, and DuRoux also says that both types of rotation are to be found. The degree of rotation is of importance. It is apparent that a complete half-turn (or 180 degrees rotation) must take place before complete obstruction can result. Many cases, however, manifest a greater degree of rotation than this and one often finds it described as a "complete turn" or even more, as occurred in Case 2 of this series, where there were two and one-half turns. Obviously in such extreme degrees of torsion the arterial supply to the twisted bowel is usually much diminished or often completely shut off, as a result of which necrosis and gangrene inevitably follow. It is in the latter group of patients that mortality is most likely to occur and, as will be seen, especially in case an excision or resection of the cecum has been performed. Table I gives a summary of the anatomical data available in the present series.

*Inciting Causes* Although the primary cause of volvulus of the cecum is the absence of fixa-

tion of this organ, there are often other causes which induce the acute attacks. Overeating is generally admitted to be an inciting cause as perhaps occurred in Case 6 of this series. Many European writers have stressed this point. At any rate, distention of the cecum with feces or gas may cause it to flop over below some point of abnormal fixation, thus starting a volvulus. Once the blood supply begins to be shut off, the bacterial activity may increase and lead to further distention and increase of obstruction as pointed out by Homans. The importance of overindulgence in food is said to be enhanced when followed by vigorous exercise as pointed out by Pratt and Fallis and others. It is conceivable that with the cecum overdistended a sudden exertion or twist of the body might induce a volvulus. Ohman believed that volvulus of the cecum occurs more frequently among people who subsist on a coarse diet with a high roughage content such as is consumed by some of the European peasant classes. DuRoux was of the same opinion and states that this form of volvulus is very common in Russia, Finland, Poland, and Scandinavia where a coarse vegetable dietary is widely used.

Another occasional inciting cause appears to be the vigorous peristalsis which results from the use of certain drastic purgatives as Corner and Sargent emphasize. Further inciting causes mentioned by Jacobsen are the pressure of an enlarging pregnant or parturient uterus, violent coughing, diarrhea from any cause, and incarceration of a dilated cecum in a hernia, especially the umbilical type.

*Diagnosis* A diagnosis of acute volvulus of the cecum has rarely been made before operation. The clinical manifestations are those of intestinal obstruction without any further char-

TABLE I

Case No	1	2	3	4	5	6	7
Location of cecum	Upper abdomen to L U Q	—	—	Epigas-tric region	—	Entire right side of abdomen	Mid-abdomen
Size of cecum	Much distended	Diameter 3½ in	Size of fire hose	Large as musk melon	Much distended and dilated	Enor-mously distended	6 x 12 in
Long mesentery with cecum not fixed	+	+	?	+	++	+	+
Degree of twist	?	2½ turns	?	180°	360°	360°	360°
Direction of twist	?	?	?	?	?	?	Clock-wise
Serious damage to blood supply	+	?+	? -	+	+	+	+
Definite gangrene	+	0	?	?	Small area	+	0

acteristic signs except, perhaps, localized abdominal distention in the right half of the abdomen or the presence of a large tympanitic mass in this region which might suggest a distended cecum.

**Treatment** Immediate operation is obviously indicated in these cases. Temporizing with enemata and symptomatic treatment are now inexcusable relics of the past. Although the need for operation is always urgent, if one finds an elevation of the white count indicating as it does in all cases of strangulation of the bowel

evitably results from the cecostomy and which tends to prevent a recurrence of the volvulus. The mortality of this operation is low, 17 per cent in Jacobsen's series as compared with 50 per cent for the operation of resection. No doubt by earlier diagnosis and early operation this could be materially reduced. It has been found by many surgeons who have reported on their end results that no further cecopexy is necessary. A summary of the types of operation performed and the results obtained in this series is given in the following table.

TABLE II

Case No.	1	2	3	4	5	6	7
Excision—ends of bowel brought out	+					+	
Detorsion and cecostomy		+		+	+		+
Cecostomy alone			+				
Died in hospital						+	
Cause of death	Peritonitis	Pulmonary embolus				Streptococcus Septicemia Bronchopneumonia	
Recurred	—	—		0 in 4 yrs	0 in year she lived	—	0 3 yrs

damage to its blood supply, the necessity for immediate operation is manifest in order to prevent inevitable development of gangrene of the bowel.

The choice of operative procedure of course, depends upon the extent of damage to the cecum and the experience and skill of the operator. Extirpation of the cecum for gangrene has been followed by a high mortality. Of the seven cases presented above, two were subjected to excision leaving the cut ends of the bowel in the wound, and both died. Jacobsen states that the mortality of resection in these cases is 50 per cent or more. There is no doubt that the relative number of cases demanding excision because of severe damage to the blood supply and resulting gangrene is small. In general the simplest procedure which will relieve the obstruction, reduce the tension in the damaged cecum, release the compression of the blood supply, and if possible tend to prevent a recurrence of the condition should obviously be chosen. These indications are best met by the operation of detorsion of the cecum followed by a cecostomy. After having determined the direction of rotation, it is simple enough to untwist the bowel, thus releasing the compressed mesenteric vessels and partially emptying the cecum into the remainder of the colon. If one then performs a cecostomy, the contents of the damaged bowel can be thoroughly evacuated and the recurrence of distention prevented while it is healing. What is very important also is the fixation of the cecum to the anterior abdominal wall, which in

Both cases where the cecum was excised died (operative mortality of 100 per cent). One of the four cases where detorsion and cecostomy were performed ended fatally (a mortality of 25 per cent). Satisfactory follow-up reports are available in four of the seven cases and in all of these there was no recurrence. The last remaining patient of the group (Case 7) reports that he is in better health than ever before. So far as immediate recovery and subsequent course are concerned, the best results, therefore, resulted from detorsion and cecostomy, which has been the experience of all who have reported on this condition.

#### CHRONIC RECURRING VOLVULUS OF THE CECUM WITH SUBACUTE OBSTRUCTION

Undoubtedly many patients with a cecum mobile suffer from recurring transitory attacks of partial volvulus producing pain in the side and perhaps accompanied by vomiting. Spontaneous correction of the volvulus quickly terminates the attack. That this is true is suggested by the history given by many patients of acute attacks over a period of many years preceding a severe acute volvulus with persistent obstruction requiring emergency operation. Corner and Sar gent conclude from a study of fifty-seven cases from the literature that there are acute subacute, and chronic types of volvulus of the cecum. That recurring chronic or subacute volvulus may occur is demonstrated by the following case report.

E. W., student nurse No. 203726 aged nineteen  
Chief Complaint Intermittent right lower quadrant pain with nausea.

**Present Illness** Three months previously the patient was operated upon by Dr Arthur W Allen for acute appendicitis. At that time it was noticed that she had a long mobile unattached cecum. In the presence of an inflamed appendix it was not plicated and a simple appendectomy was done. Her recovery was complicated by an unusual amount of gaseous distention during the first few days. Soon after she began to get about, she had attacks of cramplike pain in the right lower quadrant which at first were not very frequent and for several weeks occurred only while she was in the upright posture, never while lying down. She returned to duty after a month of rest at home, but continued to have the attacks of pain and nausea even after attempts to control her constipation with diet and laxatives. (Her bowels had been constipated since operation.) The pain became more severe and finally the attacks began to occur even at night while in bed. Defecation failed to relieve them. They lasted usually a few hours and in the interval she remained free from pain.

**Physical Examination** Nothing abnormal could be determined by palpation and inspection of the abdomen. The appendix scar was well healed, flexible, and non tender.

**X-ray** A barium enema was reported as follows: "Barium passed without difficulty to the cecum. The colon was rather low in position. On the inner border of the cecum just above the entrance of the ileum there was a rather deep indentation. On defecation the lower part of the cecum emptied normally. The changes are slight, but are somewhat suggestive of an adhesive band across the inner portion of the cecum."

The case was discussed with Dr Allen who because he was about to start on a journey, requested the author to do the second operation.

**Operation** *Preoperative Diagnosis* Partial obstruction of the cecum from adhesive band.

*Postoperative Diagnosis* Intermittent volvulus of the cecum, cecum mobile, congenital anomaly of the ileum.

The abdomen was opened through a right paramedian incision close to the previous scar. Several filmy adhesions of the omentum to the old scar were found. The cecum was found to be freely movable, without attachment to the posterior abdominal wall. There were no adhesions to the point where the appendix had been removed. The cecum was found to be rotated one half turn to the left in a clockwise direction and the terminal ileum appeared to be coming off of the right side instead of the left. The last six inches of terminal ileum was firmly adherent at the point where the cecum should be. At about the middle of the ascending colon the cecum had flopped over the right colic artery which was short and tense enough to produce a shelf on the posterior abdominal wall. The ileum was freed up and the cecum was plicated and sutured to the denuded area left after freeing up the adherent ileum. In doing this the rotation of the cecum was corrected and when the abdomen was left the ileum lay in its normal relation to the cecum. By plication the cecum had been shortened to about its normal length. The adhesions of the ileum appeared to be congenital in origin.

**Course** The convalescence was uneventful except for the development of tetany. This was thought to be the result of a low vitamin diet for several weeks preceding operation, and alkalosis resulting from hyperventilation of the lungs produced by discomfort from the operation (overbreathing).

**Subsequent Course** The patient has been seen at frequent intervals since operation and has always been perfectly well. She has not had any recur-

rence of her former attacks. Her bowels move regularly.

The following is a diagram made shortly after operation in an attempt to illustrate the condition found.

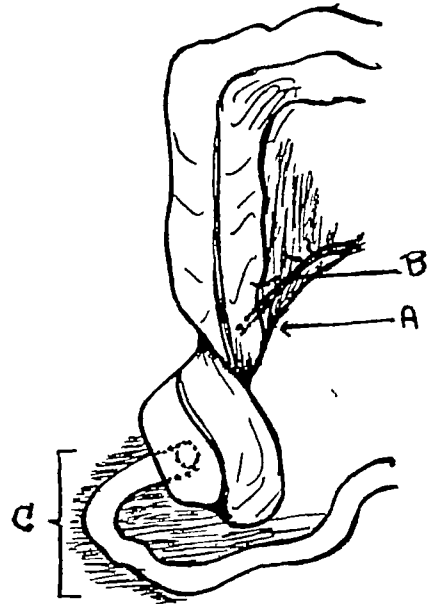


FIGURE 1 Diagram to illustrate torsion of cecum in case of chronic volvulus of the cecum.

A—fixed point.  
B—right colic artery.  
C—area of fixation of ileum.

In this case one sees an example of the influence of fixation of the terminal ileum in the right iliac fossa in facilitating volvulus of the cecum by acting as a fixed point. The importance of this condition is stressed by Corner and Sargent in their article on volvulus of the cecum where they state that a shortened fixed mesentery of the terminal ileum is the commonest cause of cecal volvulus in patients with a mobile unattached cecum. There was also in this patient a fixed point at the termination of the right colic artery which acted as a hinge upon which the cecum could turn. Correction of the abnormality of the ileum and fixation of the cecum sufficed to prevent a recurrence of the volvulus in this case.

#### \*SUMMARY AND CONCLUSIONS

(1) Two types of clinical picture may result from volvulus of the cecum. The acute type with acute intestinal obstruction is that which is best known because of the obvious necessity for operation in such cases. The chronic or subacute recurring type is little known and undoubtedly rarely recognized. Seven cases of the former type and one of the latter type are reported here.

(2) There is always a congenital lack of fixation of the cecum with a point of attachment below which the bowel rotates. The variations of the factors and the effects of various precipitating causes at work have been discussed.

(3) The diagnosis is rarely made before op-

\*I have been called upon recently to perform a resection of the 'pre-sacral nerve' for the relief of severe dysmenorrhea in this patient (E W No 303726). At this operation the cecum was found to be of normal size and still well fixed in its proper position.

eration. In the acute type the clinical picture is that of acute intestinal obstruction. The one characteristic suggestive sign is right-sided localized distention. In the chronic recurring type the history may suggest the diagnosis and the x ray may lend aid.

(4) Treatment in the acute type is immediate surgery directed toward relief of the obstruction, correction of the volvulus, and if possible prevention of a recurrence. These indications are best met by the operation of detorsion of the cecum followed by a cecostomy.

(5) Treatment in the chronic recurring type is directed toward correction of deformity and prevention of recurrence. This of necessity varies depending upon the conditions found but some method of cecal fixation must be employed.

(6) The results of surgery are good excepting when resection or excision is practiced in the acute cases, when the probable mortality is in the neighborhood of 50 per cent.

## REFERENCES

1. Quoted by Mantouff. See reference 57.
2. Deperg. H.: Volvulus of cecum. Deutsche Zeitschr. f. Chir. 175: 40 1912.
3. Blecher. Ueber Ileus bedingt durch selbst verschluckte Volvulus. Deut. Zeit. f. Chir. 64: 48 1902.
4. Bernard, M. L. et Delorme M.: De l'obstruction intestinale par torsion méscéntérique. Congrès. française de Chir. 13: 410 1909.
5. von Bergmann, A.: Zur Diagnose und Behandlung der Darmocclusionen. Arch. f. klin. Chir. 61: 445 1900.
6. Broca M. Rapport. Deux cas de occlusion int. st. ale. Gaz. d. Hop. P. 750 1907.
7. Bruns G.: Laparotomie bei einem Fall von Darmverschlingung. St. Peterb. med. Wchnschr. 3: 211 1834.
8. Bryant, Thomas: Address on the value of exploratory operations in the practice of surgery. Lancet 962 1856.
9. Bundschuh E.: Ueber Volvulus des Dickdarmes. Beitr. z. klin. Chir. 45: 55 1913.
10. Burgess, Arthur H.: Volvulus of the small intestine. Lancet 2: 1690 1900.
11. Cavallion, P. and Deloyre E.: Le Volvulus du cecum. Rev. de gynéc. et de chir. abd. 10: 169 1906.
12. Chauffat, S. A.: Torsion of the cecum with revolv. of the iliocecal junction and report of a case. Am. J. Obst. & Gynec. 2: 537 (Dec.) 1921.
13. Chailier A.: Volvulus du cecum. Soc. Nat. de Med. de Lyon. (Nov. 6) 1911.
14. Chitumsky V.: Zwei Fälle von Axendrehung des Cecums. Berl. klin. Wchnschr. 48: 173 1911.
15. Coombs, G. H.: Volvulus of the cecum. New York Med. Record. 66: 688 1899.
16. Corner E. M. and Sargent, P. W. G.: Volvulus of the cecum. Ann. Surg. 41: 93 1905.
17. Donald C.: Volvulus of the small gut, cecum, and ascending colon. Brit. J. Surg. 15: 1 (Oct.) 1927.
18. Dragen, B. G.: Volvulus of the cecum. Vrach. Gaz. 21: 45 (Jan.) 1927.
19. DuRoux, E.: Les torsions du gros intestin et leur traitement chirurgical. Revue de gynéc. et de chir. abd. 19: 225 1912.
20. Ekshorn, G.: Die anatomische Form des Volvulus und Darmverschlingens bei beweglichem Coecocolon ascendens. Arch. f. klin. Chir. 7: 872, 1904. Ibid. 76: 747 1905.
21. Erdberg: Quoted by Mantouff. See reference 57.
22. Fawcett C. Hilton: Guy's Hospital Reports. 14: 95 and 276 1888.
23. Faltin, R.: Kasuistische Beiträge zur Pathologie und Therapie des Volvulus des Cecum. Deutsche Zeitschr. f. Chir. 31: 165 1904.
24. Fildner, R.: Tilf. af cecum mobile. Ugrsk. f. Læger 3: 190 1903.
25. Feury: Quoted by Mantouff. See reference 57.
26. F. Gillet: Deux observations de l'occlusion du pév. de position de l'intestin. Bull. et mem. Soc. de Chir. de Paris. 27: 612 1901.
27. Gayet and Lacroix: Volvulus du cecum. Soc. de Chir. de Lyon. (Janvier) 1911.
28. Gelfand M.: Volvulus de l'intestin grêle et de la partie initiale du gros intestin. Rev. de chir. 35: 247 689 and 856 1907. Ibid. 36: 91 1907.
29. Guinard: Rapport. Bull. et mem. de chir. de Paris. 7: 642 1901.
30. Hildorf, V.: Fünf Tilf. af ileus af ileus. Hosp. Tid. 11: 728 1902.
31. Harvey Samuel C.: Congenital variations in the peritoneal relations of the ascending colon, caecum, appendix and terminal ileum. Am. J. Surg. 67: 641, 1912.
32. Haxen, T.: Ein Fall von chronischem (angeborenem) Volvulus coeci. Zentrabl. f. Chir. 7: 1083 1900.
33. Hedénus P.: Fall af händigt mesenterielutveckling och volvulus. Upsala Läkaref. Förh. 6: 301 1870 71.
34. Quoted by Mantouff. See reference 57.
35. Homans, J.: Torsion of the cecum and ascending colon. Arch. Surg. 2: 395 (Sept.) 1911.
36. Ippen, A.: Tilf. af ileus ved cecum mobile. Jysk. Med. Bolshak. Hosp. P. 84 1919.
37. Jacobson H.: Volvulus of the cecum. Acta chir. Scandinav. 86: 191, 1913.
38. Jankovsk, J.: Der volvulus des Dickdarms. Deutsche Zeitschr. f. Chir. 134: 9 1919.
39. Kartascher L.: Volvulus of cecum. Vrach. Gaz. 2: 271 (Feb.) 1913.
40. Kirby F. J.: Volvulus of caecum. Ann. Surg. 83: 475 (March) 1919.
41. Kloss, H.: Die habituelle Torsion des mobilen Zöcum. Münch. med. Wchn. 57: 345 (Feb.) 1910.
42. Klott: Et Pat. Tilf. of ileus p. Gr. a. Mladanelske. Nord. med. Ark. 21: Nr. 12 1900.
43. Kuna, E.: Volvulus of cecum and ascending colon. Arch. f. klin. Chir. 181: 147 1918.
44. Kupper, G.: Volvulus. Cent. f. Chir. 36: 1795 (No. 52) 1909.
45. Labat: Quoted by Mantouff. See reference 57.
46. Lagoutte: Un cas de volvulus du caecum. Lyon chir. 2: 471 1910.
47. Laperre: Deux cas de volvulus du cecum. Arch. prov. de Chir. 19: 72 1910.
48. Lécuyer: Plaines opératoires du Canal Thoracique. Rev. de Chir. 30: 743 1904. Contribution à l'étude des volvulus du Gros. Intestin. Ibid. 41: 21 1910.
49. Legoux Report. Case of volvulus of the cecum. Bull. de la Soc. de Chir. de Paris. 3: 493 1897.
50. Lenormant: Un cas de volvulus du caecum. Congrès de Chir. de Paris. 23: 320 (Oct.) 1910.
51. Littlewood H.: Seven cases of volvulus treated by abdominal section. Lancet 2: 48 1899.
52. Mäkinen, G. H.: Seven cases of intestinal obstruction. Lancet 2: 1158 1900.
53. Maklakov N. N.: Volvulus of the cecum without intestinal obstruction (case). Zentrabl. f. Chir. 56: 746 1919.
54. Malinovskiy N. N.: Intestinal obstruction with volvulus of the cecum. Vestnik Khir. 13: 70 1922.
55. Mantouff, von L.: Die Axendrehungen des Cecums. Verhandl. d. Deutsch. Gesellsch. Chir. 27: 84 1899.
56. Volvulus coeci. Samml. klin. Vortr. 60: 107 1893.
57. Mammall, R. C. B.: Volvulus of the cecum treated by reduction and appendectomy. Lancet 1: 1173 (April 23) 1906.
58. Nagel, W. G.: Volvulus of the cecum followed by volvulus of the jejunum. Brit. M. J. 2: 311 (Aug.) 1929.
59. Nelson, H. M.: Postoperative volvulus of the cecum. Am. J. Surg. 6: 293 (Oct.) 1918.
60. Obalinski, Alfred U.: Über Laparotomie bei innerem Darmverschling. auf Grund eigener 110 Fälle. Arch. f. klin. Chir. 45: 1 1913.
61. Obman, E.: Volvulus of the cecum. Finska Läk.-sällsk. handl. 66: 579 1924.
62. Owen, J.: Volvulus of ascending colon death necropsy. Lancet 1: 828 (May 1) 1908.
63. Pankula: Appendicitis et volvulus coecal. Presse med. 37: 1576 1929.
64. Pescatore M.: Ein Fall von Volvulus bei einem 19 jährigen Knaben. Deutsche Zeitschr. f. Chir. 61: 158 1902.
65. Pratt, F., and Faltin, L. E.: Volvulus of the cecum and ascending colon—3 cases. J. M. A. 9: 1225 1917.
66. Risse: Cecal volvulus with gangrene. Deutsche med. Wchnsch. 37: 1326 1911.
67. Rokitsany Charles: Étrangement interne des intestins. Arch. gen. de med. 10: 202 1837.
68. Sarlin, G.: Volvulus of the cecum simulating gall bladder disease with diarrhoea—case. Arch. d. med. de l'ap. digestif. 19: 721 (June) 1919.
69. Schlemmer, Oscar: Zur Diagnose des Axendrehung bei bestehendem Mesenteriumileocöcum commune. St. Peterb. med. Wchnsch. 16: (No. 2) 13 1899.
70. Schwarz, D.: Über Volvulus des Cecum. Zentrabl. f. Chir. 39: 21 1911.
71. Serck-Hanzen, T.: Case of retroposition of colon with volvulus of cecum. Med. Rev. Bergen. 43: 567 (Dec.) 1926.
72. Silvan, C.: Volvulus of the cecum from membranous pericolicitis. Tidn. rma med. 37: 104 (Jan. 9) 1921.
73. Smith, R. E.: Volvulus of cecum double obstruction. Brit. M. J. 1: 89 (Feb. 28) 1920.
74. Söbengren, G.: Fall von Volvulus des Cecums. Münch. med. Wchnsch. 54: 54 1917.
75. Tago-Hansen, Et Tilf. af Mesenterium ileocöcum commune med Torsion. Ugrsk. f. Læger 7: 688 1914.
76. Tscherning, E.: To Tilfælde af ileus på Grund af agglimeret Miltadnær. Nord. med. Ark. 21: 183 1900.
77. von Thun: Anomalies of the intestinal mesentery. Dibl. f. Læger. P. 40 1913.
78. Tryman, E. D.: Partial volvulus of the cecum. Surg. Clinics N. Amer. 3: 1667 1915.
79. V. W. W.: Über der klinische Diagnose der Darmocclusion durch Strangulation oder Axendrehung. Zentrabl. f. Chir. 16: (No. 9) 183 1889.
80. Wandel, Oskar: Ueber Volvulus des Cecum und Colon ascendens. Mitt. a. d. Grenzgeb. d. Med. u. Chir. 11: 39 1902.
81. Wilm, th. M.: Cecal volvulus (case). Bull. et mem. soc. N. t. de Chir. 83: 291 1919.
82. Wilms: Der ileus. Deutsch. Chir. L. f. 466 1906.

years ago by Barnard<sup>3</sup>. Drawings which are close reproductions of Barnard's diagrams are shown in figures 2, 3 and 4. In figure 2, the vari-

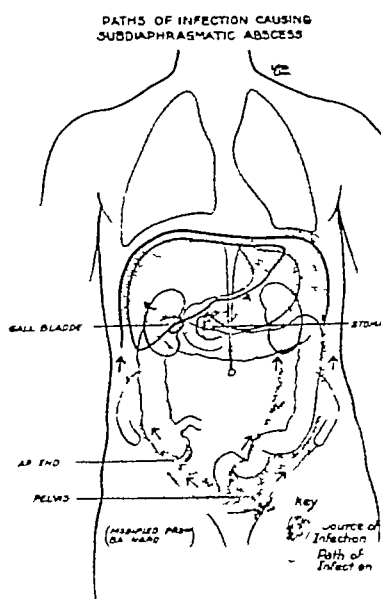


FIG 2 Diagram (after Barnard) which illustrates site of origin of intraabdominal infection and the pathways of spread. These points of origin are in the gall bladder in the duodenum in the pylorus in the appendiceal region and at times spread toward the right from the pelvic area. Note that the upward pathway on the right is shorter and more direct than on the left.

ous sources of intraperitoneal infection are given and the direction of the spread which the infection takes to reach the space beneath the diaphragm are shown. Figure 3 represents a sagit-

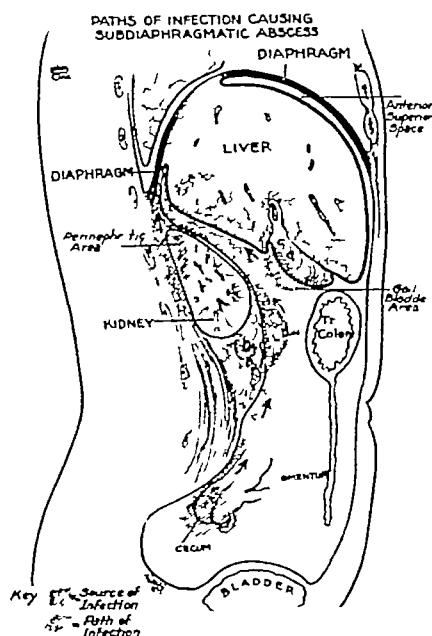


FIG 3 Diagram of sagittal view of right abdomen (just lateral to ascending colon) showing pathway of spread up the right gutter. Note close proximity of the perinephritic area to the posterior subdiaphragmatic space.

tal view of the right abdomen showing the path of travel up the right gutter (lateral to the cecum and ascending colon) to both the posterior and to the anterior space. This drawing

also illustrates the close proximity of the perirenal tissue to the posterior space. By direct extension, the infection has only to break through the parietal peritoneum at one point to involve the space beneath the diaphragm. The reflections of the peritoneum between the liver and diaphragm are shown in figure 4. This illus-

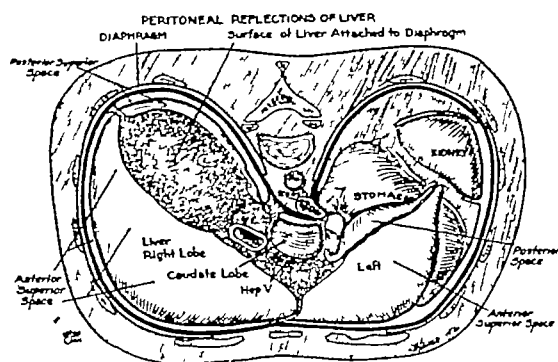


FIG 4 Diagram of superior surface of the liver showing line of reflection of peritoneum to form the diaphragmatic attachments of the liver. Note that this surface of the liver is divided into four spaces.

tration represents a view of the superior surface of the liver. The diaphragm has been removed. The shaded portion of the superior surface of the liver indicates the area of attachment of the triangular ligaments on each side and the falciform ligament anteriorly. The peritoneal reflections divide, therefore, the free spaces beneath the diaphragm into four compartments. It can readily be seen that the largest free portion of subphrenic space is over the right anterior and lateral aspects of the liver. The attachment of the right triangular ligament is broad, and extends posteriorly a considerable distance. The division of the two spaces on the right side has little practical significance because most collections are not limited strictly to either space but spread laterally over the free liver surface. All such collections are usually drained through a lateral incision either transpleurally or subpleurally.

That infection gains entrance to the spaces beneath the diaphragm most often by direct extension along the pathways mentioned cannot be questioned. It is maintained by some, however, that an infection of these spaces may be blood borne or result from a lymphatic spread. Such a method of travel is probably rare. Direct extension downwards from a pleural empyema may occur but even this is unusual. There was one such case in our series. The reverse is a much more common occurrence. A continuation of a subphrenic abscess into the chest was found in two of our cases. From a practical point of view, it can be concluded that ninety per cent of all subdiaphragmatic collections involve the right subphrenic space and result from a direct spread of infectious material from some other region in the peritoneal cavity. Factors other than the peritoneal reflections, also

influence the spread of intraperitoneal infections.

#### INFLUENCE OF RIBS AND DIAPHRAGM

The part that the pressure changes in the upper abdomen play has not been emphasized in proportion to their importance from an etiological standpoint. The thoracic cage covers the upper third of the abdominal cavity and together with the diaphragm fairly well surrounds the space we are discussing. The constant motion of the boundaries of this space incident to the act of breathing obviously creates variations in the intraperitoneal pressure of this portion of the abdomen. It is the general belief that the pressure in the peritoneal cavity is positive. It has been conclusively shown by one of us Overholt<sup>11</sup>, and by others<sup>1</sup> that the intraperitoneal pressure in the upper abdomen is less than atmospheric pressure during quiet respiration. Overholt demonstrated in animals that the pressure in the upper abdomen oscillates in the negative phase corresponding to the changes in intrapleural pressure. In other words, it was shown, that during inspiration the pressure beneath the diaphragm was less (a greater negative pressure) than during expiration. This fact was explained on the following basis. During inspiration the outward movement of the ribs enlarges the space in the upper abdomen more than it is decreased by the descent of the diaphragm. The alterations that take place in the intrapleural and in the intraperitoneal pressure during the two phases of respiration are diagrammatically represented in figure 5. With

respiration the outward movement of the thoracic cage, which extends over the upper abdomen, increases the negative pressure during inspiration. Should a tube be inserted into the subdiaphragmatic space as is shown in this figure and its distal end placed under water a negative pressure during quiet breathing can be demonstrated. Water will rise in the tube to the highest level during inspiration. In two patients convalescing from a subphrenic abscess the drainage tube (with the wound itself packed with gauze) was placed under water as shown in figure 5. During inspiration fluid was sucked up in the tube and during expiration the water in the tube dropped. This observation demonstrates what may happen to free pus in the peritoneal cavity once it reaches the upper abdomen. The infectious material is actually sucked up to that part of the peritoneal cavity where the negative pressure is the greatest. The constant sucking effect of rib movements and diaphragmatic action is undoubtedly an important etiological factor in the formation of subphrenic abscess.

Fortunately, there are forces acting to prevent the upward spread of infectious material in the peritoneal cavity namely walling off of the process with granulation tissue, and the effect of gravity. The half sitting position of the patient so often employed postoperatively, is a valuable prophylactic measure. It is desirable that respiratory movements be kept as quiet as possible. Jerky or deep thoracic movements undoubtedly tend to increase the spread of an intraperitoneal infection.

#### DIAGNOSIS

The possibility of a subphrenic abscess confronts us whenever the general evidences of sepsis disturb the postoperative course of an abdominal case. After ruling out the common complications such as wound infection, pulmonary difficulties, pyelitis, or peritonitis, an abscess under the diaphragm must be considered. In figure 6 are shown representative temperature charts of patients who were proved to have subphrenic abscesses. All are suggestive of the accumulation of purulent material somewhere. Symptoms which may suggest such a location for an abscess are as follows:

- 1 Upper abdominal discomfort with or without pain
- 2 Difficulty in breathing
- 3 Referred pain to the chest, shoulder or neck
- 4 Hiccough.

Local signs which may or may not be present

1. Limitation of respiratory movements
2. Edema of the skin overlying the region involved
3. Tenderness and painful fist percussion
4. Downward displacement of the liver

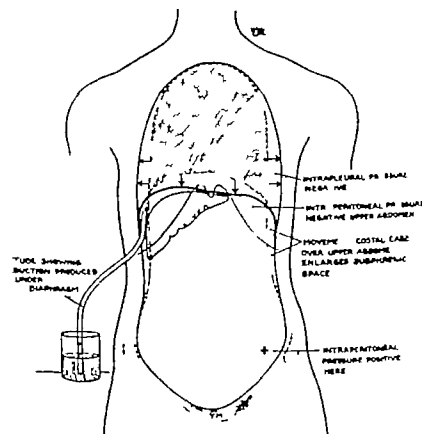


FIG. 5. Diagram which illustrates pressure changes in pleural and in upper abdominal cavities as a result of respiratory movements. The costal cage extends well down over the upper abdomen and therefore at the time of the outward excursion a suction is created in the subphrenic space. To illustrate this, a tube is shown draining the subphrenic area. Its distal end has been placed under water. During inspiration water is sucked up in the tube.



- 5 Palpable mass below the costal arch if the collection is large
- 6 Chest findings
  - a Elevated and limited motion of the diaphragm
  - b Decreased or absent breath sounds in the lower chest
  - c Physical signs of fluid in the chest above the diaphragm

phrenic lesion The diaphragm may be high, the lung clouded and a fluid level present Upon exploration of the subphrenic area a generalized involvement is found. The clinical course and abdominal signs should differentiate a local and a general infection within the peritoneal cavity 2 Liver abscess Single or multiple abscesses within the liver may be confusing

### REPRESENTATIVE TEMPERATURE CHARTS

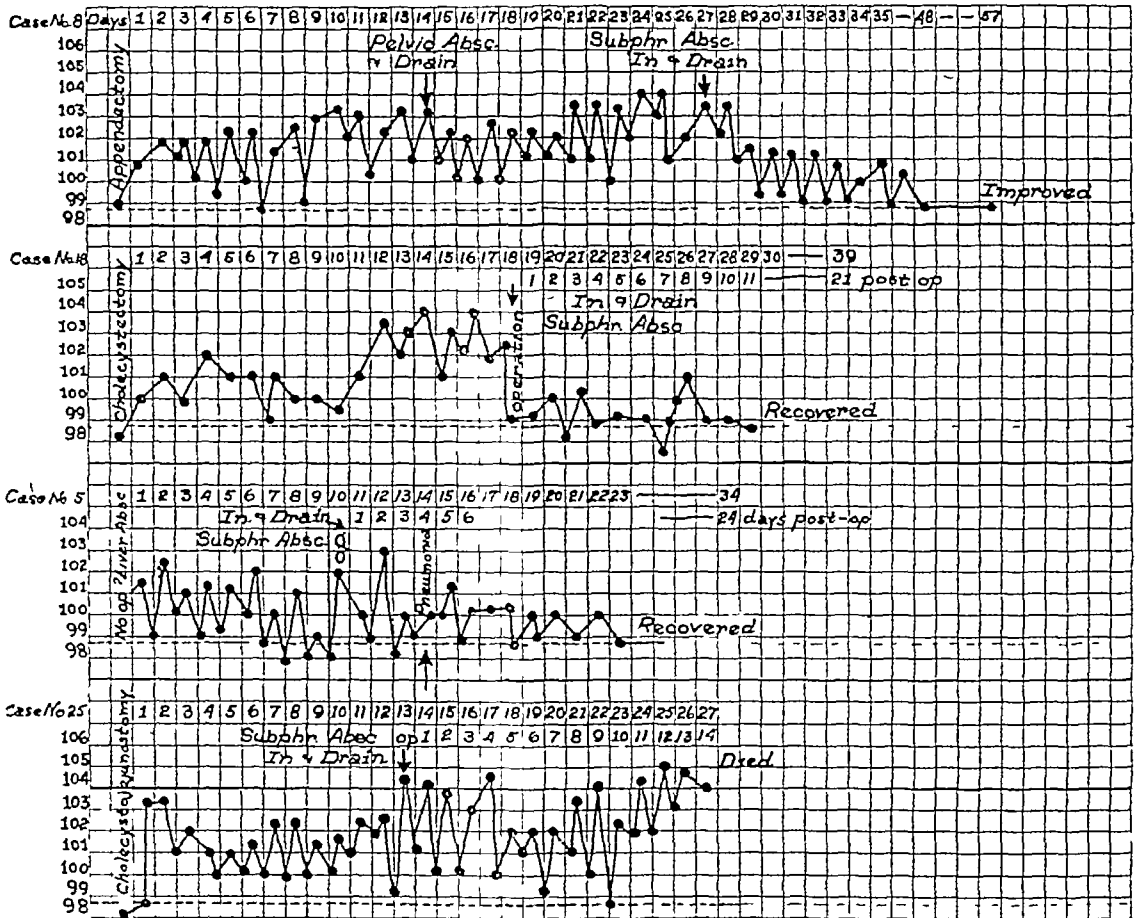


FIG 6 Reproductions of typical temperature charts in subphrenic abscess. Note that in some cases the temperature is sustained after the original operation. In others the curve has returned to normal then a recurrence of the elevated temperature occurred and was maintained until the subphrenic collection was drained.

- 7 X-ray findings
  - a Elevated and fixed diaphragm
  - b Varying degrees of haziness of diaphragmatic shadow
  - c Costophrenic angle obscured
  - d Haziness of the lung field
  - e Displacement of the heart away from the involved side
  - f Gas bubble with fluid level under the diaphragm
- 8 Diagnostic needle aspiration

### DIFFERENTIAL DIAGNOSIS

Other conditions leading to an erroneous diagnosis of subdiaphragmatic abscess may be listed as follows 1 The presence of a generalized peritonitis with apparent localizing signs has been, in our experience, one of the most difficult situations to separate from a true sub-

The clinical course is severe Jaundice may be present and a more definitely palpable liver edge would be expected The diaphragm is not so markedly elevated and the lung reaction is less pronounced X-rays fail to show a gas bubble between the liver and the diaphragm 3 Perinephritic abscess Edema and tenderness in the costovertebral angle are similar in the two conditions, but there is less change in the position of the diaphragm and less pleural reaction 4 Thoracic empyema, especially the encysted diaphragmatic type, may be confusing The lung base and diaphragm are obscured in the x-ray picture The history and clinical course are dissimilar An absolute differentiation can be made by needle aspiration, air injection, and x-ray reexamination 5 Postoperative uni-

lateral lower lobe or massive collapse. The diaphragmatic shadow in the x ray is elevated in both conditions and the lung base obscured. In lower lobe collapse, the heart is drawn toward the affected side while with a subphrenic collection it is displaced away from the side of the lesion. A fluid level below the diaphragm may outline the diaphragm and establish the diagnosis. Muller, Overholt, and Pendergrass<sup>12</sup> found a high diaphragm with some cloudiness of the lung base in the majority of patients after abdominal operations. Normally all postoperative patients who have had the abdomen opened within ten days show: 1. Elevation of the diaphragm. 2. Fixation of diaphragm. 3. Varying degrees of atelectasis of the lower lobes. 4. Air accumulations beneath the diaphragm. Since these x ray appearances are the usual and normal postoperative findings in all cases which have had a laparotomy, the problem of the differential diagnosis of subdiaphragmatic collections becomes more complicated. In figure 7 is

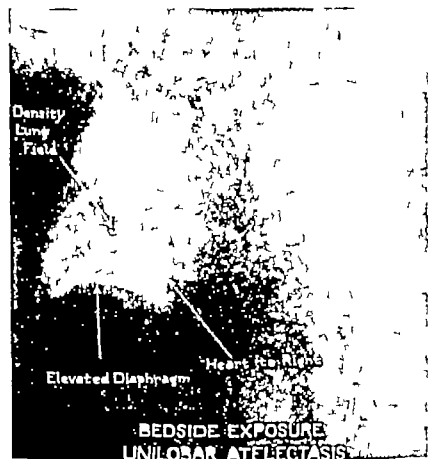


FIG. 7. Bedside roentgenogram of the chest of a patient who had a unilobar atelectasis on the right side which was proved two days later by autopsy. Note similarity of the appearance in this film and of that seen in the subphrenic patient (Figure 8). There is an elevated diaphragm, density of the lung fields, but the heart is displaced slightly to the affected side.

shown a postoperative bedside roentgenogram of a patient who had had a massive unilobar atelectasis proved at autopsy. The appearance is not unlike that seen in figure 8 which is shown to illustrate the so-called typical x ray features of subdiaphragmatic abscess.

#### TREATMENT

The basis of the treatment of subphrenic abscess is incision and drainage. Obviously this should be provided as soon as possible after the diagnosis has been established. Because of the

location of the abscess, the dangers of delay are great. In addition to the effects of prolonged sepsis an extension in any direction may contribute to a fatal outcome. The two-stage transpleural operation has been the one most universally employed. The first stage consists in the resection of segments of one or two ribs (8th or 9th) in the midaxillary line, under local anesthesia. The corresponding intercostal vessels, nerves, and muscle bundles are removed. This is an important step in the technique of the first operation. A removal of a segment of the intercostal vessels prevents hemorrhage at the time of the cauterization later. The removal of the intercostal nerve in the drainage area elim-

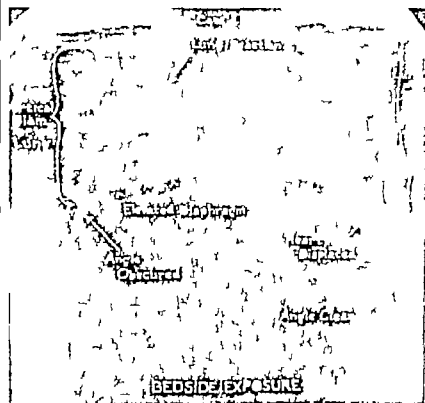


FIG. 8. Bedside roentgenogram of the chest of a patient who had a subphrenic abscess. Note the elevated diaphragm which obscured the costophrenic angle, the haziness of the overlying lung and the displacement of the heart away from the side of the involvement. Note also that the fluid level below the diaphragm is not apparent.

inates much of the pain. The parietal pleura is then anchored to the diaphragm with interrupted sutures around the circumference of the base of the wound. Gauze packing is then inserted and the wound is loosely closed over the gauze. The second stage is carried out twenty-four to forty-eight hours later which gives sufficient time for the drainage tract to be sealed. The wound is then re-opened, the gauze pack removed and the adherent pleura and diaphragm opened with the cautery. An incision sufficient to admit the examining finger is made. The ramifications of the abscess cavity are explored and its trabeculations are broken down. Wide drainage is established and maintained by the use of cigarette drains and a tube for irrigation purposes.

The subphrenic space can in some cases be approached safely by an incision below the line of the pleural reflection (i.e., the costophrenic sinus) and the abscess cavity entered immedi-

ately without the necessity of a division of the operation into stages. This route of drainage can be established by placing the incision below the costal border and carefully sliding the exploring finger upwards under the ribs, extraperitoneally, to the abscess cavity. Ochsner favors an excision of a portion of the twelfth rib and thereby approaches the abscess retroperitoneally. He was able to show a lower mortality by this method than by any other. The operation advocated by Ochsner has two distinct advantages. The operation is a one-stage procedure and the dangers of a contamination of the pleural or peritoneal cavities during the process of establishing the drainage tract are lessened.

In managing the care of these patients after operation, it has been our practice not to disturb the original pack for four or five days. When the cigarette drains are removed, a continuous drip of half strength Dakin's solution is introduced and constant gentle suction applied to the outlet tube. The obliteration of the cavity is often prolonged if such suction is not employed.

#### SUMMARY OF CASES

In the past fourteen years there are in the Lahey Clinic records of twenty-five proved cases of subphrenic abscess. A summary of these cases is shown in table I. It is interesting to note that in the postoperative group the signs of a complicating peritoneal infection appeared within the first four to eleven days. The fact that localization with signs sufficient to make a diagnosis of a subphrenic abscess is often prolonged even after the appearance of the first complicating signs is borne out by study of the average length of time required to establish the diagnosis. Undoubtedly the presence of associated disease, such as general peritonitis, pneumonia, and lung abscess, as occurred in this series of cases, was responsible for the long interval between the first complicating signs and institution of drainage of the subphrenic abscess. This interval averaged between seven and fourteen days.

The summary clearly demonstrates the value of the x-ray in the diagnosis of this condition. The various signs looked for in the x-ray film are grouped together in the chart. The diaphragm was found to be elevated in every instance excepting two when such an examination had been made. Haziness of the lung field was second in frequency and was present in sixteen cases. We were surprised to find the shadow of a gas bubble below the diaphragm in only two of the cases in the entire series. There was cardiac displacement in three of the cases. This finding is dependent, of course, upon the extent of the rise of the diaphragm and of the associated pleural effusion. It becomes evident

from a review of the x-ray appearances in these cases that a gas bubble with a fluid level should not be considered one of the cardinal signs of subphrenic abscess.

In the majority of our cases, a diagnostic tap was done. Pus was obtained in fourteen out of twenty-one aspirations. There were seven cases, or one-third of the total with proved subphrenic collections, which gave a negative tap. It is our feeling, therefore, that this procedure is of doubtful value. Obviously, if pus is found, the area must be drained. Also, if pus is not found, it does not prove its absence and in the presence of a clinical and x-ray diagnosis of a subphrenic abscess, operation is justified regardless of the tap. We may rightfully ask then what may be accomplished by such a procedure? This procedure is not without danger, as the pleura may be traversed by a contaminated needle. In one case in our series empyema complicated the treatment, due either to the tap or to the transpleural drainage. Fortunately this case survived. Fluid was demonstrated in the pleural cavity by x-ray or was found at the time of the first-stage transpleural operation in ten of our cases. The presence of fluid in the chest probably explains the frequency in the x-ray of haze or of an increased density of the lung field. In fact, it is quite likely that the x-ray appearance of the overlying lung is due to pleural fluid accumulation and not to an actual edema or inflammatory reaction in the parenchyma of the lung itself. Our experience in regard to the presence of pleural fluid, therefore, is contrary to that of Ochsner and Graves.<sup>7</sup> We agree with Clute<sup>14</sup> and Beyer<sup>8</sup> who found that pleural effusion is one of the frequent and often is an early sign of the development of a subphrenic abscess.

#### RESULTS

Every patient who had a diagnosis of subphrenic abscess, no matter what other condition was present, has been included in this report. In reviewing the cases, it was found that eight deaths occurred. From an analysis of these cases, it was found that none died primarily of the subphrenic condition per se. One patient entered in a moribund condition and was not operated. Of the seven others all died of the primary condition which originally gave them their subphrenic abscess. In six of the seven cases, autopsy established this fact. For instance, in case twenty-three, a complete gastrectomy was done and a leak of the gastro-esophageal suture line occurred. The patient developed a left-sided subphrenic abscess, as well as a mediastinal infection and died of generalized sepsis. It is, therefore, difficult to appraise such a series of cases and determine to what extent the development of the subphrenic abscesses had to do with the deaths.

There can be little doubt, however, that the

presence of a collection of pus in such a location contributed to the high mortality in this group. If we are to be self-critical in regard to the management of these patients, it might be said that the period of time between the onset of complicating signs and the institution of drainage was too long. All of the so-called cardinal signs of such a collection need not be present to warrant exploration of this space. Evidence of sepsis following an abdominal operation with out discovery of a cause elsewhere together with a unilateral elevation of the diaphragm with varying degrees of haziness of the lung field above should be enough. Exploration subpleurally or transpleurally can be done under local anesthesia with slight risk. The early and adequate drainage of a subphrenic abscess will be an important contributing factor in securing a lower mortality rate in patients with subphrenic infections.

## SUMMARY

- 1 Subphrenic abscess as a complication of abdominal disease has been discussed
- 2 Etiological factors and pathways of spread have been considered
- 3 Diagnostic procedures have been commented on

- 4 The influence of a negative pressure in the upper abdomen and of the sucking action of costal and diaphragmatic action upon the formation of collections in this area has been pointed out
- 5 A brief report of experiences with twenty-five proved cases has been given

## REFERENCES

- 1 Barlow. London Med. Gaz. (May) 1846. Quoted by Lockwood A. I.: Subdiaphragmatic abscess. Surg. Gynec. & Obst. 23:502 (Nov.) 1911
- 2 von Leyden: Ueber Pyomyoma th. rax subphrenicus. Zeitsch. f. Klin. Med. 1:20 1850
- 3 Barnard H. L.: Surgical aspects of subphrenic abscess. Brit. M. J. 1:1271 and 4:9 1903
- 4 Fifield, L. R. and Love, R. J. McN.: Subphrenic abscess. Brit. J. Surg. 13:653 (April) 1916
- 5 Elkin, D. C.: Subphrenic abscess. J. A. M. A. 97:179 (Oct. 21) 1921
- 6 Beyer H. L.: Thoracic complications of subdiaphragmatic infection. J. Thoracic Surg. 1:655 (Aug.) 1922
- 7 Ochsen A. and Graves A. M.: Subphrenic abscess. Ann. Surg. 98:191 (Dec.) 1933
- 8 von Volkman: Quoted by Lockwood. See Reference 1
- 9 Quoted by Ochsen and Graves. See Reference 7
- 10 Ochsen A.: Subphrenic abscess. Internat. Clin. 2:79 (June) 1921
- 11 Overholt, Richard H.: Intra-peritoneal pressure. Arch. Surg. 23:591 (May) 1921
- 12 Meischner E. and Meischner F.: Über den Intra-peritonealen Druck. Arch. f. klin. Chir. 119:148 1915
- 13 Wagner G. W.: Studies on intra abdominal pressure. Am. J. M. Sc. 171:897 (May) 1916
- 14 Müller G. P., Overholt, R. H. and Pendergrass E. P.: Postoperative pulmonary hyperventilation. Arch. Surg. 19 (Part II) 132 (Dec.) 1919
- 15 Clute, H. M.: Subphrenic abscess after appendicitis. Surg. Clin. No. Am. 6:774 1916

## THE USE OF SODIUM EVIPAL AS AN ANESTHETIC FOR SHORT SURGICAL PROCEDURES\*

BY WALTER E. GARREY, M.D.,† AND ROY B. COHN, M.D.†

THE need for a readily available and less cumbersome anesthetic for short surgical procedures impelled us to try anesthesia with sodium evipal. It is a barbituric acid compound which has now been in use nearly three years as an intravenous anesthetic. It has seemed particularly adaptable to work in the out patient dispensary and emergency room where it chiefly displaces gas-oxygen anesthesia.

## EXPERIENCE ELSEWHERE

The reported clinical experience with this drug is large. There are an extensive number of case reports in the German literature which have been comprehensively summarized in English by Killian<sup>1</sup> of Freiburg. These total 15,000 cases with one death in a woman very ill with puerperal sepsis. Sebening<sup>2</sup> of Frankfurt has reported in English his experience with 200 short surgical anesthetics with sodium evipal. Jarman and Abel have published three articles covering respectively their first hundred, first thousand<sup>3</sup>, and first two thousand<sup>4</sup> cases and the

reader is referred to their articles for a scholarly and comprehensive presentation of the subject. They have extended its use in combination with other drugs to longer anesthesia.

## DOSAGE AND ADMINISTRATION

The drug is dispensed in sterile glass ampoules containing one gram of the powder. For administration this is dissolved in ten cc of sterile distilled water.

A safe maximum dose may be calculated on weight basis by multiplying the patient's weight in pounds by 0.06 to obtain a safe maximum number of cubic centimeters of solution to inject. Thus an adult weighing one hundred and fifty pounds could safely receive a total of nine cc of solution containing 9 Gm of the drug.

We have preferred to use a fractional method of administration injecting three to four cc into the vein at the rate of one cc each fifteen seconds and stopping the administration there when the patient was asleep. We have then left the needle in the vein so that more might be injected if the patient showed any evidence of recovering before the operation was through. It is surprising how often the smaller doses of 2 to 4 Gm of the drug will induce loss of con-

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sciousness for long enough to do the required manipulation and the recovery period is thus shortened to a few moments. This method provides the maximum safety factor in allowing for individual susceptibility and for the fact that the effective dose is not the same for different individuals of the same weight.

The drug is a respiratory depressant. For this reason we have had available at all administrations a tank of oxygen with five per cent carbon dioxide. We have also had on the anesthesia tray coramine (5 cc) for intravenous use and an ampoule of adrenalin. We have not had any occasion to use these. In other clinics temporary but disturbing cessation of respiration has been noted in cases where a preoperative opiate has been given. Although opiates or scopolamine will lengthen the effect of the drug they are not necessary in the type of case most suited to evipal anesthesia. It has seemed to us dangerous to pyramid two known respiratory depressants.

#### PERSONAL EXPERIENCE

One or the other of us has personally administered the anesthesia in 120 cases and observed all the inductions, the maintenance and the majority of recoveries. The following types of cases presented themselves:

- 1 Out-Patient and Emergency Room Cases
  - Incision and drainage of abscesses and carbuncles
  - Incision and drainage of felons, paronychias, septic fingers
  - Extraction of multiple and abscessed teeth
  - Suture of lacerations (children and about face)
  - Reduction of Colles', Potts', nasal and greenstick fractures
  - Forearm fractures, dislocated shoulder and thumb
- 2 In-Patient Cases
  - Drainage of sepsis
    - Peripheral and intraabdominal abscesses
    - Tenosynovitis, etc
  - Neurosurgical
    - Alcohol injection, chiefly of Gasserian ganglion
  - Minor gynecological
    - Cauterization of cervix, dilatation and curettage
    - Uterosalpingograms Drainage of Bartholin's abscess, etc
  - Minor rectal
    - Drainage of perirectal abscesses
    - Excision of strangulated hemorrhoids
    - Excision of anal fistula
    - Painful proctoscopy

Some of the fractures and rectal cases could well have been done with local anesthesia, but it led to the patients greater physical and mental

comfort to be asleep. Sodium evipal anesthesia is not adapted to rectal cases requiring dilatation of the sphincter. It is adequate, however, for removal of external hemorrhoids or simple fistula. In pelvic cases the abdominal muscles may be unrelaxed and a good bimanual examination difficult. Many of the emergency room cases were children and the use of evipal was a very real comfort. The anesthesia was found ideal for the eighteen neurosurgical cases and the ten dental cases. All the patients have liked the anesthesia and many have been very enthusiastic about it, in comparison with previous experience with other anesthetic agents. Our youngest patient was an eight months infant weighing eighteen pounds, given sodium evipal for drainage of a septic tendon sheath of the finger. He had recently recovered from pneumonia and had not taken avertin well on a previous occasion. One tenth of a gram was injected into the external jugular vein for induction and with a total of 0.14 Gm the infant slept soundly for ten minutes of the operation. Our oldest patient was eighty years, and the eight patients of age sixty years or above did well.

(a) Induction and Maintenance. We have noted nothing at variance with other observers. Induction has been dramatically quiet. Between thirty seconds and two minutes after commencing injection the patient, often preceded only by a single yawn, will be in a deep sleep. The pulse remains the same, the blood pressure drops from ten to thirty millimeters systolic. The respirations have always been regular.

We have used minimal doses. The out-patient cases (adult) have received from 2 Gm upwards and have slept from four to ten minutes on these smaller doses. The length of sleep has not been constant but has been not less than eight and usually fifteen minutes for the maximum dose of about one gram.

We have observed the common slight muscular twitching in about one-third of the cases. About one-fifth of the patients have remained somewhat rigid and two very husky foreign men have had no muscular relaxation even with the larger dose.

(b) Recovery. This has been rapid in the minimal dose cases (3-4 Gm) which are often widely awake in from five to ten minutes. Those having larger amounts (8 to 10 Gm) may remain drowsy or mentally foggy for thirty to ninety minutes. If allowed up too soon they complain of vertigo and behave like intoxicated persons. No case has vomited. Several have mentioned nausea, but this has not been common or unpleasant. Two patients, both husky men, were obstreperous during recovery, one for five minutes and another for twenty minutes. None of the others were even unusually restless. The anesthesia was repeated on one of these and he reduplicated his previous obstreperous performance.

The out patient cases have been kept for recovery one or two hours and the rare doubtful case sent home in company with a competent friend or relative.

(c.) **Untoward Reactions** In two cases we observed cyanosis if the jaw was not held for ward and tongue prevented from sagging back. This is most important and, as advocated by Jarman and Abel a person other than the administrator should be at the head of the table to insure a clear airway. There were no other observed circulatory, respiratory, or other complications.

The blood pressure was accurately followed on fifteen patients and consistently fell from twenty to thirty per cent below preoperative level. In the remainder of cases the administrator kept his finger on the radial pulse which did not change perceptibly in quality or rate.

#### CONTRAINDICATIONS

In general we have felt that any anesthetic agent on trial should be used for good risk patients, so sodium evipal has not been used in the case of any very ill or debilitated patient. Because its chief potential danger is that of a respiratory depressant, we should hesitate to use it in anyone already cyanotic or in an asthmatic or decompensated cardiac patient. We have followed the conservative course in avoiding its use in patients with hypertension or severe liver

or renal disease. Allergic reaction is possible and we have seen urticaria and angioneurotic edema after ingestion of evipal by mouth.

#### CONCLUSION

1 Sodium evipal anesthesia seems especially adaptable to brief manipulations that would otherwise require a general anesthetic.

2 The chief advantages are the ease of administration, the rapidity of induction and recovery, the freedom from psychic trauma or unpleasant after-effects.

3 There is considerable variation in individual susceptibility to the drug. For this reason the fractional method of administration is the safest and most satisfactory.

4 Observations in 120 cases are briefly recorded.

5 Until more extended experience with the drug has been obtained its use should be confined to the "good risk" patient.

We are indebted to Dr. H. H. Bradshaw, chief of the anesthesia service of the Massachusetts General Hospital for guidance and advice.

#### REFERENCES

1. Killian, H. New German evipan-sodium anesthesia. *Anesth. & Analg.* 12:117, 7, 1924.
2. Sebenius, W., and Beck, W. C. Short surgical anesthesia with intravenous sodium evipan, new barbiturate. *Anesth. & Analg.* 12:13, 12, 1923.
3. Jarman, R. and Abel, A. L. Evipan as intravenous anesthetic: results of 1,000 cases. *Anesth. & Analg.* 13:470, 1924.
4. Jarman, R. and Abel, A. L. Evipan as an intravenous anesthetic. *Anesth. & Analg.* 14:64 (Mar. Apr.) 1925.

## CYCLOPROPANE, A NEW AND VALUABLE GAS ANESTHETIC\*

BY L. F. SISE, M.D.,† P. D. WOODBRIDGE, M.D.,† AND U. H. EVERSOLE, M.D.†

THE recent introduction of cyclopropane to clinical use by Waters of the University of Wisconsin has given us a very valuable new anesthetic agent of most interesting properties.

#### HISTORY

It had been found that laboratory samples of propylene ( $C_3H_6$ ) possessed excellent anesthetic properties without appreciable toxic action but when larger quantities were manufactured these were found to have a toxic action on the heart. Henderson and Lucas in hunting for the source of this toxic action investigated cyclopropane, an isomer of propylene which frequently appears in its preparation. To their surprise they found that cyclopropane was an excellent and very powerful anesthetic with low toxic action.<sup>1,2</sup> Following this report Waters after some further laboratory investigation, started its clinical use on human be-

ings. The gas has been studied from different angles by various groups of investigators at the University of Wisconsin, and Montreal.

#### PHYSICAL PROPERTIES

Cyclopropane is a hydrocarbon gas with the empirical formula  $C_3H_6$  and is therefore isomeric with propylene. Structurally it is a ring compound.



Its molecular weight is 42.05 and its density as compared with air is 1.46. Thus the undiluted gas tends to drop to the floor somewhat as does ether vapor, the density of which is 2.6, and does not float or so readily diffuse as does ethylene, the density of which is 0.975.

Its fat to water solubility is very high the ratio being given by Henderson and Lucas as 64 to 1 as compared with 13.2 to 1 for ethylene and 2.5 to 1 for ether. This characteristic ex-

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This Week's Issue, page 332.

plans the slowness with which complete saturation and stabilization is obtained

It is an inflammable gas, and is explosive when mixed with certain proportions of air or oxygen. As with other gases the exact limits of explosibility vary widely under different conditions. Thus in breathing bags containing a spark plug it could not be exploded in mixtures below 19 per cent<sup>7</sup>, but in a Hempel explosion pipette it could be exploded in mixtures down to 2½ per cent<sup>1</sup>. Buckman and Wardell of the Ohio Chemical Company give the explosion limits of this gas as determined in the Hempel explosion pipette in per cent by volume as follows<sup>1</sup>

	Lower Limit	Upper Limit
Cyclopropane and air	3 0	8 5
Cyclopropane and oxygen	2 5	50 0

The lower limits are about the same as for ethylene, but the upper limits are considerably less. The important point, however, is that ordinary anesthetic mixtures of cyclopropane (15 per cent) are well within the explosive limits while ordinary anesthetic mixtures of ethylene (80 per cent-85 per cent) are outside its explosive limits.

Care should of course always be exercised when using any inflammable anesthetic agent, but in using cyclopropane, where we know that the anesthetic mixture is not only inflammable but explosive as well, this precaution should be particularly searching and insistent.

The odor is characteristic and not disagreeable. The gas is slightly irritating. This irritation is so slight that in anesthetic dilution it is not noticeable. With the higher concentrations, however, above approximately 50 per cent, laryngospasm may be caused.

The gas liquefies at a lower pressure than does any other of our present anesthetic gases. The tank pressure is about seventy-five pounds as against about 800 pounds for nitrous oxid and 1,250 pounds for ethylene. Present product is said to be about 99½ per cent pure.

#### PHARMACOLOGY

Absorption of the gas by inhalation is quite rapid but saturation and equilibrium are not established with such rapidity as with nitrous oxid or ethylene. Even when a closed system is used the gas disappears from this system with considerable rapidity so that it is necessary to keep adding gas in order to maintain the same concentration in the system<sup>5</sup>. It seems probable that this disappearance of the gas is due to its absorption by the lipoids of the body, for which it has a high affinity. Waters and Schmidt found the concentration with human beings for third stage or surgical anesthesia to be in the first plane 7.4 per cent (but with very wide variation), in the second plane 13.1 per cent (less variation), and in the third plane 23.3

per cent. In this third plane the extreme variations were slight, being from 21.1 per cent to 27 per cent<sup>8</sup>.

Breathing is very quiet, and there is not the initial stage of stimulation seen with nitrous oxid, ethylene or ether. This gives the impression that respiration is depressed, yet there is no decrease in rate or minute volume until beginning intercostal paralysis. All observers agree that breathing ceases well before circulation.

Circulation is well maintained until the beginning of respiratory depression. At this time the blood pressure begins to drop. Cardiac irregularity does not usually appear until respiration is severely affected and about to cease. SeEVERS and MEER have made a study of this with the electrocardiogram in dogs<sup>5</sup>. They found the average concentration of the gas when irregularities appeared to be almost 50 per cent. They found the early irregularities to be nodal rhythm or ventricular extrasystole although partial or complete auriculoventricular block was not uncommon. Later effects consisted of ventricular tachycardia and auricular and ventricular fibrillation. That high concentrations of this gas may have a decidedly toxic action on the heart is shown by the death from circulatory failure of two dogs in this series in spite of the presence of adequate alveolar oxygen. Inflation with pure oxygen failed to effect recovery. The concentration of the gas was 52 per cent in one case and 71 per cent in the other, far above the range for third stage anesthesia.

The metabolic effects of cyclopropane are strikingly few. There is a slight rise in the blood sugar. The pH and the carbon dioxide combining power are affected but very little<sup>2</sup>. There is no effect on liver function<sup>4</sup>.

#### CLINICAL USE

This gas is very expensive. The first lot which we used cost \$1.25 per gallon. The cost has since been gradually reduced to about forty cents per gallon. As ethylene and nitrous oxid cost in the vicinity of two cents per gallon, it can be seen that even this reduced price is still very high, by comparison. If it attains to popular use, however, a further considerable reduction in price will probably occur. This high cost of the gas precludes the employment of any method of use which wastes any of the gas. The carbon dioxide absorption technique described by one of us in this Journal<sup>9</sup> is therefore the only present method adapted to its use. However, the power of the gas is such that it is unnecessary to waste any gas in a washing out process during induction such as is necessary with ethylene or nitrous oxid in order to get the highest possible concentration. These facts make it possible to produce and maintain anesthesia with amazingly small quantities. In the average adult, if the mask is tight fitting and the closed system does not leak, it is usually pos-

sible to produce third stage anesthesia of an hour's duration with approximately a gallon of the gas. In resistant cases two to three gallons may be necessary, and if a leak is present any amount may be used. In a number of cases less than half a gallon has been sufficient. This brings the expense within reasonable limits and well under the cost of gas anesthesia with the older agents and methods.

In selecting a gas machine it must be remembered that this gas is solvent for rubber and rubber compounds. As the seats of reducing valves are commonly made of a rubber compound, this prevents the use of these valves with cyclopropane until such time as a more resisting compound is used. The pin type of valve is therefore best adapted to the use of this gas. As the tank pressure is so much lower than with other gases, this type of valve is much more satisfactory here than it has been with the other gases.

This solvent action of the gas on rubber is not manifest in concentrations sufficiently low to be within the anesthetic range. Thus the ordinary rubber breathing bag, tubing and filter valves may be retained in the gas machine without essential damage.

The procedure at induction is quite different from that with other gases, where large quantities and high concentrations are commonly used. When first using cyclopropane those who are accustomed to the other gases are very apt to overdose the patient, sometimes with alarming results. The high power of the gas must be kept constantly in mind as must also the fact that there is a distinct lag in its effect, not noticeably present with the other gases.

Various methods may be used for induction. We have found the following general scheme satisfactory with minor changes to suit the individual case. A rapid flow of oxygen is started. When the amount in the breathing bag becomes enough to accommodate tidal breathing the mask is placed on the face and the oxygen flow is reduced to the estimated basal requirement, usually 200 to 300 cc. per minute. Cyclopropane is now started at 400 to 700 cc. per minute. This flow is maintained until, usually in about one to two minutes' time, there is loss of lid reflex. The flow is now either reduced to about a third of this amount for perhaps another minute, or is cut off entirely depending on the depth of anesthesia now desired. Thereafter the oxygen flow is regulated to the basal requirement of the patient, and perhaps small amounts of gas are admitted as indicated.

During maintenance we have had considerable difficulty in correctly estimating the depth of anesthesia. This estimation appears to us more difficult with this gas than with any other in halation anesthetic with which we are familiar. In general the signs of depth are similar to those with ether anesthesia and are not difficult

to detect with deepening anesthesia provided the deepening is reasonably slow. In the third or surgical stage of anesthesia, activity of the extra-ocular muscles is maintained in the first plane, and ceases as the second plane is approached, while intercostal activity is maintained in the second plane and ceases as the third plane is approached. If the progress of the anesthesia has not been too rapid, the signs up to this point are not difficult to recognize, but when the desired depth of anesthesia has been obtained it is often most difficult to detect the occurrence of a lightening from this depth. Each of us has on more than one occasion had the embarrassing experience of failing, even with most careful scrutiny, to detect any change in breathing, in eye signs or other phenomena to indicate change in depth till the patient made some obvious sign of lightness like raising the knee!

Experience has of course been a help, for most of these occurrences have been in our early work. Preliminary medication is also quite important as it appears to cloud the signs of anesthesia. These signs are much clearer if little or no premedication has been used.

Thus undetected lightening of anesthesia may be to some extent guarded against by admitting at not too frequent intervals (five to ten minutes) small amounts (about 100 cc.) of the gas. While this is in one way a very unsatisfactory procedure, inasmuch as it does not clear up the signs of anesthesia, yet it is an entirely logical procedure, since we know that stabilization is very slow and that for a considerable period (over an hour) the gas is being lost from the closed system probably to the lipoids of the body. The above procedure replaces this gas which we know is being lost.

Those who begin the use of cyclopropane should bear constantly in mind its great power and its rapidity of action. The effects of the higher concentrations are simply astounding and are unbelievable to those who think in terms of the weaker gases nitrous oxide and ethylene. With these gases our chief warning comes from signs of anoxemia. With cyclopropane on the other hand drastic overdosage takes place in the presence of abundant oxygen. This is a most important point to remember. If too high concentrations of the gas are used the patient passes from one stage of anesthesia to another with such rapidity that the successive stages cannot be recognized and he, therefore, may plunge into extreme overdosage with great rapidity and abruptly cease breathing. Relaxation is such that breathing is easily obstructed. Crowing respiration is here common, and the obstruction may become extreme so rapidly as to constitute an acute emergency. Much preliminary narcotic medication is inadvisable since cyclopropane lacks stimulating properties to offset the narcotic effect. If much preliminary nar



cotic has been used, undue depression or abrupt cessation of breathing may result. The medication may be given with a view to preoperative apprehension only, since anesthesia is satisfactory with no premedication whatever. We, therefore, have discontinued the use of a barbiturate and use only morphine sulphate grains 1/8 and scopolamine hydrobromide grains 1/200 to 1/150.

The possibly deleterious action of this gas on the heart muscle should be kept in mind. Note that in the experimental work of Seevers et al. two dogs died of circulatory disturbance in the presence of adequate oxygen and in spite of artificial respiration. Hence the pulse should always be carefully watched, and the advent of any irregularity or any considerable change in rate in either direction should dictate a prompt lightening of the anesthesia.

#### RECOVERY

Recovery of consciousness is rapid, approximating that from the other gases, but complete desaturation does not take place for several hours. The estimation of postoperative results may be made most accurately from the very careful and painstaking study by Schmidt and Waters<sup>6</sup>, with which our clinical impressions are in accord. In this study 2,200 cases under cyclopropane were compared with a like number under ethylene, nitrous oxid or ether. Schmidt and Waters found: 1. There were fewer respiratory complications under cyclopropane. 2. There was more circulatory damage under cyclopropane. This statement they qualified, feeling that further study is needed. 3. Nausea and emesis were less in major surgery but possibly more in very short and minor operations.

#### USES

The combination of certain properties in cyclopropane make it unique among anesthetic agents. Probably no other agent combines in itself as does cyclopropane speed both in induction and recovery, high oxygen supply during anesthesia, and power to produce a considerable degree of relaxation, together with a minimum of deleterious effects on the various organs and functions of the body. The quiet type of breathing which it produces is also desirable. This combination of properties makes it a very valuable anesthetic agent.

On the other hand its very speed and power make it potent for danger unless these properties are thoroughly appreciated and allowed for, and the cardiac effects in high concentrations should always be borne in mind. The explosibility of anesthetic mixtures of this gas must also be remembered and carefully guarded against. It should, therefore, not be employed where diathermy or x-ray or other high potential electrical equipment is to be used.

Its chief fields of usefulness appear to be as follows:

1 *Chest surgery*. Here the high oxygen supply is a great advantage. These patients almost always have a lowered vital capacity. The position during operation and the release of negative pressure in the chest often put them at a great disadvantage in breathing. The power of the anesthetic is of value in overcoming the marked reflexes which often arise from stimulation of the pleura. The quiet breathing is a help to the surgeon in his work, and rapid recovery of cough reflex is valuable.

2 *Respiratory obstruction*. Here the high oxygen supply is also of value. Where practical we have always used intratracheal anesthesia in these cases. The power to relax the jaw and larynx makes cyclopropane one of the best agents for intubation.

3 *Marked anemias*. The advantage of the high oxygen supply is here obvious.

4 *Cardiac cases*. Here again the high oxygen supply appears advantageous, especially where decompensation is present. Because of its deleterious action on the heart muscle, however, its value here is subject to qualification. This deleterious action, however, has been definitely shown only in comparatively high concentrations. In the weaker anesthetic mixtures it has not been shown and clinically does not appear to be present. If, therefore, the contemplated operation demands considerable depth, cyclopropane might not be so advantageous as some other anesthetic. But in all other cases, where marked depth is not necessary, it is our clinical impression that the high oxygen supply, the quiet breathing, and the comparative lack of stimulation to the pulse and blood pressure more than compensate for the possibility of deleterious action. Further experience and study are necessary, however, before more definite statements can be made.

5 *States of marked debility and shock*. The advantages and qualifications are very similar here to those already discussed for cardiac cases.

6 *Short procedures where a moderate amount of relaxation is desirable*. This would include, for example, pelvic examinations, simple reduction of fractures (but not in x-ray room) and manipulation of joints.

7 *Possibly abdominal operations*. Our own experience in this field is too limited to hazard an opinion. From the experience of some others, however, it would seem probable that those surgeons who have been accustomed to operating under nitrous oxid or ethylene would find the increased relaxation of cyclopropane very gratifying, while those who are used to the relaxation of spinal anesthesia would not be so enthused.

8 *As an adjuvant to other anesthetics* With patients who are resistant to ethylene the addition of a comparatively small amount of cyclopropane to the mixture will almost always result quickly in the attainment of a satisfactory plane of anesthesia, and at the same time make possible an adequate supply of oxygen. The change wrought in these cases is most gratifying. It should be remembered, however, that if more than a small amount of cyclopropane is added, a considerable amount of oxygen will also have to be added. The proportion which the oxygen will then hold to the two inflammable gases, ethylene and cyclopropane, will probably be such as to place the resulting mixture well within the explosive range, whereas an anesthetic mixture of oxygen and ethylene alone is usually entirely outside the explosive range. But, if the cyclopropane added is only just sufficient to produce the desired effect the oxygen supply may still probably be kept down sufficiently to keep the mixture outside the explosive range.

If instead of ethylene nitrous oxide is being used, the addition of more than a very small amount of cyclopropane even without increased oxygen supply will, because of the oxidizing

power of nitrous oxide, place the mixture within the explosive limits, just as is the case when ether is added to nitrous oxide mixtures.

Tables 1, 2, and 3 are compiled from a series of our cases taken in succession without selection. It includes cases of straight cyclopropane anesthesia only, not any cases in which other anesthetics were used in combination.

In these statistics the most noticeable fact is the large number of chest operations (124 out of 184 operations). This appears to us the field to which cyclopropane is most suited.

Of the seven deaths, it does not seem possible that cyclopropane was directly responsible in any case. It is conceivable that it may have been one of the factors involved in cases 4, 5 and 6. That any other anesthetic would have been better in these cases seems doubtful.

The number of cases showing mucus cough, grunting spasm and poor respiration does not seem remarkable in view of the large number of chest cases. The number recorded as showing obstruction and probably those in which depth of anesthesia was not correctly gauged seem less than actually occurred. Some cases doubtless were not recorded. The cases of cardiac irregularity are of interest, but the number does

TABLE 1  
OPERATIONS

Thoracoplasty	117
Thoracotomy	2
Pneumonectomy	2
Lobectomy	1
Extrapleural pack	1
Partial excision pericardium	1
Thyroid operations (includes 4 total thyroidectomies)	32
Manipulations	4
Closure colostomy opening	3
Breast operations	1
Adrenalectomy	3
Miscellaneous (1 each)	10
	184

TABLE 3

Carbon dioxide absorption (all cases)	184
Intratracheal	21
Poor induction	11
Poor maintenance	19
Poor respiration (depressed irregular or jerky)	9
Spasm or stridor	7
Auricular fibrillation	1
Extra systoles	3
Pulsus bigeminus (possibly pulsus alternans)	3
Dropped beats	1
Tachycardia	1
Shock	1
Cyanosis	2
Grunting (all in thoracoplasties)	12
Bleeding more than usual	3

TABLE 2

## DEATHS

Number of Cases 184  
Deaths 7

Risk of Operation (Graded 1-4)	Operation	Time of Death After Operation	Cause of Death
1 Grade 2	Thoracoplasty	10 days	Postoperative empyema
2 Grade 3	Extra pleural pack	13 days	Pulmonary hemorrhage
3 Grade 3	Thoracotomy (carcinoma of lung)	Immediate (on table)	Air embolism (confirmed at autopsy)
4 Grade 2	Pneumonectomy	4 days	Pneumonia in other lung
5 Grade 4	Thoracoplasty	26 days	Pulmonary tuberculosis (gradual failure)
6 Grade 3	Closure colostomy opening (carcinoma rectum)	20 days	Heart failure (coronary sclerosis)
7 Grade 4	Adrenalectomy	13 days	Intestinal hemorrhage

not seem unduly large This whole group did perfectly well otherwise except the case of dropped beats This was case 1 of the deaths

#### SUMMARY

Cyclopropane is a hydrocarbon anesthetic gas of great power, giving adequate anesthesia with concentrations in the vicinity of fifteen per cent Its power and rapidity of action are of potential danger if it is carelessly used In high concentrations it may have a deleterious action on the heart Anesthetic mixtures are within the explosive range The high percentages of oxygen which can be used with it make it of great value in chest surgery, respiratory obstruction, and some other conditions Because it apparently combines low toxicity with fairly powerful anesthetic action it could conceivably encroach on the fields of virtually all the other commonly used anesthetic agents

#### REFERENCES

- 1 Buckman M. A (BS) and Wardell C. H., Jr (Ph B) Bulletin 112 Research Laboratory Ohio Chem and Mfg. Co
- 2 Henderson V. E and Lucas G. H. W Cyclopropane new anesthetic. *Anesth & Analg* 9 1 (Jan.-Feb) 1930
- 3 Lucas G. H. W and Henderson V. E New anesthetic gas cyclopropane preliminary report. *Canad. M. A. J* 21 173 (Aug) 1929
- 4 Raglinsky B. B and Bourne W Effects of cyclopropane on normal and impaired liver *Canad. M. A. J* 31 500 (Nov) 1934
- 5 SeEVERS M. H. Meek, W. J. Rovenstine E. A. and Stiles J. A Study of cyclopropane anesthesia with special reference to gas concentrations respiratory and electrocardiographic changes *J Pharmacol & Exper Therap* 51 1 (May) 1934
- 6 Schmidt, E. R. and Waters R. M. Cyclopropane anesthesia postoperative morbidity in 2200 cases *Anesth & Analg* 14 1 (Jan.-Feb) 1935
- 7 Stiles J. A. Neff W. B. Rovenstine E. A. and Waters R. M. Cyclopropane as anesthetic agent preliminary clinical report. *Anesth & Analg* 13 56 (Mar-Apr) 1934
- 8 Waters R. M. and Schmidt E. R. Cyclopropane anesthesia *J. A. M. A* 103 975 (Sept 29) 1934
- 9 Woodbridge P. D. Better gas anesthesia carbon dioxide absorption method *New Eng J Med* 208 682 (March 23) 1933

## THE MANAGEMENT OF ROENTGEN SICKNESS\*

BY GEORGE W. HOLMES, M.D.,† AND FRANCIS T. HUNTER, M.D.†

WITH the more generalized use of the Roentgen ray in the treatment of neoplastic diseases, particularly with the development of the massive dose technique, the prevention and treatment of so called "Roentgen sickness" have become of increasing importance In the past few years the subject has received considerable attention, many theories have been advanced to explain the phenomenon and an equal number of methods of treatment have been advocated With the exception of the suggestion made by Pfahler, in 1916, that unpleasant odors in the treatment room may play a part in causing the sickness, none of the various theories have been generally accepted

At the Massachusetts General Hospital, in the last few years, we have gradually developed a routine management which we believe has definitely decreased the amount of sickness and which offers some alleviation of symptoms when they do occur In our study of the problem it soon became apparent that there are, roughly, three types of sickness seen in patients undergoing Roentgen treatment First, there is that group of cases which we have termed "toxic sickness", which shows marked nausea and vomiting following heavy doses of x-ray therapy over large masses of tumor tissue and which, being extremely sensitive to irradiation, rapidly break down and are absorbed during the course of treatment This form of sickness is fairly well recognized and is, possibly, a toxemic phenomenon produced by the extra work thrown upon the liver in its effort to detoxify and

deaminize partially split proteins The obvious method of avoiding the symptoms of nausea and vomiting in such cases is to adjust the dosage to such a small amount that rapid breakdown of tissue does not occur The second group we have classified as "psychic sickness" and this phenomenon occurs in patients who have been previously made sick by exposure to some form of irradiation, or occasionally in high-strung, nervous individuals who have been told by well meaning friends or nurses that x-ray treatment always produces sickness Nausea or vomiting or both, usually occur in this group either while they are being treated or very shortly afterwards, and they belong to the group which complain of odors in the treatment room, of which Dr Pfahler has written The third group is by far the most important and may be called "true Roentgen sickness" The cause of this is not known with any certainty, but there is some evidence which points to temporary interference of liver function by heavy irradiation It is this group that we particularly wish to discuss

It is well known that the severity of the general reaction—that is, the proneness to develop anorexia, nausea or vomiting after irradiation—depends upon the size of the area and the part of the body treated, the amount of irradiation given at any one sitting, and the frequency with which the dose is repeated It is also generally accepted that treatment over the abdomen or thorax is more likely to produce sickness than irradiation over other parts of the body There appears to be some relation, too, between the severity of the reaction and the nearness of the treated area to the liver If one groups the symptoms of Roentgen sickness and compares them with the symptoms seen in certain diseases which are known to impair the

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function of the liver, there is a striking similarity. For example, in catarrhal jaundice and in Roentgen sickness the earliest complaint is that of fatigue, then loss of appetite, anorexia, and finally, vomiting. That inhibition of function occurs after irradiation is generally accepted. This is particularly true of the glandular structures of the body, a well known example being the effect of irradiation on the parotid gland. The dose necessary to produce such inhibition of function is not large and hence it seems reasonable to assume that irradiation over the thorax or abdomen may temporarily inhibit liver function. It is also well recognized that an increase of carbohydrates in the diet or the use of glucose intravenously relieves, to some extent, the distressing symptoms often seen in acute impairment of liver function due to disease. It is largely on this assumption that we have adopted our routine of management of x ray sickness.

(1) *The management of "Toxic Sickness"*  
The management of this group of cases seems obvious. The treatment consists in avoidance of large amounts of irradiation at any one time, particularly in cases with radiosensitive tumors. The initial dose should be quite small and every effort should be made to avoid a rapid breakdown of the tumor mass and the consequent rapid absorption of protein material by carefully regulating the daily dosage. Should very rapid absorption occur, on occasion true anaphylactic shock may take place, e.g., pulmonary edema, and the usual treatment for anaphylactic shock is indicated. When the symptoms seem to be more definitely those of toxemia, such as fever, leucocytosis, etc., stimulation of elimination, supportive treatment, fluid rest, and at times, intravenous glucose may be used to advantage.

(2) *The management of "Psychic Sickness"*  
In this type of sickness prophylaxis is, again, more important than treatment. We do not believe that this type of sickness occurs except in persons who have previously been made sick by irradiation. If this assumption is correct, this type of sickness could be completely eliminated by careful dosage and proper selection of cases. If, however, it does occur and becomes unmanageable, it is at times even advisable to transfer the patient to another clinic, or to use a different form of irradiation such as radium, rather than high voltage x ray. Clinically this type, as we have noted before is characterized by rapid development of symptoms after or during treatment. In these cases the therapy should be given in the shortest possible time. It is surprising that in this group, as well as in true Roentgen sickness, the symptoms do not depend entirely upon the size of the dose given. Doubling the dose may not appreciably increase

the severity of the nausea or vomiting. In some cases of this type we have found it advisable to keep the patient under morphine and scopolamine, and to give intravenous glucose by the constant drip method, completing the entire treatment within forty-eight hours. Recovery from the sickness does not appear to be prolonged and it may be much easier for the patient than to be permitted to have anorexia over a longer period of time. As Pfahler has pointed out, this group of cases is very susceptible to odors which may be present in the treatment room. These odors may be minimized by using equipment so constructed that the tube and high tension wires are outside the room in which the treatment is given. In spite of these precautions, however, they are not always completely eliminated. When such a patient complains it is at times advisable to have him report early in the day, for even with the best equipment, after some hours of continued use there will usually be some odor present.

(3) *The management of "True Roentgen Sickness"*  
If it is assumed that "true Roentgen sickness" is related to temporary disturbance of liver function by irradiation, there are certain routine measures which may be taken which may either prevent, lessen, or eliminate this form of sickness. Those patients who have recently undergone a major operation, those who have been for any other reason on a restricted diet, and those who are already nauseated from their disease are almost certain to develop "true Roentgen sickness." The condition of these patients should be improved as much as possible before beginning treatment. It is better to wait, after operation, until the patient is again on a normal régime, is taking liquids freely, and is able to take a reasonable amount of nourishing food. It must be borne in mind that particularly in cases which have had abdominal operations, nausea and vomiting may be caused by subacute intestinal obstruction, and it is obvious that under such circumstances irradiation should not be begun until the abdominal condition has been surgically cared for.

In all types of sickness particularly in "true Roentgen sickness" where heavy, prolonged treatment is planned the carbohydrate intake should be increased. If possible, this should be begun two or three days before irradiation therapy is started. We have found that if a high carbohydrate diet is prescribed and the patient is given candy between meals and fruit juices sweetened with extra amounts of lactose, many patients may go through their treatment without any nausea or anorexia. If unable to take foods by mouth, at times we have given glucose intravenously before and during the treatment. The usual amount is 1500 cc. of five per cent glucose given twice a day by the intravenous drip method. The results with

this type of management have not been constant, but a sufficient number of cases have responded well enough to make us feel that it is of considerable value. In addition to the carbohydrate intake, it is important to keep the bowels moving daily, and to insure a good night's sleep, even if the use of sedatives is required. It has been our experience that when the cases are properly selected, carefully prepared for treatment, the proper dose prescribed to correspond with the patient's condition and with the size and location of the area treated, and a forced

carbohydrate intake maintained "true Roentgen sickness" rarely develops and we are able to carry most cases through their series of treatments without discomfort.

#### CONCLUSIONS

- 1 There appear to be three distinct types of Roentgen sickness (a) "toxic sickness", (b) "psychic sickness", and, (c) "true Roentgen sickness"
- 2 The prophylaxis and management of these three types of treatment have been discussed

## VORHEES BAG IN THE TREATMENT OF PLACENTA PREVIA\*

BY MEINOLPH V KAPPIUS M D I

A STATISTICAL study has been made of all of the cases of placenta previa treated with Vorhees Bag at the Boston Lying-In Hospital during the period beginning with January, 1916 and ending with January, 1934. It was undertaken primarily for the purpose of affording comparisons between this and other methods of treatment for the same condition as carried out contemporaneously in the same institution, notably Braxton Hicks version alone or in conjunction with bagging, and Caesarean section.

This series includes 120 patients. Of these, nineteen had a complete previa, thirty-four partial and sixty-seven marginal. With few exceptions all of these patients were treated in a more or less routine manner on admission to the hospital. They were prepared for vaginal examination and under an anesthetic the finger of the examining hand was passed through the cervix and the inside of the lower uterine segment explored. There are, however, sufficient incidences of patients having been previously examined vaginally without inserting the finger through the internal os or rectally, and the presence of a placenta previa overlooked, to make it appear obvious that such an examination is not only misleading, but dangerous to the mother and child. That a serious hemorrhage was not precipitated reflects upon either the gentleness or inadequacy of the examination, or both. One patient early in the series who had two such examinations in the Out-Patient Department was later admitted to the hospital in poor condition following a third attack of bleeding, the last a profuse hemorrhage.

Only two patients were admitted with vaginal packs, yet all but thirteen patients were in good condition on admission and in only one was there profuse bleeding. Aside from its inade-

quacy, this would indicate the lack of need for such packing, with its probability of contamination, if patients are promptly hospitalized and then examined after any abnormal bleeding in the latter months of pregnancy.

Although dealing with patients varying in duration of pregnancy from five months to term, in only five instances is the cervix described as being closed, but in spite of this, it evidently admitted the examining finger sufficiently for diagnostic purposes. In the majority of cases the cervix was dilated two fingers or more, sufficient for the performance of a Braxton Hicks version if such method of treatment had been elected.

Bags varying in size from three to six inches in diameter were used, the larger sizes predominating. It is of interest that in the eighty-eight cases so recorded, the bag was inserted extra-ovularly fifty-two times, intra-ovularly thirty-eight times. There is nothing to indicate that the method of insertion influences either the blood loss incident to the bagging or thereafter. Bleeding is usually well controlled, as indicated by the relatively small number of transfusions before delivery—a total of six—especially when it is recalled that thirteen patients were in only fair condition on admission.

A rather unexpected finding is that the length of time until expulsion of the bag was forty-eight minutes less when the bag was placed outside of the ovum rather than inside, five hours and thirteen minutes as compared with six hours and one minute respectively. However, since the bag was removed slightly more than twice as frequently when the membranes had been previously ruptured or the placenta perforated, it seems probable that labor was progressing unsatisfactorily or, as happened twice, bleeding was inadequately controlled. It is also to be noted, in determining a choice of methods, that of the seventeen patients who bled after the bag came out or was removed thirteen had had an extra-ovular insertion. Incidentally, of the forty

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stillbirths of all weights, twenty six occurred with an extra-ovular and only fourteen with an intra-ovular insertion.

#### TYPE OF DELIVERY

As shown by table 1, there were three sets of twins and one patient died intra partum mak

TABLE 1  
TYPE OF DELIVERY

Method	Type of Previa			Total
	Complete	Partial	Marginal	
Normal	0	3	22	25
Forceps	0	1	11	12
Breech Extraction	5	6	6	17
Braxton Hicks Version	4	4	2	10
Version and Extraction	11	21	28	58
Total	20	35	67	122

Includes 3 pairs of twins (1 patient died, under 1)

ing a total of 122 babies delivered. The preponderance of deliveries by version and extraction is noteworthy. It encourages three inferences (1) that labor was artificially terminated because of fear of hemorrhage, (2) that actual hemorrhage made delivery desirable or imperative (3) that the baby was, or appeared to be, in jeopardy. It is difficult to obtain statistical evidence regarding the actual degree of dilatation of the cervix when the bag was expelled but it is recorded sufficiently often in this series to leave little doubt but that a large number of babies were delivered before the cervix was completely dilated, if such terms as, 'almost fully' or 'full dilatation' are assigned their proper meaning. This has an important bearing on the fetal as well as maternal mortality and is a direct criticism of this form of treatment.

#### FETAL MORTALITY

Since the treatment in placenta previa consists in termination of the pregnancy irrespective of its duration any study of fetal mortality, to be of comparative statistical worth must of necessity consider not only the mortality in gross, but on a defined corrected basis as well, which requires also an analysis of results in different weight groups. A certain number of patients enter the hospital with dead babies. Some babies are obviously nonviable or present developmental deformities inconsistent with extra uterine life. It is inaccurate for statistical purposes to determine nonviability by arbitrary standards, as occasionally a small baby survives. This applies to a 2 lb 7 oz. baby in this series. For practical purposes, however and as a guide to treatment, a baby under 4 lbs deserves little consideration. To overcome the above difficulty, the fetal mortality has been computed separately for the different weight

groups and this permits comparison with the fetal mortality for a large series of babies delivered by all methods in the same hospital over a like period of years.

TABLE 2  
FETAL MORTALITY

Weight of Baby	Central	Partial	Marginal	Total	General for B. L. H.
Under 3	100%	100%	80%	90%	88%
3-4 lbs.	100%	100%	71.4%	83.3%	44%
4-5 lbs.	—	66.6%	62.5%	63.5%	5%
5-6 lbs.	66.6%	50%	33.3%	40.0%	3%
Under 4	100%	100%	75%	83.1%	—
Over 4	50%	33.3%	21.1%	43.6%	—
Over 5	44.4%	27.5%	14.2%	21.8%	12%
All Babies	64.3%	53.3%	33.9%	52.8%	12%

The figures as shown in table 2 are entirely on a corrected basis, monstrosities and babies in whom fetal heart sounds were poor or inaudible on admission having been excluded.

It is to be noted that up to 4 lbs, 83.1 per cent of the babies were lost and this constitutes 34 per cent of the entire series of babies, hence different standards for the comparison would appreciably affect the fetal mortality as reported.

A comparison of the fetal mortality in babies of varying weights with that of similar groups for the entire hospital series indicates a striking discrepancy. Is the high figure in the former largely attributable to the type of delivery or to the underlying complication of pregnancy? There is clinical evidence to conclude that small babies in particular who have been subjected to maternal hemorrhage have a high death rate irrespective of the type of delivery. Yet, it seems reasonable that a certain number of these smaller babies, and most of the larger ones, could be saved by Caesarean section.

To determine the accuracy of this assumption a comparative analysis has been made of the fetal mortality in placenta previa when treated by Caesarean section<sup>1</sup> in contrast to Braxton Hicks version<sup>2</sup>, and Vorhees Bag. In a few cases the last two methods were combined (Table 3). In arriving at the corrected mor

TABLE 3  
COMPARATIVE TOTAL MORTALITY

Method of Delivery	Caesarean Section	Braxton Hicks Version	Vorhees Bag
Total No. Patients	62	71	120
Total No. Babies	63	73	123
Total Babies Lost	12	65	65
Gross Mortality	14.2%	89.8%	52.8%
Corrected Mortality	3.7%	70.0%	43.6%

tality the following babies were excluded (1) monstrosities, (2) babies who died weighing

less than 4 lbs, (3) babies in whom the fetal heart sounds were missing or of poor quality when treatment was instituted. The advantage to the baby of Caesarean section is obvious.

#### MATERNAL MORBIDITY AND MORTALITY

Twenty-four and one-tenth per cent of all the patients had a febrile convalescence (Table 4). This is comparable to figures obtained

TABLE 4  
MATERNAL MORBIDITY

Type of Previa	No of Patients	No Febrile	% Febrile
Marginal	65	11	17.0
Partial	32	9	28.1
Complete	17	8	47.1
Total	114*	28	24.5

\*Does not include 6 patients who died intra-partum

in the same institution for Braxton Hicks version and Caesarean section in placenta previa. Of the complete previas, however, 47 per cent had a temperature of 100.4 or more for at least two days following delivery.

There was a total of eight maternal deaths in this series, a mortality rate of 6.6 per cent. It is significant that the deaths show no striking predilection to parity, type of previa or method of delivery (Table 5). One patient

TABLE 5  
MATERNAL MORTALITY

No	Para	Type of Previa	Method of Delivery	Cause of Death
1	9	Complete	Version and Extraction	Shock and Hemorrhage
2	1	"	Version and Extraction	Hemorrhage
3	8	Partial	Version and Extraction	Sepsis
4	4	"	Version and Extraction	Shock and Hemorrhage
5	9	"	Braxton Hicks Version	Shock and Hemorrhage
6	4	Marginal	Version and Extraction	Shock and Hemorrhage
7	4	"	Undelivered	Coronary Embolus
8	17	"	Braxton Hicks Version	Sepsis

died undelivered. She was admitted in good condition and at no time was there undue bleeding. No autopsy was obtained but the death was characteristic of coronary embolism.

Of the remaining seven, five died of hemorrhage, or shock and hemorrhage, and two of sepsis. Three of the former entered the hospital in relatively poor condition due to loss of blood. All five of the patients died within

five hours of delivery. In four, delivery was effected by version and extraction, in the fifth by breech extraction. Two patients in this group sustained lacerations of the cervix, which required suturing, two were examined for tears of the cervix and lower uterine segment but none found, while no mention is made of the other.

Of the two patients who died from sepsis, one had had two vaginal examinations under decidedly questionable conditions before admission to the hospital. The other was a patient who was admitted for bleeding of a slight amount and on examination a marginal previa was felt but no attempt was made to initiate labor. Two days later, the patient having slight pains without progress, a No. 4 bag was inserted, which was expelled the next morning. Evidently no further progress was made as a Braxton Hicks version followed by slow extraction was done. Considerable foul smelling lochia was noted and patient had a chill after delivery. The baby weighed 9 lbs 11½ ozs and was stillborn, the fetal heart disappearing a few hours before the bag was expelled. The patient died on the eighth day following a septic metritis, septicemia with abscess of the lung and embolic pneumonia.

Both of the deaths from sepsis occurred in patients having incomplete previas, whereas, all of the deaths in the complete previa group were due to shock and hemorrhage. This is comparable with Depken's<sup>3</sup> statistics, which, in a series of 204 placenta previas, 114 of which were delivered with Vorhees Bag, show deaths in the central previa group as due to hemorrhage in eight and sepsis in one, whereas, in the incomplete previa group eight deaths were caused by a sepsis and two by hemorrhage.

#### SUMMARY

In a series of 120 patients with placenta previa, eight mothers died, five from shock and hemorrhage, two from sepsis and one from coronary embolism, a maternal mortality of 6.6 per cent. Twenty-four and five-tenths per cent of the patients had a febrile convalescence. The fetal mortality for all babies who had good fetal heart sounds on admission (exclusive of 2 monstrosities) was 52.8 per cent and for all such babies over 4 lbs, 43.6 per cent.

#### CONCLUSIONS

The high fetal mortality among viable babies indicates that the use of the Vorhees Bag should not be the method of choice when dealing with a live viable baby. This applies equally to premature, immature and full-term babies irrespective of the type of previa.

The 24.5 per cent morbidity, as compared with 5 per cent for all patients in the hospital, indicates the much greater susceptibility of patients

with placenta previa to infection and the two deaths from sepsis emphasize its relative importance in contributing to maternal mortality in this condition.

A comparison between the results following the use of the bag and those obtained by Braxton Hicks version alone or following the bag and Caesarean section, emphasizes suggestions for treatment previously outlined by Irving<sup>1</sup> and crystallizes the opinion that instead of allowing the type of previa encountered on examination to determine the method of treatment, all cases of placenta previa might better be considered as a group, all manifesting varying degrees of the same condition and the considerations determining treatment be limited to the condition of the patient and the baby on admission to the hospital, or when treatment can be instituted.

On such a basis the babies would fall into two groups (1) fetal heart sounds poor or absent or estimated weight of the baby less than 4 lbs (for practicable purposes non viable) (2) a living baby, weighing over 4 lbs.

The mothers can be subdivided into three groups (1) those in good condition, (2) those in poor condition due to loss of blood, (3) those potentially infected.

Mothers in good condition with a living viable baby should be subjected to Caesarean section in the interests of the baby, those with a dead

or non viable baby can be delivered through the pelvis by Braxton Hicks version if the cervix is two fingers dilated (rather than waiting for spontaneous expulsion of the bag and possible hemorrhage), then spontaneous delivery.

Patients in poor condition due to loss of blood are preferably delivered by Braxton Hicks version, or bagging or Braxton Hicks version, as it entails less shock than Caesarean section, permits a more effective method of controlling immediate blood loss and allows for an interval during which the patient's general condition can be improved by transfusion and other supportive treatment. The baby under such circumstances is not likely to survive, irrespective of the method of delivery.

This leaves for consideration the potentially infected patient who enters the hospital with a vaginal pack inserted under questionable conditions or following vaginal examinations carelessly made. Irrespective of the condition of the baby or type of previa the interests of this patient are best served by a Caesarean section followed by hysterectomy.

#### REFERENCES

1. Kellogg, F. S. Placenta previa. *New Eng. J. Med.* 203 1-91 (Dec. 14) 1933.
- Irving, F. C. Personal communication.
2. Depken Hermann. Die Behandlung der Placenta praevia. *Zentralbl. f. Gynäk.* 48:281 1924.
3. Irving, F. C. Problems in placenta praevia. *Surg. Gynec. Obst.* 45:224 1927.

## FRACTURE OF THE EPIPHYSIS OF THE LESSER TROCHANTER OF THE FEMUR

BY SETH M. FITCHET, M.D.\*

**F**RACTURE of the lesser trochanter of the femur is a relatively rare condition or else rarely noted or reported.

King<sup>1</sup> was able to collect but sixty one cases from the literature. To these sixty-one cases, King adds one case of his own. The end results are known in fifty cases. Of these fifty cases, four died of other causes. Of the forty-six remaining cases in this series of fracture all recovered fully irrespective of the varied methods of treatment employed.

#### REPORT OF A CASE

**History.** A boy fourteen years of age was making a standing high jump. He is not sure how he took off for the jump but believes he landed first on his right foot and with his body hyperextended at the hips. As he landed he felt a sharp pain which he localized chiefly on the lateral aspect of his right thigh in the lower third. He fell to the floor in pain. He was assisted to his feet and was able to

walk with assistance but complaining of pain still localized chiefly over the lateral lower third of his thigh.

**Physical Examination.** He was seen that night but examination was not satisfactory because of extreme apprehension on the part of the boy. Flexion of the thigh while supine was possible actively and passively to about forty-five degrees without undue complaint of pain. Beyond that point he could not go because of pain referred to the lateral aspect of the lower one-third of his thigh. While sitting with his legs over the side of the bed he complained of pain in the same region and could not flex further (Ludloff's sign). Internal and external rotation were possible but painful. There was moderate spasm of quadriceps and adductor group of muscles. Abduction was resisted. Tenderness over all of the thigh was complained of but was believed to be due to his apprehension since there was no localization. There was no swelling or discoloration. The left side was normal.

Fracture of the lesser trochanter was not suspected. No rupture of muscle could be made out. "Pulled groin" appeared to be the probable diagnosis but did not satisfactorily explain the pain referred to the lateral aspect of the lower one-third of the thigh.

X-ray examination of the entire femur showed

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a fracture and displacement of the lesser trochanter, typically upward and medially, and no other pathology

*Treatment* A hip spica plaster cast was applied with the hip flexed at about thirty five degrees, neutral as to abduction and adduction, and extending only to the level of the patella

Exercises of the foot and leg and "setting" exercises of the muscles of the thigh were instituted at once and continued until the plaster spica was removed after being on for four weeks

As soon as he had regained his balance he began to get about on crutches. Crutches were used for one week, a cane for an additional week, and then he was permitted to resume normal activities

The x rays show the separation of the epiphysis



and a satisfactory bony union two months after the injury

The anatomy involved needs no comment except to remember that the powerful iliopsoas

muscle has its principal insertion into the lesser trochanter and at times must exert a very powerful pull on this insertion

Fracture of this epiphysis most frequently occurs between the ages of twelve and seventeen, before the epiphysis becomes united by bony union with the femur

In all the cases except two, or possibly three, studied by King, the injury was in males. Usually it occurs during sudden hyperextension of the trunk on the thighs during some athletic activity. Since girls are taking a more active part in athletics, it is quite possible that the girls will show an increasing incidence of this injury as time goes on

#### SUMMARY

- 1 A typical case of fracture of the lesser trochanter of the femur is reported
- 2 The injury is correctly termed an "athletic injury" occurring primarily in children before the age of bony union of the lesser trochanter with the femur
- 3 Diagnosis may be confused with "pulled groin" and entirely overlooked because of nerve distribution referring the chief complaint at a distance to the injury
- 4 X-ray shows a characteristic displacement in the direction of the pull of the iliopsoas muscle, which is, of course, the displacement factor
- 5 Because a small part of the combined tendon of the iliopsoas inserts into the shaft of the femur below the lesser trochanter, this displacement is limited in extent, since we have no evidence that this insertion is pulled off when the lesser trochanter is fractured
- 6 The epiphysis will reunite no matter what treatment is instituted, or none, even though the epiphysis appears widely separated
- 7 A logical treatment appears to be that of treatment of a fracture, immobilization in a plaster hip spica, in moderate flexion, neutral as to abduction and adduction, with the leg free to permit active exercises, with the usual routine of after-care employed in the treatment of fractures

#### REFERENCE

- King Don Avulsion of the epiphysis of the small trochanter  
Arch Surg 28 561 (March) 1934

## THE NEW HAMPSHIRE MEDICAL SOCIETY

## MEDICAL ECONOMICS\*

BY N. B. VAN ETTEN, M.D.†

"PUNCH, my dear Copperfield, like time and the tide, waits for no man," said Wilkins Micawber whose attitude of expectancy toward fortuitous circumstance is typical of large numbers of physicians today. Waiting for something to turn up may be characterized as dignified and masterly inactivity, but it will prove as disastrous to medicine as it was to Micawber. I fear that some very potent punch must be served to the medical profession if it shall ever be awakened to an appreciation of its collective responsibility.

Scientifically, medicine is glorious. Economically it is improvident. Living in an industrial age it makes little effort to learn from industry practical methods for spreading the knowledge of its potentialities. Hiding its light under obscurant ethics because of fear of commercializing individual abilities, it screens from publicity much knowledge of great popular value. Membership in a profession seems to have caused the physician to forget that everything in this country moves to the tempo of industry.

We struggle for employment or fall into the mass of those who cannot keep up with modern rhythm. From birth to death we all live by the clock. The physician rates no exception. The compelling pulse of progress beats also for him. If he fails he cannot eat, cannot pay his rent, his fuel bill, his taxes, cannot insure himself a decent interment.

If modern society rates him successful, he must step faster and sleep less than others. He cannot be content with being on time, he must be ahead of time. For many of us 1934 and 1935 have been a whirl of desperation of anxiety of speculative wonderment. The Doctor of Medicine is accused of being socially uncooperative and out of step. The Doctor of Philosophy is now trying to prescribe. Will the American people take his medicine? The bottle is labeled Socialism and State Medicine. The directions are, take it and like it. Socialism is defined as a theory of civil policy that aims at the public collective management of all industries. Socialized Medicine would be the public collective operation of the practice of medicine.

State Medicine is the operation of the functions or powers collectively of a state or nation in the control of the practice of medicine. These forms of collectives are claimed by their advo-

cates to promise sure cures for all of the present economic troubles of the physician.

The struggle between individualism and collectivism is world wide. The Soviet steam roller has been unsuccessful in ironing out the rising tide of capitalism. The Soviet tractor has failed to eliminate man power individual farms producing a bushel an acre more than the highly mechanized State collectives. The German State has not profited from the murder and exile of German individualists and I am told that the German physician has sunk to new lows under their present system of State Medicine while misery, malingering and misrepresentation have risen to new heights. Fifty years ago students of medicine pilgrimaged from every corner of the earth to the feet of the German masters of science. No one goes now. The masters have been ruined by mass medicine and finally have been scattered by the lash of paganism.

A distinguished German professor under the date of March 10 1935 writes "I hope that the curse of Health Insurance will be spared to the profession in the United States. It is the beginning of the end of independence and high moral standards. It has ruined the profession all over Europe." Before the institution of Health Insurance the German people averaged five and one-half days of annual sickness, a rate which has now risen to twenty five and one-half days. This is a false index of morbidity because much of it is due to false certification by a demoralized medical profession. Contrast this with seven days annual sickness in the United States.

The American physician is having plenty of trouble, but at the same time is still giving the highest quality of service of which he is capable and better service than is given in any other country in the world. It cannot be denied that American physicians are themselves measurably responsible for their difficulties, that those who have been making a living have not been properly interested in those who have not. It cannot be denied that the workers in Organized Medicine have been retarded in their work by a very large number of physicians who are so indifferent to their own welfare that they do not take the trouble to attend the meetings of their County Medical Societies but, while being entirely uncooperative, do not hesitate to revile their officers for involving American Medicine in an economic crisis.

It cannot be denied that conservative doctors, indifferent doctors, lazy doctors, foundation

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doctors, dissatisfied doctors, unethical doctors, socialistic doctors, communistic doctors, doctors of Public Health, doctors of Philosophy, are all taking a shot at Organized Medicine

The conservative doctor resents the suggestion of any deviation from the traditions of medicine, any new plan for the payment of the doctor. He has nothing to offer but his satisfaction with things as they are.

The indifferent doctor does not care enough about economics to go to his County Society meetings and thinks the evolution of *laissez faire* will take care of things and that everything will go on about as usual, and that there is nothing he can do about it anyway.

The lazy doctor, who is largely responsible because he is so socially uncooperative that he has taken no interest in the fact that lay organizations have taken away from the doctor the administration of several fields of medical service, notably that of tuberculosis and mental hygiene, will wake up long enough to ask why his elected representatives have permitted such an outrage upon the medical profession.

Then there is the doctor who is under such obligation to philanthropic foundations that he no longer speaks the language of the County Medical Society. He is so saturated with the social theories that are backed by rich laymen who employ doctors of Philosophy to do their thinking, that he has come to believe that medical organization is unimportant. He has no plan of his own but is willing to impose a copy of some of the foreign plans which are now regarded as unsatisfactory in the countries in which they are now operating. He is willing to impose those systems of the delivery of poor medical care upon the American people. He says that Organized Medicine is on its last legs and is now fighting a losing game with its back to the wall. He may be right. The strength of wealth accumulated through the devious control of useful everyday commodities by capital combinations may buy political control of an idealistic profession and destroy its value to the people and may dull its scientific interest. Some of these foundations have promoted valuable scientific operations, but it is an interesting fact that no great discovery has ever been evolved from these groups. Always and only the individual, by lone concentration of his energies, has produced the real discoveries that have changed and advanced basic science.

Then there are the doctors of undefined desires, who are dissatisfied with the status quo, which a colored clergyman defined as, "the mess we is in." Vulnerable doctors who try to justify themselves by asserting that everybody is crooked, all "merchants of health", all fee-splitters. They claim that medical ethics are mere façades to cover criminality, abortions, fraud and deceit. They would reduce everybody to their own depths of intellectual dis-

honesty. While they claim that Socialized Medicine will furnish panaceas for the plight of medicine, they merely mean that they see, in such operations chances for their own parasitical existence.

Organized Medicine on the other hand, is trying to furnish constructive plans for the delivery of better medical service to all of the people and protection of the physician from bureaucratic domination. One hundred and fifty different operations are now proceeding in the United States, some of which are thirty-five years old. None of them involve either voluntary or compulsory insurance, but all of them are attempting to keep the patient in the hands of his personal physician and out of the hands of government.

The exigencies of the times demand the full cooperation of every licensed practitioner of medicine. Medical organizations have been too conservative. In order to avoid mistakes all of the units of Organized Medicine must work together, not only to resist the imposition of regimentative schemes upon the medical profession, but also to evolve plans which will satisfy the demands of society without sacrificing the dignity inherent in the delivery of service of high quality.

The American physician is entitled to an opportunity to advise and to propose any legislation concerned with the health of the American people. Change comes to the physician and he will welcome it. Social conditions change the manners and the conduct of all professions. The medical profession asks that its educational qualifications be taken into account in the development of new programs for medical service. The prospect of legislation for control of the delivery of medical service being written by lay foundation employees is a dismal one and should be vigorously protested.

The continued activities of some of the foundations have served a useful purpose if they have sufficiently irritated the medical profession to stand upon its own feet and repudiate the offensive actions of those non-medical dilettants, who assume such superior knowledge of what is the best medicine for the American people. Private practice has such public consequence that there is need for Government umpiring, but the prospect of Government competition is appalling.

In the light of debasing foreign experience with State Medicine and in the light of our own experience with political bureaucracy, the physician who respects the high calling of his profession must meet the threat of an extension of State Medicine as a militant fighter for the maintenance as well as the elevation of his ideals. It will be a backward step into chaos if the Department of Labor of the United States should succeed in imposing upon the medical profession codifications such as those which have cre-

ated such confusion in industrial and agricultural production

How shall the sick be adequately served? How shall the servants of the sick be adequately paid? These are the questions which should be adequately and unemotionally debated in every State and in every County before hurried national commitments are made. Quacks, charlatans and cultists have always marched side by side with the physician, and occasionally politicians notably Bismarck and Lloyd George, have joined the long procession of those who have discussed these questions.

For a long time professional philanthropists have theorized and politicized, using physicians as unpaid pawns in their schemes of health promotion. They have promoted large scale institutional care of the sick with more or less success because the physician was always willing and anxious to be exploited. The physician, always dominated by scientific interest, was more concerned with the welfare of the patient than with his own comfort or prosperity. He has been improvidently generous.

All of modern medicine has been developed within the last fifty years, and the progress of the science of medicine has been so absorbing that the art and application of medicine has lagged far behind, and shows few signs of reaching its proper proportionate position unless or until a new type of physician shall have been developed. The physician now feels the pressure of Public Health education, and the reaction of his own work in preventive medicine which has eliminated diseases which formerly absorbed much of his effort. The physician has cooperated with the Government agencies in the attempt to eliminate communicable diseases and the absence of destructive epidemics has been of great economic value to the Nation. Unpredictable catastrophes have always been cared for by Health Departments, or by emergency organizations supported by generous people and by the free services of physicians with the hearty concurrence of the whole profession. The quality of medical care has been so remarkable that students generally concur in the opinion that nowhere are the citizens of any country better served.

The United States Public Health Service reports for the year 1933, the lowest general death rate ever recorded for this Nation. The Division of Vital Statistics of the State of New York reports for the year 1934 the lowest death rate for the State since such figures have been collected, "11.1 per 1000 of population." Infant mortality under one year was 52 deaths per 1000 live births. This figure has never been lower. The maternal mortality rate of 50 deaths per 10,000 total births was, with the exception of the rate for 1916, the lowest ever recorded. The scarlet fever rate was 12 per 1000 the second

lowest recorded. New minimum rates were set for typhoid 0.6, tuberculosis 56.1, pneumonia 83.9, influenza 6.7 and cerebral hemorrhage 48.6. The total number of cases of diseases reported was lower by 40,000 than in 1933.

Such statistics do not support the claim made by some advocates of Social Security programs that large numbers of the American people receive no medical care. The fact that all morbidity and mortality statistics show general decline, except those relating to senescence and casualty, materially changes the health picture of the Nation, and confronts the physician with radically different medical and social problems to which he will be compelled to adjust himself individually and collectively.

The distribution of medical care, while admittedly faulty, is steadily improving. In New York State a few years ago, there was attempted a campaign for remedying the rural situation by planting physicians in small towns where there were no physicians. The few physicians so placed could not exist in those small places because the rural people drove right past their doors to the larger towns where they thought that they could find better medical facilities. In short, good roads largely solved the rural medical deficiencies in the State of New York.

In spite of the fact that very few physicians have ever been included among the wealthy classes, there has been very little complaint from physicians until the last five years. In our richest year 1929 only fifteen per cent of the physicians had net incomes above \$10,000 and this group was largely composed of highly skilled specialists. At the other end of the financial scale fifteen per cent were said to be failing to make a living. As this was in our most prosperous season this fifteen per cent may safely be considered a constant figure and it is reasonable to assume that this group includes not only aged and physically incompetent physicians, but also those unkindly treated by fortuitous circumstances, and those who lack the will to work. During the present depressive cycle it is said that thirty per cent of the physicians are failing to make their current expenses.

Many limited specialists suffer extremely because many of their patients are unable to pay the specialists' fees and have returned to their family physicians or turned to free clinics. For several years physicians have complained of the intrusion of free or cheap clinics upon their private fields. They have complained of the corporate practices of institutions in delivering medical care, because in line with all corporate practices they have crowded out the small individual by restraint of opportunity. During this time physicians have continued to be the only double taxpayers concerned in the care of the sick making their regular tax contribution and at the same time serving tax-supported

institutions and public clinics without fee. In all of this public service, physicians are the only persons who work without pay. This inherited traditional service has now become so heavy that the physicians are stimulated to demand a change. If, however, economic conditions should tend to improve it will be characteristic for physicians to continue to give away millions of dollars in free service.

It has been claimed that the only way to secure payment for the physician for his free work is through the medium of sickness insurance. May I remind you that the foreign insurance schemes, as now operating, provide for workers only and not at all for the indigent who must be cared for by general taxation. The taxpayer pays nurses, social workers, and all other hospital servants. Because the physician is a higher grade servant of the sick, delivering a higher grade or quality of service would not seem to justify the taxpayer in expecting him to work without pay in a tax-supported operation.

There were more than 450,000 separate visits to the city hospitals in the city of New York during the past year, 1934, made by visiting physicians and surgeons. For this vast service not a cent was paid by the city of New York or by any one else, 2,290,000 treatments were given in out-patient departments to approximately 500,000 patients. These figures do not include an additional very large figure for the free service of physicians in the non-governmental hospitals which would have been obliged to close their doors if this free service had been discontinued. Who are asking the Government to interfere in the practice of medicine? Who are devising schemes for security through insurance or cooperative protection of medical service? The visible demand for Government medicine seems to come from the patrons of free hospitals or free clinics. The medical indigent, who may be defined as a person who cannot pay for medical care without denying himself or his family the necessities of life, is entitled to this care, but the generosity of the taxpayer is abused by a very large number of people who are well able to pay for the same kind and quantity of care they seek in the hospital.

Otherwise I do not hear people asking for free service. I see no letters in the newspapers complaining of the quality of medical care. There seems to be no public demand for Sickness Insurance. Public officials are not besieged with cries for public medicine. The common run of people seem to be satisfied with the medical care they now receive. Large groups such as the Parent-Teacher Organization or the Labor Federations are not asking for Sickness Insurance. Labor asks for equitable wages and if, or when, labor secures them there will be little or no demand for any type of compulsory Sickness Insurance.

Our people are entitled to good medical care. Physicians want to give it, but are met with the resistance of indifference. This is well illustrated by the reaction of the people to campaigns for immunizations, which show only half-hearted cooperation under the stimulus of artificial excitement, and show that no lesson has been learned of the value of the health measure because, after the health campaign is over, immunizations of the untreated are neglected just as they were before. People want security, so do physicians.

Physicians want to be paid for what they do. Not necessarily single fees for single services. There is nothing new about an inclusive fee for a complete maternity service. There is nothing new about agreements for a term of service. Deferred payment is not new, doctor's bills are usually put in deferred files.

Many medical service plans are being tried. The Iowa plan is still developing in that State and some of its features are being used in other places. Other notable plans are the Alameda plan, the San Diego plan, the Vaughn plan now being tried in many cities, and the Wayne County plan which is interesting many County Medical Societies. None of these plans employ compulsory or voluntary insurance and all of them are designed to give the patient the benefit of the services of his own physician.

If these plans, or parts of them, work well they may be tried without committing the Government. If they fail they can be forgotten. The new plans of the California State Medical Society go practically all the way to compulsory Sickness Insurance with all of its governmental complications. If the Government sets up a machine to develop a system of service it must employ many people. It must pay them. The Legislature that votes the money must participate in its spending. If they spend money, bureaucracy is inevitable and, once embarked upon, is almost impossible to recall if it proves to be inefficient.

Who is asking for Sickness Insurance schemes built after the European manner? Or any other schemes which involve the necessity for permissive or mandatory legislation?

A group which is actively demanding Socialized Medicine is typified by a physician who calls himself a "Merchant of Health" who boasts superior honesty in admitting high pressure salesmanship in order to increase his practice. In a public letter to which he signs his name and address, he asserts that "thousands of x-rays are taken needlessly for no other purpose than to help the doctor to cover his expenses." He continues, "How many injections of one kind and another, how many laboratory tests, basal metabolisms, electrocardiograms are done daily when the physician knows beforehand that the reports will be negative, but makes the patient

take those tests for no other reason except the monetary reason? How many patients are referred to consultants and specialists so that the general practitioner will get his half, third, or quarter of the fees collected, depending upon the particular specialist?"

He denies that there is any such thing as a personal relationship between physician and patient and further continues, "Let us stop pretending and face the facts. Is there any one that does not know the general practitioner's very existence depends to a great extent upon the rake-offs he gets from referring his patients to various specialists and laboratories?" His remedy for these disgraceful conditions is the socialized operation of the practice of medicine when there will be no cheating when everybody will be compelled to be honest by the order of the State. Everybody will be amply salaried and have no worries. How can highly educated physicians, who have spent half of their lives struggling to enter the practice of a supposedly honorable calling, subscribe to such pernicious utterances in the name of "common honesty"? I know that there are a few physicians who are false to their oaths, false to their obligations as citizens, and the profession should be purged by their expulsion.

Another group of physicians who seem to desire Government medicine, are those who are already in it as practitioners of State medicine. Health officials who see an enlargement of opportunity in widened fields and employment in many bureaus. Few salaried officers can have a private practitioner's viewpoint, security colors their vision. Not a dazzling color however, because the average Government medical employee receives so small a salary that it excites very little envy.

The most ardent advocates of Sickness Insurance are foundation directors, who have never practiced medicine, who cannot understand the confessor relationship between patient and physician, and who desire in their great wisdom to prescribe English medicine, German medicine, or Red medicine for the American people.

Our experience with the operation of compulsory industrial insurance has taught us that it is riddled with rackets. A few physicians who are on the inside of the rackets, make inordinate profits while the rest of the profession and the injured workman get little or nothing out of this politically mismanaged piece of Government medicine. The contemplation of compensation operations will not inspire anyone to desire new forms of compulsory insurance until this present compulsory scheme shall have been so amended that labor industry, and the physician shall be guaranteed and receive a fair deal.

Amending legislation to eliminate some of the medical abuses passed the New York State Leg-

islature at the last session, putting the selection of the physicians who may do compensation work in the hands of the County Medical Societies. Let us hope that the County Societies will rise to their new obligation so successfully that the Legislature will continue to listen to their demands for corrective legislation.

Although it may be possible that the insurance principle may be invoked in a final working plan for American medicine, let us avoid compulsory Sickness Insurance until every phase of the subject shall have been studied carefully and unemotionally with special reference to its adaptability to conditions of medical care in America.

Conditions of medical care have always been better in the United States than they were in England when compulsory Sickness Insurance was adopted there in 1911. National insurance appears to have improved the kind of medical service then given the British people, but Sickness Insurance there today does not prevent disease, does not take care of the indigent or reduce the costs of the care of this class of people and does not reduce morbidity. The average yearly sickness of the British people before 1911 was seven days, it has been extended to seventeen days and is another false index due to false certification and malingering. Sickness Insurance has not reduced the costs of medical care but has merely instituted additional expenditures incident to the collections and to the distribution of these costs.

The Organized Medical Profession has been called reactionary, and static, and obstructive, because it does not welcome these foreign schemes with enthusiasm. These aspersions are unjust. The Medical Profession knows that changes in the delivery of medical service are as inevitable as the changes due to the extension of scientific understanding of disease. The profession is willing and anxious to promote changes, ardently desires improvement in the art and application of medicine, is generously public minded, desires only the best of medical service for the American people, and asks that no governmental system shall be developed without full opportunity for free coöperation by American physicians.

During the last eighteen years there have been presented from time to time at the sessions of the House of Delegates of the American Medical Association various propositions concerning Sickness Insurance, and many forms of group or corporate or contract practice. All of these were seriously considered by reference committees and by the House of Delegates with an open mindedness and a forward looking vision which displayed intellectual integrity. The insurance schemes have been all disapproved and constructive cautions have been given concerning contract alliances involving medical practice.

The American Medical Association suggests uniformity of action in setting up its ten-point basic principles, but has no desire to suppress the spirit of adventure which may inspire pioneers to look for new paths to new horizons. Our present economic policies will not determine the course of the world of tomorrow, indeed it is much more likely that some now unknown influence will change the current of our civilization.

The World War failed to make the world safe for democracy. Its great accomplishment is a seventeen year armistice during which the World has rearmed as never before in history. Democracy is on trial. Dictatorships of various colors are dominant. America must walk carefully if she will avoid the "isms" that are keeping European Nations in constant fear of explosion. Regimentation is the parent of "isms." The threat of bureaucratic domination must be opposed. Self-respect must be maintained by maintenance of a high quality of service regardless of material reward.

It is evident that Organized Medicine must array its forces aggressively, not only to improve the service to the sick, but also to improve the financial position of the physician. American ingenuity should be equal to the task.

American Medicine has a task. It must not only defend itself against destructive influences, but also must develop a constructive offensive behind which all of its forces must be massed. One of its first objectives may very well be seeing that the physician is paid for his free work which he has imposed upon himself so long that society in general, and hospital society in particular, has come to regard it as his obligation. Getting the physician paid for his work may involve a revolution in hospital organization, it may involve cooperative or other insurance schemes, it is likely to be a key which may be difficult to turn in a rusty lock, but once turned may open the door to hitherto unsuspected opportunity. I believe that the time is ripe to try it. I believe that the state of the country justifies it.

A current historian of excellent repute stated a few days ago that, at this time, in spite of our confusion and economic distress, the effects of which are keenly felt by most of us, there is greater general economic well-being in the United States today than has been enjoyed by any other nation at any time in history. It is difficult to believe this statement in the light of your personal experience, and yet there is statistical evidence to support it.

A sense of confidence in future security would be justified if the country could be allowed to follow in natural ways its upward trend, if fear could be lifted, and if the genius surrounding the central administration could be tempered by sanity. If they could be infused with some sympathy for the present and fu-

ture taxpayers who must pay for the highly exciting music to which these geni are dancing.

While I believe that the Government pump priming is a retarding influence, I also believe that it cannot stop natural recovery and that the next decade is full of promise for those who have the will to work for the common good. The implication is especially pertinent to the economic situation of physicians who must drop all differences and work together.

Few physicians have ever acquired wealth from the practice of medicine. Many physicians are unable to maintain the overhead which they built up during the speculative decade of 1919 to 1929. Many physicians are failing to make respectable livings. Many physicians observe an increasing flow of paying patients to free hospitals. Many physicians are excluded from the opportunity to practice their profession in tax-supported hospitals.

Many physicians are on the outside looking in and will remain there until they unite in a demand as taxpayers for their right to participate in all of these public operations.

Fewer people are sick. Morbidity statistics are lowest in history. Fewer people are earning enough money to pay physicians. Fewer people are able to pay reasonable fees. Fewer people are able to pay any fee.

More people than formerly are visiting all sorts of cheap clinics. More counter prescribing by pharmacists prevails. More people eagerly accept and apply to themselves the medical advice of the radio broadcaster.

More patent medicines are taken. More physicians are being licensed than can be used by our citizens even if they were able to pay them, 125,000,000 people are served by 154,000 physicians, a ratio of 1 to 814.

The community is poorly served by crowded clinics. The community is defrauded by clinic visitors who are able to pay private practitioners. Community hospitality is abused by irresponsible non-residents. The community suffers from division of hospital support by too many hospitals or clinics too closely located.

The community has a poor return from its investment when hospital facilities are idle because of exclusion of practitioners who are qualified to use them. The community is poorly served by hospital practitioners who are disinterested because they work without pay.

All of these conditions can be cured by the concerted action of physicians, hospitals, welfare organizations, Health Departments, and an educated public.

These conditions cannot be cured by the imitation of any of the European systems of distributing medical care. They must be taken care of by ourselves, within our own medical organizations, and by the influence of sympathetic citizens.

By limiting the number of physicians newly licensed so that it may be possible for every com-

petent physician to make a living By zoning cities and communities so that they may be served by small hospitals By opening all tax supported hospitals to all physicians who live within the hospital zone

By payment of physicians for their work for the indigent in all tax supported institutions By payment of physicians for their services to all tax supported indigents within or without hospitals

By exclusion from tax supported hospitals of all non-emergent patients who are able to pay a private physician

By reform of the workman's compensation operation of compulsory industrial insurance in the interest of the worker and of the physician who takes care of him

By development of the full values of Organized Medicine by the enlistment of every physician within the ranks of the County Medical Society

By development of the values of the personal and family physician as the basis of medical service By maintenance of the highest quality of medical care

His age old experience and his education qualify the physician to meet a changing world and should qualify him for wise leadership of its evolution The future of medicine challenges him If he becomes indifferent, selfish, lazy, socially uncooperative, he will write a sad chapter in medical history, if he becomes alert, awake to his opportunities to meet the new daily demands of the American people and give the most faithful service, the service of personal devotion to the science and the art of medicine, his glorious traditions will be multiplied and he will meet the new day in the spirit of the old Sanserit Salutation of the Dawn,

"Listen to the Exhortation of the Dawn!

Look to this Day!

For it is Life the very Life of Life

In its brief course lie all the

Varieties and Realities of your Existence

The Bliss of Growth

The Glory of Action

The Splendor of Beauty

For Yesterday is but a dream

And Tomorrow is only a Vision,

But Today well lived makes

Every Yesterday a Dream of Happiness,

And every Tomorrow a Vision of Hope

Look well therefore to this Day!

Such is the Salutation of the Dawn

#### DISCUSSION

PRESIDENT LORD I will ask Dr Timothy F Rock of Nashua to discuss this paper of Dr Van ETTEN s

DR. TIMOTHY F ROCK When I was asked to discuss Dr Van ETTEN's paper I was very naturally embarrassed because I realize that it would be presumptuous on my part to attempt it and I felt that whatever I might say would be an anticlimax upon a most interesting and instructive presentation of the subject by an authority We are all greatly indebted to you, Doctor

I appreciate that the Doctor has given most generously of his time and talent to study and analyze an abundance of information and of misinformation upon the subject of Medical Economics or Socialized Medicine or whatever you may wish to designate State Medicine and has tried to separate the good from the bad that those who wish it may have a clear concept of the subject and that as much of State Medicine as may be forced upon us shall be made as distasteful to the profession as possible.

This Society appreciates the conscientious and tireless work of our Committee of the House of Delegates to preserve and buttress the profession against the insidious advance of the political control of the practice of medicine because such control unbridled may become political despotism I feel that I express the hope of this Society and of the thinking people of our State that the President's Committee on Economic Security at Washington shall be persuaded that relief of human suffering through sickness and the ministrations and administration of medical service shall continue to be the responsibility of the medical profession free from any group politically conceived politically born and nourished and maturing powerful and arrogant to our disadvantage by the spending of political favor for which we shall pay an unjust tax.

I am sure it has become a commonplace to feel that those in Washington have the answers for all the questions upon all of the problems of the day and that it is "Love's Labor Lost" for us to attempt to maintain the practice of medicine upon the high ideals of individual scientific initiative professional ethics and patient and physician relationship of the past if it fails to square with the New Deal program But I am not so sure that the New Deal answer to our problem is correct. It may be that Socialized Medicine or any other form of compulsory sickness insurance which makes for a mighty political influence while making near serfs of the doctors and drones of the willing people is not the right answer to the problem of Medical Economics

State Medicine so-called seems to have had its start in Germany in 1883 when Bismarck initiated it solely as a sop for political unrest. It was introduced in England in 1911 by Lloyd George also as a stop-gap for political unrest. Wherever it exists its background is the same. Even in industry sickness insurance whether contributory or not, is fundamentally a political factor against industrial unrest. And whether you recognize it as such or not we have State Medicine in this country today and in this State and whether it is called Welfare or Federal Emergency Relief Administration or Economic Security or anything else its purpose is unchanged and its dangers every bit as pernicious and malignant as State Medicine in any form any where.

I presume that all of us realize that in England where State Medicine is perhaps less in disfavor among the physicians than in any other country the average annual income of all panel doctors is \$2000 out of which must be paid the usual expenses of a medical practice and that this income is greater than in other countries having State Medicine. While it is true that a panel doctor is permitted to have a private practice in addition to his insurance work few have the time for any such practice.

If that, or anything resembling it, is what new thought in this country wants, we have it and like it. You realize also I think that State Medicine or insurance practice means mass treatment, the cough and the bottle. If that is what the people of this country are willing to take they may get it. If unemployment relief is made a part of any medical prescription the multitude of poor souls too ill



to work will increase many fold, just as industry finds a disconcerting incidence of disability among those entitled to sick benefits as against the better health of those not so privileged and a dramatic recovery from disability, beyond the power of medical science, when benefits cease.

If these are among the fundamental goals of Economic Security that are to be saddled upon the backs of the people of this country, they may be achieved most speedily through State Medicine, or Socialized Medicine, or any other catch phrase designation you wish applied to a politically controlled practice of Medicine.

Vital statistics do not reveal any dramatic decrease in mortality or morbidity in Hillsborough County of this State in the last year or so. Yet the cost of medical care put upon the county has increased from an average annual expense of \$3000 up to two years ago, to \$40,000 last year. And for what? Sickness among our people has not increased to that extent, any more than that outlay has improved the health and happiness of our people. And the worthy poor were always adequately and conscientiously cared for.

It would seem that a system is developing similar to that in Germany where the number and remuneration of executives, social workers, clerks and others engaged in the care of the sick, far exceeds the number and the recompense of the doctors who treat them. It is not impossible that State Medicine, now an actual, vital, living thing under the Federal Relief Administration is, or will become, the kind of State Medicine which the most thoughtful element in the profession has long and earnestly opposed.

I do not intend the inference that there is nothing good for anybody in State Medicine as it lives today in this State, nor do I feel that every doctor and every citizen will view it, eye to eye, with me. I feel very strongly, however, that whatever of good there may be in it today is unreal and obscures its ultimate disadvantages to the physicians, professionally, scientifically, and economically obscures its degrading influence upon the morale of our people, and obscures the stifling burden which taxation for its wasteful operation will put upon all business and upon all the people.

Out of our experiences with State Medicine as it is practiced in this State, and I repeat that it is State Medicine, a segment of our profession may be economically encouraged because some recompense accrues from a service that would otherwise be gratuitous. This may simulate a feeling of security. Let me repeat, however, what I have said before, that herein lies a real danger to the whole profession, because the State politic and the citizen may become accustomed to medical service at a cost that does not and cannot repay the doctor for the careful conscientious attention he should devote to each patient, and these may well demand medical service at the same cost in a better day. It is also conceivable that present payments may be reduced as politically conscious administrators need to curtail expenses or look with envy upon the rising income of the physician as his number of calls ascend just as they have always done under similar systems subjected to the human impulses of doctor and patient alike.

When the time comes, as it came under every system of State Medicine, that the doctor is placed upon a wage or per capita basis, he may find his average payment something like *five cents* per call, as it has just worked out to be in a Massachusetts community.

I have it upon the word of physicians engaged at the present time in insurance work and in industry, that the amount of work, often to the point of

fatigue, demanded of them in return for their more or less security of income, stifles initiative and deprives them of the opportunity for self improvement. Such is generally the experience of panel or insurance doctors in their countries, such may well be the unhappy lot of those of us who feel complacent toward our present form of State Medicine, unmindful of the cancerous nature of its germ cell left unguarded.

We must put forth every effort and power at our command to the end that the practice of medicine under any form of political subsidy shall end with the emergency responsible for its birth. Let us hope that out of all the chaos surrounding the subject of Medical Economics some plan, that will be fair and just to the patient, to the physician, and to all the people who pay the bill, will be designed eventually.

All of us who are zealous for the future of our profession, that its ideals may continue and its achievements multiply for the benefit of all within our borders, rich and poor alike, hope that the practice of medicine may be allowed to live as an honorable profession, free from political influence or control, that it may not become a program of the cough and the bottle, or be divided in first and second rate doctors.

We thank you, Dr. Van Etten and your Committee, for your diligent work in our best interests.

PRESIDENT LORD: I will ask Dr. Metcalf to continue the discussion on this interesting subject of "Medical Economics of 1935."

DR. CARLETON R. METCALF: Your Committee on Legislation, which has had under its wings the problems in medical economics during the past year, has been concerned about possible adverse legislation, both from our own General Court and from Washington.

The legislation which concerned us most here was the so-called Epstein Bill, a radical bill for health insurance or sickness insurance, which was, in reality, introduced into the Legislatures of more than twenty states this past year. This particular bill came from an organization called the American Society for Social Security, which has about five thousand members, and which has its headquarters in New York.

We estimated that if this bill were passed in New Hampshire, it would cost about six million dollars to provide an inferior brand of medical practice in a state where the medical cost at the present time is about three million dollars. If any of you are familiar with bureaucracy, I think you can imagine what was going to be done with the extra three million dollars. When a group of five thousand enthusiasts try to put something over on the other 120,000,000 people in the United States, it looks to me like a very shining example of the tail trying to wag the dog.

This bill was not introduced in the New Hampshire Legislature, and while Dr. Van Etten and his colleagues in New York State have been locking horns with Mr. Epstein, we were ignored. So there are some advantages in being an inconspicuous state.

The other thing that we were concerned about was government ownership of medicine, emanating from Washington. It seemed to us that the more abundant life, which is about to be bestowed on the citizens of this country, was coincident with a less abundant life for physicians.

Your committee tried to counteract these two methods of legislation by talking before the county societies, by giving radio talks, by sending out releases to the newspapers and by an effort to affiliate with other groups who were similarly concerned.

—with the dentists with the 65 000 farmers in New Hampshire, with the employers and with the employees.

Your committee objected to first, compulsory insurance secondly insurance controlled by the government and thirdly the supervision of lay officials. You will find that those are the three key stones of all systems of medical insurance in the different European countries compulsion government control and lay supervision.

Your State Society and your House of Delegates followed the A. M. A. in a constructive program, which could be controlled and supervised by the doctors. But they tried to point out the dreary inefficiency of the systems which prevailed on the continent of Europe.

A few weeks ago I had the pleasure of talking with Dr. Gros, who is in charge of the American Hospital in Paris and I asked him how the French system was working out. He said that the doctors didn't like it and that the patients didn't like it. He told me that he had to contribute \$15.00 a year for his cook, she had to contribute \$30.00 a year and the government contributed another \$15.00 a year a total of \$60.00 a year. Recently his cook injured a finger she went to the clinic to have it fixed and sat around several hours before a young doctor came out and put a splint on the finger. He said I lost her services for six hours. I am going to hire one of my friends and pay for it myself the next time she hurts her finger.

Our efforts may have met with some success. Both of our Congressmen at any rate seem to be with us. Our former Governor and present Congressman, Charles W. Robey has written to me

"I have for some time, been interested in some form of old-age pension and unemployment insurance and have been sympathetic therewith. I believe these two salient points are real objectives and the matter which you oppose namely sickness insurance I shall oppose if an opportunity comes to vote against it.

Congressman Rogers wrote in a similar vein

Now I think it is obvious from what you have heard today that it is up to us to present a united front on this matter. And I hope that every one of you will impress the views of the medical profession not only on your patients but on the respective members of the largest legislative body in the world.

PRESIDENT LONG Does Dr. Van Etten wish to add anything to what he said?

DR. VAN ETTEN Mr. President—Fortunately the Epstein Bill slept in committee, and is still there. The Epstein bill was in our State a very pernicious one and was introduced in Massachusetts and in one other State, in which it failed. I feel that we were fortunate this year in getting a little breathing spell but I feel that before the next session of the national legislature we shall all have to become personally and coöperatively active in our op-

position to that piece of legislation which has in one form or another been before the medical profession insidiously in one place and then in another and now out in the open and we shall have to be very much alive before the organization of the next national legislature in order to prevent the attachment of this particular type of legislation to unemployment insurance legislation.

It is exceedingly important that every doctor should study these things out for himself. But it is even more important that every doctor should appreciate his potentiality as a citizen and as an informed citizen he must accept his responsibility to tell all of the people with whom he comes in contact the real truth about these matters. The people must be educated. The people will be sympathetic if they know anything about it. The great trouble with the medical profession is that they haven't known anything about it they haven't paid any attention to it at all. They are interested in scientific medicine and aside from that, I do not think that they read their medical journals very much. They read just the things that they are interested in if they open the journals at all. They don't even go to society meetings except for interesting programs.

When the question of economics comes up if they know about it in advance there will be a corporal's guard in attendance. Really they are not interested in anything but scientific medicine.

That gentlemen should be a thing of the past. Medicine is changing very much.

The whole scheme of the practice of medicine will be changed in the future and if the medical profession doesn't realize its economic problem it will soon be facing economic slavery.

## MISCELLANY

### ANNOUNCEMENT

The Hitchcock Clinic, Hanover New Hampshire announces the association of Dr. M. Dawson Tyson

## RECENT DEATH

MITCHELL—ABRAM WHITTEMORE MITCHELL, M.D., of Epping New Hampshire died at the Elliott Hospital, Manchester July 31 1935 following an appendectomy. He was born in 1867. He graduated from the New York University Medical College in 1887. He began practice in Epping in 1892 and was the second oldest ex-president of the New Hampshire Medical Society and a Fellow of the American Medical Association. He was a thirty-second degree Mason and had served in the New Hampshire Legislature in 1897 and 1899.

Dr. Mitchell is survived by three children. His wife died a few months ago while on a trip South.

# CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C CABOT, M D

TRACY B MALLORY, M.D., *Editor*

## CASE 21331

### PRESENTATION OF CASE

A fifty-three year old American housewife entered complaining of shortness of breath of two weeks' duration

One year before entry she began to feel tired and weak. She suffered from shortness of breath at intervals especially upon moderate exertion. Her physician put her on digitalis which he increased in amount as her symptoms increased in severity. She lost about forty pounds in weight during the next six months. A few months after the onset her urine began to have a disagreeable odor but this passed off shortly. A few months later her urine was thick and cloudy on one occasion. Three weeks before admission her weakness and shortness of breath increased. She became dizzy on one occasion and had nausea and vomiting. She stopped her medication and since then the vomiting had not recurred. She had had two attacks of nocturnal dyspnea. During the past two weeks she was bedridden and had shortness of breath at all times except when sitting up. She soon began to have a dry cough. There was no history of edema. During this illness she had many severe headaches behind her left eye. She had nocturia twice a night.

The family, marital and past histories are non-contributory. She had had twelve pregnancies. Nine children were living and well, two died in infancy, and there was one miscarriage. The menopause occurred five years before admission.

Physical examination showed a well-developed and nourished woman in a semi-reclining position breathing very rapidly and with much effort. Her skin was flushed and slightly blue, her lips and fingers cyanotic. Her breath was not urinous. Her hands and feet were cold and clammy. The right fundus showed blurring of the disc margins. The left, however, was clear. In both there was marked narrowing and tortuosity of the arterioles with many small irregular hemorrhages and yellowish exudate. The veins were dilated. Scattered throughout both lungs most numerous at the bases, were many

moist râles. There were signs of fluid at both bases. The heart was slightly enlarged, the left border of dullness being 9 centimeters to the left of the midsternal line, 3 centimeters to the right. The midclavicular line was 8 centimeters from the midsternal line. The sounds were forceful and the rhythm regular. The blood pressure was 210/120 with pulsus alternans between 210 and 190 millimeters. The abdomen was slightly distended. The liver edge was felt five fingerbreadths below the costal margin. It was smooth and slightly tender. The spleen was felt three fingerbreadths below the costal margin and was slightly firm and non-tender. There was slight pitting edema of both legs and very slight edema of the sacrum.

The temperature was 98°, the pulse 102. The respirations were 20.

The urine was cloudy and had a specific gravity of 1.012 to 1.014, a slight trace to a huge trace of albumin, and an occasional white blood cell. Examination of the blood showed a red cell count of 7,800,000, with a hemoglobin of 95 per cent. The white cell count was 14,300, 90 per cent polymorphonuclears. The nonprotein nitrogen of the blood was 77 milligrams. A Hinton test was negative. The oxygen capacity of the blood was 29.6 volumes per cent. The volume of the cells was 66.7 per cent. The volume index was 1.05, the color index 0.99. The stools were negative. An electrocardiogram showed normal rhythm, rate 105, slight left axis deviation, prominent S<sub>2</sub>, inverted T<sub>1</sub> and T<sub>2</sub>, low upright T<sub>3</sub>, inverted P<sub>3</sub> and absent Q<sub>4</sub>. The serum protein was 5 per cent.

X-ray examination of the chest showed some fluid in both lower lung fields which prevented demonstration of the exact position of the diaphragm. The heart was slightly enlarged.

The red cell count remained elevated. She was venesected several times with marked relief of her dyspnea. On the tenth day she was started on phenylhydrazine which was given for ten days, a gram and a half each day. She developed a carbuncle on her left buttock which was poulticed. On the fourteenth day she suddenly developed what was called acute pulmonary edema. Her blood pressure was 270/170. A venesection of 500 cubic centimeters was done and she was put into an oxygen tent. She felt well following this. A week later the abscesses of the left buttock were incised and drained. Approximately one month after admission she began to complain of severe left upper quadrant pain. Her temperature rose to 103°. There were tenderness and spasm in the left upper quadrant. A friction rub was heard over her spleen and in the left lower chest posteriorly. A rectal examination at this time was negative. Her red blood cell count had by this time decreased to 3,500,000 and her white cell count had risen to approximately 30,000, 90 per

cent polymorphonuclears. She continued to do poorly the temperature remained elevated, the abdominal pain did not abate, and she died approximately five weeks after admission and nine days after the onset of the abdominal pain.

#### DIFFERENTIAL DIAGNOSIS

Dr. CHESTER S. KEEFER.\* As one reads the story of this patient's illness it seems clear that the main diagnostic problem is the interpretation of the episode that began nine days before death. Briefly, we have a woman who had the symptoms of heart failure which were progressive over one year. This was characterized by exertional paroxysmal and continuous dyspnea and orthopnea, without conspicuous peripheral edema. In addition there had been loss of weight, unilateral postorbital headaches and nocturia. The dizziness, nausea and vomiting apparently followed digitalis therapy since they disappeared following the discontinuance of the drug.

The physical examination revealed a woman in considerable distress with dyspnea and orthopnea, cyanosis, hypertension with pulsus alternans, pulmonary congestion, bilateral hydrothorax, cardiac enlargement, an enlarged liver and spleen, and edema over the sacrum. The changes in the ocular fundi were consistent with a vascular retinitis, but in addition there was haziness of the right disc and engorgement of the veins.

The laboratory examinations revealed polycythemia and a slight leucocytosis, moderate nitrogen retention, albuminuria with a reduced specific gravity. The electrocardiographic tracing was consistent with that found in patients with hypertension and sclerosis of the coronary vessels supplying the anterior wall of the left ventricle with myocardial fibrosis.

From these findings, one would not hesitate to make the diagnosis of vascular disease with hypertension, cardiac insufficiency and polycythemia vera.

The course of the illness in the hospital was punctuated by three episodes: (1) the development of acute pulmonary edema which was a sign of progressive heart failure, (2) the appearance of a furuncle on the buttock, and (3) the attack of abdominal pain, localized in the left upper quadrant and accompanied by tenderness and spasm of the abdominal wall. A friction rub over the spleen and in the lower part of the chest, fever and leucocytosis.

When a patient with heart failure complains of pain in the left upper quadrant one naturally thinks of infarction of either the lung or spleen. In this patient, the presence of a friction rub over the spleen, without cough or expectoration, would lead one to suspect that the infarct was in the spleen.

When a patient with polycythemia complains

of acute abdominal pain one entertains the possibility of either a vascular accident or a perforated gastric or duodenal ulcer. Both conditions are fairly common in this disorder. Of the vascular accidents, one has portal, splenic or mesenteric thrombosis, or thrombotic occlusion of one of the branches of the coronary or splenic arteries. The latter is more common. From the story and course of events it would not be possible to make a diagnosis of occlusion of one of the large veins mentioned. However, there is no serious objection to the diagnosis of infarction of the spleen. If this line of reasoning is correct it is necessary then to explain how this infarction arose. Two possibilities I have mentioned already, but there is a third, namely, a septic infarction of the spleen following the infection of the buttock. This is suggested by the presence of high fever and leucocytosis, accompanying the signs of splenic infarction. It is not absolutely diagnostic, however, since bland infarctions of organs such as the kidney or spleen may be accompanied by fever and leucocytosis. As a rule, however, the duration is somewhat shorter than nine days unless there is a superimposed infection.

The leucocytosis might be explained on a basis of the phenylhydrazine therapy. Generally speaking, the increased leucocytosis produced by phenylhydrazine does not persist more than ten days after the drug has been discontinued, so that it seems unlikely that the phenylhydrazine treatment can account for the leucocytosis in this case, since it was discontinued approximately ten days before the onset of the pain in the abdomen.

There remains for discussion the question of the relation, if any, between the polycythemia and the cardiac insufficiency. Polycythemia is seen in certain types of congenital heart disease, and in the heart failure resulting from chronic pulmonary fibrosis or kyphoscoliosis. In this particular case these conditions can be excluded at once. There are a few patients, however, with polycythemia and hypertension in whom the symptoms and signs of the disease may be predominantly those of the hypertension. In these cases it is necessary to exclude instances of suprarenal and hypophyseal tumors. Once this has been done there remains a group of patients with hypertension and polycythemia in whom the precise relationship between the two conditions is difficult to define. As a rule the spleen is not enlarged and the blood pressure may be lowered following the reduction of the red blood cells. In the present case I am unable to see how the cardiac insufficiency and the polycythemia are related to a common cause unless one assumes that the generalized vascular disease which is so common in these cases is the primary lesion and the polycythemia is secondary to diffuse vascular lesions of the bone marrow which produce anoxemia and a stimulation of red cell production.

\*Associate Physician, Thorndike Laboratory of the Boston City Hospital.

## X-RAY INTERPRETATION

DR GEORGE W HOLMES The x-ray film shows a rather characteristic picture of a somewhat dilated heart with passive congestion in both lungs. The condition in the lungs obscures the outline of the heart to such an extent that one would not be able to say whether this was a dilated hypertensive heart or some other heart lesion. There is also evidence of fluid at the bases.

## CLINICAL DISCUSSION

DR WILLIAM D SMITH This case has been discussed so adequately that there isn't much to say. The consensus of the service was that she had polycythemia vera and then the question came up whether the hypertension might be secondary to the polycythemia.

DR GRANTLEY W TAYLOR We saw this patient on the surgical service because of her carbuncles, which we treated. Then this final complication developed. We found very little else but what is stated here, tenderness, spasm, high white cell count, elevation of temperature and the complaint of a good deal of pain on the patient's part. The onset was very abrupt so much so that although we considered the possibility of metastatic abscess of the spleen we were inclined a little more to consider that it was a splenic thrombosis secondary to polycythemia rather than bacterial infection. The question arose whether exploration was called for if so what we would attempt, and there again we did not have a very definite plan of campaign unless we found an abscess. We thought abscess was an extremely unlikely possibility. She was transferred back to the medical service and I do not believe we saw her again after that original episode.

DR FRANCIS T HUNTER I want to call your attention to the fact that we are having, with Dr Holmes' assistance, rather good luck with radiation of patients with polycythemia vera. My experience with phenylhydrazine has been very unpleasant because in order to get results you have to push up the dose almost to the point of nausea. The two cases we have radiated have had counts of eight or nine million. We gave them spray radiation, a rather enormous dose for three weeks and after months of rest when the count did not change we repeated. These two patients—one two years now the other eighteen months—have had no change in their red count—from four to four and a half million. I think this method of treatment offers something to these people that we have not been able to give previously.

A PHYSICIAN What white cell counts did your cases have?

DR HUNTER In the neighborhood of fourteen, fifteen or eighteen thousand. They came down to six thousand.

A PHYSICIAN Did any of the cases have a leukemic blood picture?

DR HUNTER No, the leukemias have not done nearly so well.

## CLINICAL DIAGNOSES

Polycythemia  
Splenic thrombosis  
Carbuncles  
Mesenteric thrombosis?  
Pylephlebitis?  
Cardiovascular renal disease

## DR CHESTER S KEEFER'S DIAGNOSES

Hypertension with arteriolar sclerosis  
Coronary arteriosclerosis with myocardial fibrosis  
Cardiac insufficiency  
Benign nephrosclerosis  
Polycythemia vera with enlargement of the liver and spleen  
Splenic infarction with perisplenitis due to thrombotic occlusion of a branch of the splenic artery  
Splenic abscess?

## ANATOMIC DIAGNOSES

Polycythemia  
Splenomegaly  
Septic infarcts of the spleen  
Thrombosis of the splenic artery  
Pulmonary abscesses, multiple  
Pleuritis, acute fibrinous  
Carbuncles of left buttock  
Cardiac hypertrophy, hypertensive type  
Benign nephrosclerosis  
Leiomyoma of the esophagus

## PATHOLOGIC DISCUSSION

DR TRACY B MALLORY The autopsy was characterized by a single outstanding feature, a very large spleen weighing 750 grams. It showed very nearly complete infarction although the infarcts were multiple, so numerous as to be contiguous, with practically no normal tissue between them. We found the splenic artery completely thrombosed, a part of the thrombus evidently being quite an old affair since it was fibrous and in places calcified. Then there was a fresh, completely occluding thrombus which I assume was terminal and which accounted for the last episode. In all probability she had had at least one preceding attack of splenic thrombosis, a matter of months or years before. The infarcts in the spleen had not as yet broken down but the amount of leukocytic infiltration in some places suggested that there was probably a septic element to them, but there certainly was nothing that one could call an abscess and nothing that could have been surgically drained. She did have definite abscesses elsewhere most noticeably in the lungs, which were

peppered with small ones varying from a millimeter up to a centimeter and a half in size. One or two of these had evidently in the last few hours of life broken through into the pleural cavities. An acute fibrinous pleuritis presented in both pleural cavities but was as yet not very extensive.

The stomach was very carefully examined for evidence of present or past ulcer and no acute erosions and no scars of any sort were found. We did find incidentally—nothing of any clinical importance to the case but rather unusual—a leiomyoma of the lower end of the esophagus a small one about 2 centimeters in diameter.

The heart weighed 350 grams which is slight hypertrophy for a woman. The coronary arteries were capacious and practically free from atheroma. The kidneys were definitely small weighing only 175 grams, showing as Dr. Keefer predicted a fairly marked degree of benign nephrosclerosis.

The sepsis had made its way to the head also and acute suppurative sinusitis was found in the left frontal sinus and in the ethmoid with a somewhat more questionable lesion in the right frontal.

Microscopically the feature of greatest interest is the bone marrow which showed a very marked degree of hyperplasia not only in the usual blood forming areas, that is the vertebrae ribs and various flat bones, but also in the portions of the marrow usually composed only of fat tissue, for instance in the middle of the femur where the marrow was deep red in gross and microscopically the fat cells are replaced by active hematopoiesis. The excessive blood formation is not limited however to the red cell series as it would be in pernicious anemia for instance. Red cells, white cells and megakaryocytes seem to be present in normal proportions but in greatly increased numbers. Moreover, the differentiation of all the cells seems to be going through to conclusion. One has no striking predominance of immature cells, such as one finds in either pernicious anemia or leukemia. The vessels of the marrow with ordinary stains show nothing abnormal. It is possible that with special stains we might bring out some arterial thickening but I have not been able to demonstrate it in our ordinary sections.

DR. HOLMES: This film was taken two months before. It is quite possible that the abscesses that you found were not present at the time.

DR. MALLORY: No, I think the abscesses developed only in the last week or two.

DR. ARLE V. BOCK: I should like to ask Dr. Keefer to explain the electrocardiographic findings in view of your findings.

DR. KEEFER: I am not able to do that. Have you any explanation?

DR. BOCK: No. I cannot explain any of

them. I think that very often they are too finely drawn.

DR. KEEFER: The only reason I mentioned it is that in our experience within the last year or two the prediction of the location of a myocardial lesion from the type of electrocardiographic change has been rather accurate and I think it is a more than academic question. As you follow a series of patients who have coronary occlusion and show electrocardiographic signs through the wards you find that a high proportion of those who do well for a long period of time have posterior infarctions where as those who have anterior infarctions do very poorly.

## CASE 21332

### PRESENTATION OF CASE

*First Admission.* A sixteen year old native schoolboy entered complaining of diarrhea.

Approximately one year before admission he noticed the onset of more frequent bowel movements and a change from the normal character to that of a watery secretion. At this time there was no blood, mucus or tarry stools and no abdominal pain. Two months later because of the persistence of these symptoms he visited a physician who gave him milk of bismuth and pepsin. This however, gave no relief. He then began to lose his appetite tire more easily and for the first time noticed that his skin was gradually becoming pale yellow in color. These symptoms gradually progressed until he was having six to eight bowel movements every day and about three months before entry he noticed for the first time a small quantity of dark red blood in each movement. He visited the Out Patient Department five weeks before entry where his treatment consisted of bismuth powders soft diet, liver soup, cod liver oil, tomato juice and red bone marrow. During the month before admission his stools became slightly less watery and very often contained no blood. He felt that he had improved generally had gained a little weight and had more ambition. He had not been confined to bed and had been attending school fairly regularly. His weight did not change. He recently had a little dyspnea on exertion but no other symptoms.

His father and mother were both living and well. Two sisters were living and well. There was no familial history of tuberculosis or colitis.

His past history was negative except for an attack of painful but not swollen joints two years before entry requiring bedrest for a week.

Physical examination showed a well-developed and well nourished boy. The skin and mucous membranes were pale. The teeth were normal. The lungs were clear. The heart was slightly enlarged to percussion and palpation. At the

apex there was a blowing systolic and a low pitched rumbling diastolic murmur. The blood pressure was 130/70.

The temperature was 99.6°, the pulse 120. The respirations were 25.

Examination of the urine was negative. Examination of the blood showed a red cell count of 4,800,000, with a hemoglobin of 50 per cent. The white cell count was 14,200, 73 per cent polymorphonuclears. There was marked achromia. Five stool examinations were negative except for slight watery consistency. The guaiacs were negative for the first week. A Hinton test was negative. The serum protein was 6.5 per cent. A dysentery agglutination test was negative. Tuberculin tests up to 1:1000 were negative. Gastric analysis showed a normal amount of free acid. The guaiac was negative.

A barium enema showed complete lack of haustral markings. The rectum was not definitely diminished in size. The cecum showed no spasm. There were no haustral markings and the size of the cecum was that of the descending colon. The terminal ileum showed slight variation from normal. Examination of the chest was essentially negative.

He did fairly well for the first week. He showed no evidence of blood in his stools. His temperature chart was flat. About ten days after admission his stools became more watery and showed definite blood. The guaiacs in his stools remained positive for the next two weeks, although he felt much better. Approximately one month after admission he was discharged improved. He was put on a low residue diet, given one yeast cake three times a day, one half a pound of domestic liver extract daily, and iron and bismuth subcarbonate p r n.

#### *Second Admission, six days later*

When he was discharged he had been having only four to six stools daily. After he was home for two days he began to vomit and soon his diarrhea increased markedly, requiring bowel movements every one or two hours at night and about every three hours during the day. Associated with this diarrhea was cramp-like abdominal pain. He lost his appetite and felt very weak.

Physical examination was the same as on his previous admission, except for slight tenderness over the course of the colon, especially in the left lower quadrant.

The temperature was 100.3°, the pulse 103. The respirations were 20.

Examination of his blood showed a red cell count of 7,450,000, with a hemoglobin of 95 per cent. The white cell count was 6,800, 64 per cent polymorphonuclears. The stools were watery, green brown in color and had a four plus guaiac.

Two days after admission an ileostomy and appendectomy were performed. For the fol-

lowing few days the chart was satisfactory and the ileostomy was working well. One week after operation he began to vomit a great deal and became slightly distended. The ileostomy was still draining. Aspiration of the stomach yielded sixty ounces of upper intestinal contents containing occult blood. The abdomen became more distended. He became irrational. His temperature rose to 107.5°, the pulse to 170 and the respirations to 30. He died nine days after operation.

#### DIFFERENTIAL DIAGNOSIS

DR WILLIAM B BREED. There is very little in the present illness in the way of a differential diagnosis. It would seem that he was well on his way toward idiopathic ulcerative colitis. I think that tuberculous colitis in a child like this is not to be considered very seriously. Of course, one must consider the various parasites. I assume that later in the history we shall investigate the question of parasites, also the question of tuberculin tests, etc. Probably x-rays of the chest and stool examinations follow down the diagnosis of tuberculosis and parasitic disease, but offhand I should think that such efforts were fruitless.

"His past history was negative except for an attack of painful but not swollen joints." That is of interest because of the question of possible rheumatic fever—merely as an incidental process, however, because this story of colitis is not often associated with rheumatic fever in children. He may have had rheumatic fever. We should like to know what the examination of his heart was prior to his entry and whether any doctor had ever noted any evidence of rheumatic heart disease. There is some evidence here to indicate that this boy has rheumatic heart disease and in view of the enlargement of the heart I think it may turn out that he has. On the other hand, if he had only a severe degree of anemia we might get these findings through the stethoscope. He might have the systolic murmur of course, and one does rarely get a diastolic murmur in severe anemia which clears up with the improvement of the anemia. Our experience in the House of the Good Samaritan is that very many times we get a rumbling diastolic murmur during the acute stage of the disease, even in the presence of true rheumatic heart disease, and later on find that it disappears. Frequently in such a case no stenosis can be demonstrated at autopsy. So, in view of the enlargement I think we have to say he has mild rheumatic heart disease, but I am not prepared to say he will show stenosis of the mitral valve. We get very meek about this question of diastolic murmurs because we have been tripped up too many times in making the diagnosis of mitral stenosis on the basis of a diastolic murmur at the apex and finding later no real stenosis of the valve.

He has hypochromic anemia, secondary in

type, with a rather surprisingly high red cell count. I should like to have that checked because one would rather expect with a hemoglobin of 50 not quite such a high red count even though it is a hypochromic anemia.

DR. BENJAMIN CASTLEMAN The hemoglobin was repeated a week later and was 60 per cent. Two weeks later the red cell count was 5 400 000 with a hemoglobin of 60 per cent.

DR. BREED "Tuberculin tests up to 1 1000 were negative." That practically rules out tuberculosis, 1 1000 is a strong dilution.

It does not say anything about examination of the stools and culture for amebae.

DR. CASTLEMAN They were done and were negative.

DR. BREED I think this is a perfectly good picture for ulcerative colitis.

DR. CASTLEMAN I might say, Dr. Breed that x-ray examination of the heart showed no enlargement.

DR. BREED And no mitral shape, I take it.

DR. CASTLEMAN No.

DR. BREED This diastolic murmur might be a red herring, also the question of enlargement. I am not sure he has rheumatic heart disease at all.

Apparently then, on the basis of how he was treated, the hospital diagnosis was ulcerative colitis. Of course, the hospital may be wrong.

He came in again after six days. Something must have come up of an acute nature that sent him back into the hospital.

I have not read the history but I imagine he got so much worse that they operated on him. That brings up the question of why they did not operate on him sooner. He was pretty well during his first stay. I think the one temptation with these people is to let them go until they get in such poor condition they are bad risks.

There is remarkably successful treatment of anemia here! His hemoglobin which was 50 per cent is now up to 95 per cent, unless he was dehydrated. I think the smear would be of some value.

DR. CASTLEMAN He was very ill and dehydrated at the time.

DR. BREED I do not see how that would make the red cells appear normal as quickly as this. One of these examinations must be faulty.

DR. CASTLEMAN A week before he left the hospital the red count was 5 4 and the hemoglobin 60. No smear is recorded.

DR. BREED I see here that they did operate on him.

Did they examine the heart at this admission?

DR. CASTLEMAN The heart was normal in size. There was a blowing systolic murmur at the apex, transmitted to the axilla.

DR. BREED Any diastolic murmur?

DR. CASTLEMAN A<sub>2</sub> was equal to P<sub>2</sub>. There was no diastolic murmur heard.

DR. BREED I do not know whether we can find the exact cause of death. Intestinal obstruction is not indicated. We know that the stomach contents showed upper intestinal fluid. He may have had ileus from toxemia. I think he just died from colitis and operation and I think it is futile to inquire into the exact and distinct cause of death. I should doubt if you find real intestinal obstruction. I am going to say that he did not have rheumatic heart disease. I am assuming that he did not have amebic dysentery and that he died of ulcerative colitis. It is what one would expect in a young person because the younger they are the more severe they are as a rule.

A PHYSICIAN Was a proctoscopic examination done?

DR. BREED There is no record of it.

A PHYSICIAN How about the blood picture?

DR. BREED I am assuming that he had a secondary anemia due to blood loss and toxemia.

A PHYSICIAN Do you think it was primary blood disease? I am wondering how much dependence you can put on the record as to the blood picture.

DR. BREED I am not willing to put very much on it. It contradicts itself. I am going to leave the blood picture out. I think he had secondary anemia. I will take the first report rather than the second one.

Of course, the outlook in a person of this age is very gloomy with or without operation and one cannot look back and say that if he had been operated on earlier he would have survived. But, as I said before, people often hesitate too long in operating on ulcerative colitis. Naturally, it is well to hesitate for a certain length of time to be sure of the diagnosis, because it is very disconcerting to operate by mistake on a case of amebic dysentery or the like.

#### CLINICAL DIAGNOSES

Ulcerative colitis  
Acute appendicitis  
Intestinal obstruction

#### DR. WILLIAM B. BREED'S DIAGNOSES

Idiopathic ulcerative colitis  
Hypochromic secondary anemia.  
Ileus?

#### ANATOMIC DIAGNOSES

Chronic ulcerative colitis  
Peritonitis, generalized, acute.  
Appendiceal abscess, retroperitoneal, localized  
Intestinal obstruction, ileum  
Operative wounds: Necrotomy, appendectomy, jejunostomy  
Hydronephrosis, right.  
Pulmonary congestion.  
Hydrothorax, left.



## PATHOLOGIC DISCUSSION

DR CASTLEMAN He had no rheumatic heart disease. The heart was small and showed no valvular lesions. He was very pale and emaciated, and weighed only 85 pounds. On opening the abdominal cavity it was found filled with slightly turbid hemorrhagic fluid. The surfaces of the intestine were all covered with a fibrinous exudate. There was also a moderate degree of intestinal obstruction in the ileum, produced by a small kink due to adhesions of fibrinous bands. The colon throughout, beginning at the cecum and extending down to the anus, showed numerous ulcerations and in between the ulcerations there were small areas of mucosa that appeared raised, the so-called pseudopolyps, but no true adenomatous polyps at all and no evidence of carcinoma. There were no perforations or fistulae. He had some congestion in his lungs and a little fluid in the pleural cavities but no evidence of pneumonia. The bone marrow was tremendously hyperplastic, a finding which would go well with the hypochromic anemia.

DR BREED What sort of peritonitis was it?

DR CASTLEMAN *Bacillus coli*.

A PHYSICIAN How often do these ulcerative colitis cases perforate? As often as amebae?

DR CASTLEMAN There is a type of acute ulcerative colitis in which the symptoms are only of two or three weeks' duration before death ensues. This type is much more prone to perforate than the chronic type with remissions. The chronic type on the other hand is more prone to develop strictures and polyps. The Mayo Clinic has recently reviewed 800 cases and found that 2½ per cent of them developed adenocarcinoma<sup>1</sup>. Ten per cent developed true adenomatous polyps, not the pseudopolyps that you ordinarily see, true polyps. We have had only one case of carcinoma associated with chronic ulcerative colitis<sup>2</sup>. In this case there were multiple carcinomata, a fact that suggests that the tumor arose on a previous irritative focus.

A PHYSICIAN How do you account for the systolic murmur?

DR BREED I think on the basis of anemia, even the diastolic murmur.

A PHYSICIAN His diastolic murmur disappeared but the systolic did not.

DR BREED With nothing else to back up the diagnosis of heart disease a systolic murmur can be thrown out. That is, with no enlargement and no evidence of any heart disease other than the murmur you had better disregard it.

I wonder what the joint pains were two years before. He might have had rheumatic fever. Some have rheumatic fever even at this age without heart disease, but very few, of course, escape without cardiac involvement.

A PHYSICIAN Would a proctoscopic examination have cleared up this picture? If there was ulcerative colitis you should see the ulcers quite easily.

DR BREED They felt pretty certain that it was true ulcerative colitis and did not consider anything else after the negative tuberculin test. They did not consider amebic dysentery very seriously. Some people say they can tell the difference between ulcerative colitis and amebic colitis by proctoscopic examination but it is very difficult in some cases. I know of two that were wrongly diagnosed by proctoscopy, amebic dysentery was called ulcerative colitis.

A PHYSICIAN Do you ever have diarrhea and constipation in idiopathic colitis?

DR BREED They have spontaneous remissions and during the remission they may be constipated.

A PHYSICIAN Supposing that he had not been secondarily infected, what would be the chances of cure?

DR BREED I think not very good because sometimes even with an ileostomy they will go on and have colitis. All you do is short circuit the bowel stream from the colon and let it rest. They do not attempt to close the ileostomy any more. Do you know of any cases where the circuit has been reestablished and a cure obtained, Dr Castleman?

DR CASTLEMAN I do not think that there have been any in this hospital.

## REFERENCES

- 1 Brust J C M. and Barger J A. Neoplastic factor in chronic ulcerative colitis. *New Eng J Med* 210 682 1934.
- 2 Case 21081. *New Eng J Med* 212 350 (Feb 21) 1935.

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## 'CONTINUING MEDICAL EDUCATION'

UNDER this suggestive caption\*, the Vice-President in Charge of University Relations, University of Michigan describes Michigan's Postgraduate Program for keeping practitioners up to date in their knowledge of the science and of the art of medicine. The problem is stated in a quotation from Osler "The family doctor, the essential factor in the battle, should be carefully nurtured by our schools and carefully guarded by the public." The responsibility of the public is generally lost sight of, but the participation of the schools has always been regarded as necessary. It is here that the teachers must chiefly be sought and found but the form and degree of participation have varied in the numerous experiments made in many states. Osler was writing on the "Educational Value of Medical Societies", and it is to the state society that the general practitioner must look for the

chief means for solution of the problem, with which he is by himself helpless to deal.

All of these experiments in "continuing medical education" are worthy of close scrutiny and study, for the physician should be a student all his life, but among the growing group the Michigan experiment especially deserves attention. The details need not be specified now naturally they might be different in Michigan with a state university from what would be appropriate in Massachusetts.

The efforts of the Massachusetts Medical Society have met with encouraging response, but the opportunities have been merely touched. The hands of those responsible for the rather modest program should be upheld and they should be encouraged by suggestion and helpful criticism.

The possible results of a wise program carried out over a period of years are very great. Already as Dr. Bruce says of Michigan "There has been a decided improvement in the morale of the medical profession of the state, and evidence of a helpful coöperative attitude of one physician to another stimulated by the class room contacts. In addition there has developed a teaching talent in many well informed practitioners and specialists which hitherto has not had opportunity to express itself. But possibly more important than all, the standards of social responsibility of the profession have gone forward, as well as those of medical practice, with the evidence of a renewed confidence on the part of the people."

If these results may reasonably be expected, the movement deserves the support of every member of the medical profession and especially of every member of the state society.

## INDUSTRIAL DISEASE REFEREES

UNDER House Bill 2147, enacted recently, the text of which appears on page 338 of this issue, provision is made for the selection, by the Industrial Accident Board, of impartial physicians who may examine a claimant for compensation, for "injury due to an industrial disease", and "may cause to be made an inspection of the place or places of employment."

The selection of these referees is to be made from a list of registered physicians prepared by the Board of Registration in Medicine. Whether this list shall be the entire list of registered practicing physicians, or a list of those considered suitable by the Registration Board does not appear. The last paragraph of the act provides for a revision of the list on the request of the Industrial Accident Board. Whether this in turn means a revision to delete those who no longer practice and include new registrants, also does not appear. The assumption that discretion lies with the registration

board may be the intention of the framers of the bill. If indicated, the reviewing board may refer the matter back to the referees for further diagnosis.

One may see that the operation of the provisions of this act may be a reasonable resource for the injured workman, if the service rendered by the Industrial Accident Board, the Board of Registration, the Impartial Referees and the Reviewing Board is free from political influences.

Under the operation of this act, if the injured workman, the doctors and the insurance companies all find that the results are satisfactory, it may prove to be a step in the right direction. The results of the operation of this act will be watched with interest.

### THE RESPONSIBILITY OF OWNERS OF DOGS

THE Massachusetts Department of Public Health is placing on owners of dogs the responsibility of a large proportion of the almost three hundred cases of rabies in this state during the past year.

About one thousand persons who were bitten by or exposed to these dogs or bitten by stray dogs have had to take antirabic treatment. One untreated child bitten by a stray dog died of rabies.

Rabies is on the increase, with the spread to several sections of the state from the metropolitan area.

Here is a public health opportunity in which doctors may participate by telling the owners of dogs, among their patients, to have the animals immunized. Veterinarians will give the required treatment. Rabies is one of the most horrible diseases, but fortunately is largely preventable.

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

SWEET, RICHARD H. M.D. Harvard University Medical School 1926. F.A.C.S. Assistant Surgeon, Massachusetts General Hospital, and Palmer Memorial Hospital, Boston. His subject is "Volvulus of the Cecum. Acute and Chronic with Reports of Eight Cases." Page 287. Address 205 Beacon Street, Boston.

OVERHOLT, RICHARD H. A.B., M.D. University of Nebraska College of Medicine 1926. F.A.C.S. Instructor in Surgery, University of Pennsylvania. Surgeon, Lahey Clinic, Boston, and in charge of Department of Thoracic Surgery. Thoracic Surgical Consultant to New England Deaconess Hospital, New England Baptist Hospital, Norfolk County Hospital, Bristol County Hospital, and New Hampshire State Sanatorium. Address 605 Commonwealth Avenue, Boston. Associated with him is

DONCHES, JOSEPH C. M.D. University of Pittsburgh School of Medicine 1932. Fellow in Surgery, Lahey Clinic. Address 605 Commonwealth Avenue, Boston, Mass. Their subject is "Subphrenic Abscess." Page 294.

GARREY, WALTER E. B.S., M.D. Harvard University Medical School 1931. Resident, East Surgical Service Section, Massachusetts General Hospital. Address Massachusetts General Hospital, Boston. Associated with him is

COHN, ROY B. A.B., M.D. Leland Stanford University School of Medicine 1932. House Officer, East Surgical Service, Massachusetts General Hospital. Formerly, Resident in Neurosurgery, Massachusetts General Hospital. Address Massachusetts General Hospital, Boston. Their subject is "The Use of Sodium Evipal as an Anesthetic for Short Surgical Procedures." Page 301.

SISE, L. F. A.B., M.D. Harvard University Medical School 1901. Anesthetist, Lahey Clinic, and New England Baptist Hospital, Boston. Consulting Anesthetist, New England Deaconess Hospital, Boston. Address 605 Commonwealth Avenue, Boston. Associated with him are

WOODBIDGE, P. D. A.B., M.D. Harvard University Medical School 1921. Anesthetist, Lahey Clinic, New England Deaconess Hospital and New England Baptist Hospital. Address 605 Commonwealth Avenue, Boston. And

EVERSOLE, U. H. A.B., M.D. University of Kansas School of Medicine 1932. Anesthetist, Lahey Clinic, New England Deaconess Hospital and New England Baptist Hospital, Boston. Address 605 Commonwealth Avenue, Boston. Their subject is "Cyclopropane. A New and Valuable Gas Anesthetic." Page 303.

HOLMES, GEORGE W. M.D. Tufts College Medical School 1906. Roentgenologist, Massachusetts General Hospital. Clinical Professor in Roentgenology, Harvard Medical School. Address Massachusetts General Hospital, Boston. Associated with him is

HUNTER, FRANCIS T. A.B., M.A., M.D. Harvard University Medical School 1924. Assistant Physician, Massachusetts General Hospital. Address Massachusetts General Hospital, Boston. Their subject is "The Management of Roentgen Sickness." Page 308.

KAPPIUS, MEINOLPH V. B.Sc., M.D. Harvard University Medical School 1924. Assistant in Obstetrics, Harvard Medical School. Assistant to Out-Patients, Boston Lying-In Hospital, Boston, and Free Hospital for Women, Brookline. His subject is "Vorhees Bag in the Treatment of Placenta Previa." Page 310. Address 475 Commonwealth Avenue, Boston.

FITCHET, SETH M. A.B., M.D. Harvard University Medical School 1921. B.P.H., F.A.C.S. Visiting Surgeon, Orthopedic Department, Chil-

dren's Hospital Assistant in Surgery, Massachusetts General Hospital Associate Surgeon, New England Baptist Hospital Consulting Surgeon, Josiah B Thomas Hospital, Peabody and Massachusetts Eye and Ear Infirmary Assistant in Orthopedic Courses for Graduates, Harvard Medical School His subject is "Fracture of the Epiphysis of the Lesser Trochanter of the Femur" Page 313 Address 319 Longwood Avenue, Boston

VAN ETEN, N B M.D. Bellevue Hospital Medical College 1890 F.A.C.P. Speaker House of Delegates of the American Medical Association Trustee of the Medical Society of the State of New York President and Medical Director of the Morrisania City Hospital Chairman of the Medical Board of the Union Hospital of The Bronx. His subject is "Medical Economics" Page 315 Address 300 East Tremont Avenue, New York, N Y

## MASSACHUSETTS LEGISLATIVE NOTE

House 2147 as enacted

AN ACT providing for the reference of certain cases under the Workmen's Compensation Act to industrial disease referees

Chapter one hundred and fifty two of the General Laws is hereby amended by inserting after section nine A as appearing in the Tercentenary Edition the following new section —

SECTION 9 B The board of registration in medicine shall as soon as this section takes effect prepare and transmit to the department a list of registered physicians In the event of any employee or in case of his death his legal representative or dependents making a claim for compensation alleging that his injury is due to an industrial disease, the industrial accident board shall submit the claim to three physicians selected by it from said list, who shall be impartial Such three physicians shall be known as industrial disease referees They may make such examinations of the employee and cause to be made such inspections of the place or places of employment as they deem necessary and shall report their diagnosis to the department. The insurer shall reimburse the department for the fees and other expenses of such referees subject to the approval of the industrial accident board The diagnosis shall be made by a majority vote of the referees and shall be included in the decision of the single member and in the decision of the reviewing board and such diagnosis shall be binding on the parties. The reviewing board if a claim for review is filed may refer the matter back to the industrial disease referees for further diagnosis The board of registration in medicine from time to time may and on request of the industrial accident board shall revise the list of physicians from which industrial referees may be appointed and shall notify the department of such revision

## MISCELLANY

### APPOINTMENTS AT THE BOSTON UNIVERSITY SCHOOL OF MEDICINE

School of medicine promotions—Leroy M S Miner M.D., D.M.D., dean of Harvard dental school, professor of stomatology Edwin W Smith M.D. professor of obstetrics Burnham S Walker, Ph.D. M.D., professor of biochemistry C Wesley Sewall, M.D., associate professor of obstetrics Frederick F Younman Ph.D. associate professor of pharmacology William C Boyd, Ph.D. assistant professor of biochemistry John C V Fisher M.D., assistant professor of obstetrics Kenneth Christophe M.D., instructor in orthopedic and fracture surgery Enslo K F Ronka M.D. instructor in anatomy Albert J Plummer Ph.D., instructor in pharmacology Frank Barton M.D., instructor in clinical surgery

The following appointments were made to the medical school faculty Richard H. Norton D.M.D. assistant professor of stomatology Phillips Boyd M.D. assistant in anatomy Welman B Christie M.D., assistant in surgery L. Curtis Foye M.D. assistant in pediatrics Thomas R. Mansfield M.D. assistant in surgery Anthony Macaluso M.D., assistant in ophthalmology Barnett H. Rosenfield, M.D. assistant in gynecology Carl E. Trapp M.D., assistant in neurology

### DR MCKHANN VISITS CHINA

Dr Charles F. McKhann Assistant Professor of Pediatrics at the Harvard Medical School has gone to China where he will be Visiting Professor of Pediatrics at the Peking Union Medical College during the first half of the school year 1935 and 1936 He will return to Boston early in March, 1936

## CORRESPONDENCE

### THE CHANGING ORDER IN MEDICAL CONVENTIONS OR A SUGGESTION FOR THE PROGRAMS OF MEDICAL CONVENTIONS

Editor *New England Journal of Medicine*,

The increasing value of the Scientific Exhibit at the conventions of the American Medical Association has impressed itself upon the attention of every visitor Two features of the Exhibits in recent years have been prominent

(1) The demonstration of new methods in diagnosis and treatment.

(2) The extension of knowledge of modern methods and medical concepts through the personal energy and enthusiasm of individual exhibitors.

The program at large medical conventions has become so extensive and diversified that greater correlation of the didactic portions with the exhibits seems necessary The didactic papers given in various sections would gain tremendously in interest and effectiveness if accompanied in some way by active demonstration of some phase of the subject. The use of moving pictures or slides which can be stopped at any point for elaboration of some point or the answer

board may be the intention of the framers of the bill. If indicated, the reviewing board may refer the matter back to the referees for further diagnosis.

One may see that the operation of the provisions of this act may be a reasonable resource for the injured workman, if the service rendered by the Industrial Accident Board, the Board of Registration, the Impartial Referees and the Reviewing Board is free from political influences.

Under the operation of this act, if the injured workman, the doctors and the insurance companies all find that the results are satisfactory, it may prove to be a step in the right direction. The results of the operation of this act will be watched with interest.

### THE RESPONSIBILITY OF OWNERS OF DOGS

The Massachusetts Department of Public Health is placing on owners of dogs the responsibility of a large proportion of the almost three hundred cases of rabies in this state during the past year.

About one thousand persons who were bitten by or exposed to these dogs or bitten by stray dogs have had to take antirabic treatment. One untreated child bitten by a stray dog died of rabies.

Rabies is on the increase, with the spread to several sections of the state from the metropolitan area.

Here is a public health opportunity in which doctors may participate by telling the owners of dogs, among their patients, to have the animals immunized. Veterinarians will give the required treatment. Rabies is one of the most horrible diseases, but fortunately is largely preventable.

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

SWEET, RICHARD H. M.D. Harvard University Medical School 1926. F.A.C.S. Assistant Surgeon, Massachusetts General Hospital, and Palmer Memorial Hospital, Boston. His subject is "Volvulus of the Cecum. Acute and Chronic with Reports of Eight Cases." Page 287. Address 205 Beacon Street, Boston.

OVERHOLT, RICHARD H. A.B., M.D. University of Nebraska College of Medicine 1926. F.A.C.S. Instructor in Surgery, University of Pennsylvania. Surgeon, Lahey Clinic, Boston, and in charge of Department of Thoracic Surgery, Thoracic Surgical Consultant to New England Deaconess Hospital, New England Baptist Hospital, Norfolk County Hospital, Bristol County Hospital, and New Hampshire State Sanatorium. Address 605 Commonwealth Avenue, Boston. Associated with him is

DONCHES, JOSEPH C. M.D. University of Pittsburgh School of Medicine 1932. Fellow in Surgery, Lahey Clinic. Address 605 Commonwealth Avenue, Boston, Mass. Their subject is "Subphrenic Abscess." Page 294.

GARREY, WALTER E. B.S., M.D. Harvard University Medical School 1931. Resident, East Surgical Service Section, Massachusetts General Hospital. Address Massachusetts General Hospital, Boston. Associated with him is

COHN, ROY B. A.B., M.D. Leland Stanford University School of Medicine 1932. House Officer, East Surgical Service, Massachusetts General Hospital. Formerly, Resident in Neurosurgery, Massachusetts General Hospital. Address Massachusetts General Hospital, Boston. Their subject is "The Use of Sodium Evipal as an Anesthetic for Short Surgical Procedures." Page 301.

SISE, L. F. A.B., M.D. Harvard University Medical School 1901. Anesthetist, Lahey Clinic, and New England Baptist Hospital, Boston. Consulting Anesthetist, New England Deaconess Hospital, Boston. Address 605 Commonwealth Avenue, Boston. Associated with him are

WOODBIDGE, P. D. A.B., M.D. Harvard University Medical School 1921. Anesthetist, Lahey Clinic, New England Deaconess Hospital and New England Baptist Hospital. Address 605 Commonwealth Avenue, Boston. And

EVERSOLE, U. H. A.B., M.D. University of Kansas School of Medicine 1932. Anesthetist, Lahey Clinic, New England Deaconess Hospital and New England Baptist Hospital, Boston. Address 605 Commonwealth Avenue, Boston. Their subject is "Cyclopropane. A New and Valuable Gas Anesthetic." Page 303.

HOLMES, GEORGE W. M.D. Tufts College Medical School 1906. Roentgenologist, Massachusetts General Hospital. Clinical Professor in Roentgenology, Harvard Medical School. Address Massachusetts General Hospital, Boston. Associated with him is

HUNTER, FRANCIS T. A.B., M.A., M.D. Harvard University Medical School 1924. Assistant Physician, Massachusetts General Hospital. Address Massachusetts General Hospital, Boston. Their subject is "The Management of Roentgen Sickness." Page 308.

KAPPIUS, MEINOLPH V. B.Sc., M.D. Harvard University Medical School 1924. Assistant in Obstetrics, Harvard Medical School. Assistant to Out-Patients, Boston Lying-In Hospital, Boston, and Free Hospital for Women, Brookline. His subject is "Vorhees Bag in the Treatment of Placenta Previa." Page 310. Address 475 Commonwealth Avenue, Boston.

FITCHET, SETH M. A.B., M.D. Harvard University Medical School 1921. B.P.H., F.A.C.S. Visiting Surgeon, Orthopedic Department, Chil-

settled in Attleboro in 1910 and practiced there until his death with the exception of war service. He had served as school physician and physical director of high school athletic activities

## NOTICES

### REMOVAL

M. L. KRAFT M.D., announces the removal of his office to 93 Washington Avenue Chelsea Mass

### A VACANCY FOR A PHYSICIAN

An opening for a country practice exists in Massachusetts. Call at the office of the *New England Journal of Medicine*

### UNITED STATES CIVIL SERVICE EXAMINATIONS

The United States Civil Service Commission has announced open competitive examinations as follows  
Public Health Specialists

Applications for a number of specialist positions in the U S Public Health Service, Treasury Department, must be on file with the U S Civil Service Commission Washington, D C., not later than September 9 1935 These positions include several grades of bacteriologist, cytologist, epidemiologist, and mycologist (medical) positions and the position of senior pathologist (medical)

Area Medical Director \$5 600 a Year  
Indian Service, Department of the Interior

Applications must be on file with the United States Civil Service Commission at Washington, D C., not later than August 26 1935

The United States Civil Service Commission announces an open competitive examination for the position named above Vacancies in this position and in positions requiring similar qualifications will be filled from this examination unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer or promotion The salary named above is subject to a deduction of 3 1/2 per cent toward a retirement annuity and to a further deduction of \$400 for Government quarters when furnished

## REPORT AND NOTICE OF MEETINGS

### THE SOUTHEASTERN MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH

The Southeastern Massachusetts Association of Boards of Health held its annual meeting in the Town Hall at Marion on Wednesday July 31 some sixty persons being in attendance After a busi-

ness meeting, which included the reading of reports of the secretary and treasurer the election of officers was in order resulting in the following list for the coming year

President, Dr T L Swift Fulmouth Vice-Presidents, Dr G El Ward Orleans, and Joseph Christy Dartmouth Secretary Treasurer George F Crocker Marston's Mills Executive Committee Dr R. P MacKnight, New Bedford Dr W O Hewitt, Attleboro and W F Delano Fairhaven

In a brief address of greetings Walter K. Perry of the Marion committee sketched the admirable work in health and public sanitation effected by the town. Some forty years ago an improvement association was formed, the first work of which was a campaign against the fly which included the screening of cellars and proper care of manure heaps. Next, work was toward the elimination of the mosquito. In this more than \$45 000 has been expended and the territory covered includes breeding places in neighboring towns. Marion has expended \$165 000 for a sewer system the sewage being pumped to a basin far removed from the shore and there treated so that there is no pollution of coastal waters. The water system which has a longer mileage than the streets since it supplies cottages at the shore cost about \$300 000. Even with these costs the town indebtedness today is only \$100 000. There are two full time nurses serving the town.

The speaker for the occasion was Hermann C Lythgoe, S B Director of the Division of Food and Drugs Massachusetts Department of Public Health, who presented the important points of recent legislation affecting the sale of mixtures containing alcohol of narcotics, the licensing of the manufacture and sale of soft drinks, and the inspection by the local health officers of dairies furnishing milk to towns.

Following the formal meeting the company adjourned to the Old Stone House where a collation was served.

### MIDDLESEX SOUTH DISTRICT MEDICAL SOCIETY

The Mid-Summer meeting will be held Wednesday August 21 1935 The undersigned will act as host. Among the attractions are the following. An opportunity for an afternoon in Bedford. Any "New Dealers" will be very welcome regardless of their rash ideas but can expect to have some in jections of horse and dog sense and scents.

My unpretentious ranch has been in existence since 1095 and is located on the North Road in Bedford about one mile beyond the centre of the village and four miles north of Lexington.

There is an opportunity for any number to swim in the pool and for a limited number to ride horseback through the woods. They should come

prepared for riding and let the undersigned know their intentions so that plans can be made for suitable mounts. There is unrivaled opportunity for hiking through the primeval woods. There is a suitable field for ball games and an opportunity for quoits and archery.

Arrangements can be made for any number to play golf at the Paul Revere Golf Club which is but a short distance from the Farm. It is quite essential to notify the undersigned in advance as to the number who would care to spend the afternoon golfing.

There will be a clambake on one of the hills at about 12:30 or 1 o'clock.

When arriving in Bedford you continue north on Route No. 4, the main road going toward the mountains, for about one mile. When coming from the south or east of Lexington, you turn to the right at the Battle Green on Bedford Street and continue straight to the centre of Bedford. If coming from the northeast, you follow Route 62 directly to Bedford Centre. If coming from the north or west you can follow Route No. 4 from Chelmsford Centre directly to the Farm or Route No. 2 or No. 2A to Concord and then No. 62 to Bedford.

If Wednesday, August 21 should prove to be rainy or unpleasant, the meeting will be postponed until the following Wednesday.

In order that the necessary provisions may be made, please notify the undersigned promptly.

G. V. BUEHLER

### SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

#### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, AUGUST 19, 1935

Wednesday, August 21—

12 M. Clinico-Pathological Conference. Children's Hospital.

Saturday, August 24—

\*10-12 Staff rounds at the Peter Bent Brigham Hospital.

\*Open to the medical profession.

†Open to Fellows of the Massachusetts Medical Society.

August 29 - September 6—Latin American Congress of Physical Therapy, X-Ray and Radium. For information address Dr. Madge C. L. McGuinness, 1211 Madison Avenue, New York City.

September 5, 6, 7—American Congress of Physical Therapy will meet at the Hotel Kansas City, Kansas City, Missouri. Program and circular of information may be secured by addressing American Congress of Physical Therapy, 30 North Michigan Avenue, Chicago, Illinois.

September 17, 18, 19—Eleventh Clinical Congress of the Connecticut State Medical Society. For details address Dr. Creighton Barker, 129 Whitney Avenue, New Haven, Conn.

October 7-10—American Public Health Association will meet in Milwaukee, Wisconsin. For information address the American Public Health Association, 50 West 50th Street, New York City.

October 21 - November 2—1935 Graduate Fortnight of the New York Academy of Medicine. See page 898, issue of May 9.

October 28 - November 1—The Twenty-Fifth Clinical Congress of the American College of Surgeons. See page 1065, issue of May 30.

### DISTRICT MEDICAL SOCIETY

MIDDLESEX SOUTH DISTRICT MEDICAL SOCIETY

August 21—See page 335

### BOOKS RECEIVED FOR REVIEW

A Textbook of Clinical Neurology with an Introduction to the History of Neurology. Third Edition. Re-set. Israel S. Wechsler. 826 pp. Philadelphia and London: W. B. Saunders Company. Cloth, \$7.00 net.

Lactobacillus Acidophilus and Its Therapeutic Application. Leo F. Rettger, Maurice N. Levy, Louis Weinstein and James E. Weiss. 203 pp. New Haven: Yale University Press. \$2.50.

Diet and Physical Efficiency. The influence of frequency of meals upon physical efficiency and industrial productivity. Howard W. Haggard and Leon A. Greenberg. 180 pp. New Haven: Yale University Press. \$3.00.

Methods and Materials of Health Education. Jesse Feiring Williams and Fannie B. Shaw. 331 pp. New York: Thomas Nelson & Sons.

National Medical Monographs. Abnormal Arterial Tension. Edward J. Stieglitz. Edited by Morris Fishbein. 261 pp. New York: National Medical Book Company, Inc. \$4.00.

The Spleen and Resistance. David Perla and Jessie Marmorston. 170 pp. Baltimore: The Williams & Wilkins Company. \$2.00.

Six Conférences de Physiologie. Léon Binet. 73 pp. Paris: Masson et Cie. 12 fr. Leçons de Physiologie Médico-Chirurgicale. Léon Binet. 244 pp. Paris: Masson et Cie. 40 fr.

Docteur Carlos J. Finlay. Son Centenaire 1933. Sa Découverte 1881. Francisco Dominguez. 302 pp. Paris: Librairie Louis Arnette.

Bernardo de Galvez in Louisiana 1776-1783. John Walton Caughey. 290 pp. California: University of California Press.

Thermal Processes for Canned Marine Products. O. W. Lang. 182 pp. California: University of California Press.

Traitement des Fractures et Luxations des Membres. Jacques Leveuf, Charles Girode et Raoul Charles Monod. 447 pp. Paris: Masson et Cie. 50 fr.

National Medical Monographs. The Management of Colitis. J. Arnold Barger. 234 pp. New York: National Medical Book Company, Inc.

National Medical Monographs. Diseases of the Chest. J. Arthur Myers. 285 pp. New York: National Medical Book Company, Inc.

National Medical Monographs. Obstetrics for the General Practitioner. J. P. Greenhill. 304 pp. New York: National Medical Book Company, Inc.

Lilly Research Laboratories, Dedication. Indianapolis: Eli Lilly & Company.

Midwifery. By ten teachers under the direction of Clifford White. Edited by Comyns Berkeley, J. S. Fairbairn and Clifford White. Fifth Edition. 740 pp. New York: William Wood & Company. \$6.00.

The Medicine Man of the American Indian and His Cultural Background. William Thomas Corlett. 369 pp. Springfield and Baltimore: Charles C. Thomas. \$5.00.

A Bibliography of Two Oxford Physiologists, Richard Lower 1631 1691, John Mayow 1643-1679 John F. Fulton 62 pp New Haven Yale University Press  
*Traité de Thérapeutique* A Theohari Tome I et II 1307 pp Paris Masson et Cie 125 fr

New and Supplementary Facts and Figures about Tuberculosis. Jossamine S Whitney 46 pp New York National Tuberculosis Association \$50

The Doctor and the Public A study of the sociology, economics ethics and philosophy of medicine based on medical history James Peter Warbasse 572 pp New York Paul B Hoeber Inc

A Synopsis of Regional Anatomy T B Johnston Third Edition 460 pp Philadelphia Lea & Febiger \$150

National Medical Monographs. Commoner Diseases of the Skin S William Becker 283 pp New York National Medical Book Company Inc

National Medical Monographs. Industrial Medicine W Irving Clark and Philip Drinker 463 pp New York National Medical Book Company Inc

Gynecological and Obstetrical Tuberculosis Edwin M Jameson 256 pp Philadelphia Lea & Febiger \$3.50

A Record Book for Tuberculosis Patients Law reason Brown New York National Tuberculosis Association \$15

The Theory and Practice of Anaesthesia M D Newsworthy 223 pp London Hutchinson Scientific 1/6 net.

The Medical Man and the Witch During the Renaissance Gregory Zilboorg 215 pp Baltimore The Johns Hopkins Press \$2.50

Living Along With Heart Disease Louis Levin 126 pp New York The Macmillan Company \$1.50

Annual Reprint of the Reports of the Council on Pharmacy and Chemistry of the American Medical Association for 1934 with the comments that have appeared in the Journal 135 pp Chicago American Medical Association

New and Nonofficial Remedies 1935 Containing descriptions of the articles which stand accepted by the Council on Pharmacy and Chemistry of the American Medical Association on January 1 1935 510 pp Chicago American Medical Association.

Diet Control A system of eleven hundred diets for the prescription of diabetic anti-obesity and measured diets in general George E Anderson and Paul C. Eschweiler New York City Gallo & Ackerman Inc.

Arthritis and Rheumatoid Conditions. Their nature and treatment Ralph Pemberton Second Edition 455 pp Philadelphia Lea & Febiger \$5.50

Oxford Medical Publications. Gastritis and its Consequences Knud Faber 119 pp London Oxford University Press \$3.00

1000 Questions and Answers on T B Edited by Fred H. Hoise. 232 pp New York City National Tuberculosis Association

Consultations de Cardiologie George Marchal 227 pp Paris Masson et Cie 25 fr

Les Acquisitions Nouvelles de L'Endocrinologie R. Riviere. 305 pp Paris Masson et Cie 36 fr

The American Illustrated Medical Dictionary A complete dictionary of the terms used in medicine surgery dentistry pharmacy chemistry nursing veterinary science biology medical biography etc., with the pronunciation derivation and definition. W A. Newman Dorland Seventeenth Edition 1573 pp Philadelphia and London W B Saunders Company \$7.00

## BOOK REVIEWS

Diseases of the Skin Richard L. Sutton and Richard L. Sutton Jr Ninth edition 1433 pp St. Louis The C. V. Mosby Company \$12.50

This standard textbook of dermatology has been thoroughly revised and brought up to date. In this edition the senior Dr. Sutton has included his son as co-author although the latter has collaborated with him in previous editions. The literature since the last edition has been completely covered and twenty-eight new dermatological conditions have been included in this edition. The 1310 illustrations cover the specialty extremely well and aid greatly in diagnosis. It is one of the best pictorial exhibits in any textbook on cutaneous diseases. Included also are many photomicrographs well chosen and excellent in quality.

The section on syphilis has been revised and expanded to eighty-seven pages. The text is limited by the large number of excellent photographs and there is an excellent bibliography.

In general there are many references to all conditions for the student seeking further information. Individual methods of treatment are stressed although reference is made to other therapeutic methods. This book can be recommended to student and practitioner alike as a thoroughly excellent source of information on cutaneous disease.

Maladies Infectieuses A Lemierre 406 pp Paris Masson et Cie 60 fr

This book which strikingly reminds one of The Clinics of North America, is an excellent presentation of a wide variety of disorders of infectious origin. Since the work is essentially a monographic nature the diseases discussed are those usually not treated at any great length in the usual text on infectious diseases. For example instances of benign tetanus undulant fever acute infectious nephritis typhus the various forms of meningitis and amebic abscess are among those described and discussed. Each case is taken up at length and its salient features presented in such fashion that there should be no question as to the possibility of its retention. Although exception may perhaps be taken to the title "diphtheritic nephritis" heading the chapter dealing with this particular complication of diphtheria this minor point should be disregarded in evaluating the work as a whole. It is recommended not only to physicians and students especially interested in the infectious diseases but to the general practitioner as well.



**Sedgwick's Principles of Sanitary Science and Public Health** Rewritten and enlarged by Samuel C Prescott and Murray P Horwood. 654 pp New York The Macmillan Company \$4 25

A generation ago and more Professor Sedgwick of the Massachusetts Institute of Technology was an inspiring force in awakening the public to a realization of the economic importance of the prevention of disease His influence was chiefly due to his attractive and persuasive personality, but to some extent also to his book published in 1901, *The Principles of Sanitary Science and Public Health*

This book long since out of date and undependable, Professors Prescott and Horwood have undertaken to rewrite to serve primarily as a textbook for "students in science or engineering interested in sanitary science and public health," preserving Professor Sedgwick's form of presentation and changing the substance as has appeared necessary to them in the light of better knowledge and wider practical experience

The present edition has 600 pages The subjects treated are presented in twenty-eight chapters, beginning with a consideration of "Health, Old Age and Disease," the Etiology or Causes of Disease "Ancient and Modern Theories," "The Rise and Influence of Bacteriology," and "Sanitary Aspects of the Struggle for Existence, Factors Affecting Survival," and ending with a chapter on "Organization for Public Health Administration in the United States"

Among the other chapter headings are "Refuse Collection and Disposal," "The Protection and Purification of Public Water Supplies," "Milk Supplies and the Public Health"

Where the phenomena of life are considered as in the introductory chapters and that relating to "Nutrition on the Public Health," a professorial physician who has been bedevilled by a clinical experience with the biological vagaries and assimilative idiosyncrasies of real human beings will find that the authors have made biological premises too simple in order to make their conclusions more positive, but on the whole the book is not so dogmatic as those usually written by professorial teachers for the instruction of students

The book contains a large amount of practical information and presents effectively and without prejudice apparently inconsistent correlated observations For these reasons the omission now and then in subjects treated of facts of eminently practical importance become all the more noticeable Failure to mention the presence of grease as an obstacle to the practical utilization of raw sewage as a fertilizer and to refer to the effect of refrigeration on trichina and tape worm cysts may be cited as two instances

An example of the authors' way of summing up essentials is the following

"For among all the vehicles of disease there is perhaps none more potentially dangerous to man than infected milk" The chapters on "Air in Re-

lation to Health and Comfort," on "The Relationship of Housing to Health," and on "Public Health Aspects of Tuberculosis" are to be commended as a refreshingly sensible appraisal of present knowledge regarding these subjects

Doubtless the information contained in the book might have been condensed into fewer pages, but its verbosity is of the kind which makes it entertaining reading

**Mouth Infection** Clinical histories Oliver T Osborne 119 pp New Haven The Printing Office of the Yale University Press \$2 00

Dr Osborne's book of 120 pages is divided into three parts The first part deals with infections of the teeth and gums, the second, with tonsil infection, and the third, with Vincent's infection, the tongue, adenoids, growths and the toothbrush

In the first part, the author gives a brief clinical story of mouth infection in which he deplors the indifference of most physicians to this phase of the practice of medicine He classifies the physical disturbances arising from mouth infection into seven groups, among which are included heart, arthritic and eye conditions A series of clinical histories are given in a condensed form, usually of only three or four lines

The same procedure obtains with respect to Part Two, on tonsil infection. The subjects of Part Three are given quite cursory treatment.

As an outline of the general subject, this book may serve a useful purpose Those seeking only an introduction to the study of the various factors associated with mouth infections, or those who want suggested to them clues to be followed up, will find material in this volume which may intrigue them and perhaps stimulate them to explore further into the subject.

The utmost condensation of the subject matter could only result in these restrictions to the book's usefulness

**Alcohol and Anaesthesia** W BurrIDGE 65 pp London Williams & Norgate Ltd 2/6

"Alcohol and Anaesthesia" is a monograph embodying the ideas of the author as to the mechanism by which alcohol affects tissues and that by which anaesthesia is produced BurrIDGE employs the new principles that central neurones are rhythmically active structures which possess two sources of potential for their energy manifestations, and that the physiological basis of an idea is a group of nerve cells rhythmically active in unison He argues that we are wrong in stating that alcohol is either a stimulant or a depressant, and deduces from experiments that it is both at the same time

We find his argument difficult to follow and his recorded experiment lacking in definite data With his conclusions that some people may use alcohol with benefit while others ought never to use it at all, there would seem to be small ground for disagreement.

# The New England Journal of Medicine

VOLUME 213

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NUMBER 8

## The Massachusetts Medical Society

### SECTION OF DERMATOLOGY AND SYPHILOLOGY

Ball Room Assembly, Hotel Statler, Boston, June 3, 1935, 9 15 A.M.

#### PRESIDING

Charles J White Boston Chairman  
William P Boardman, Boston Secretary

CHAIRMAN WHITE Will the meeting please come to order?

The first business before the meeting is the election of officers for next year and I will call on the chairman of the Election Committee to report the names of the nominees

DR. FREDERICK S BURNS Boston Mr Chairman and Members of the Society—The Nominating Committee has nominated Dr Harvey P Towle for Chairman and Dr Jacoby for Secretary for the coming year

CHAIRMAN WHITE You have heard the names and the chairman is ready to hear a motion about the method of election of these two officers We have no by laws, and I would be pleased if anyone would make a motion as to how we should vote

DR. ARTHUR M GREENWOOD I move that the sec-

retary be instructed to cast one ballot for Dr Towle and Dr Jacoby

VOICES Second the motion

CHAIRMAN WHITE Any discussion of that motion? Now for chairman of next year's section Dr Harvey P Towle of Boston And I will ask the secretary to cast a vote in favor of Dr Harvey P Towle (The secretary cast a ballot.)

CHAIRMAN WHITE Dr Towle is elected unanimously

Now the secretary? Dr Jacoby of Boston. The same motion I suppose? The secretary will cast the ballot.

(The secretary cast a ballot.)

CHAIRMAN WHITE Dr Jacoby is duly elected. Now is there any other business to come before the meeting? If not, we will proceed to the reading of the papers

Dr White then read a paper on The History of Dermatology in Boston."

### THE HISTORY OF DERMATOLOGY IN BOSTON\*

The Chairman's Address

BY CHARLES J WHITE, M.D.†

THERE is still in existence a little broadside measuring four and one half by seven inches announcing that "The undersigned respectfully inform the medical profession of Boston that they have established a free dispensary for diseases of the skin and eye at 93 Ehot Street which will be open every morning from 10 to 12, Sundays excepted They will be happy to attend to any charity cases of these diseases which may be sent to them" This notice was dated September 24, 1860 and was signed J C White, B J Jeffries, F B Sprague and announced, apparently the birth of the specialty of dermatology in Boston

These three young physicians, together with Drs. Hasket Derby, Gustavus Hay and Henry Kemble Oliver, were fellow Bostonians, by birth or by adoption, who studied in Vienna in 1856 and 1857, in the very heyday of the Knistadt when Franz Joseph and his beautiful empress were young and happy, when the music

and ballet of this gay city were the delight of the world and when the master physicians Skoda, Oppolzer, Hyrtl, Sigmund Rokitsky and Hebra were the pride of the medical world When these six devotedly enthusiastic young admirers of Viennese culture returned to Boston five to become ophthalmologists and one a dermatologist they founded their so-called "Vienna Club" which was destined to endure for fifty years before any one of them should die, and is "a rather remarkable record At first their monthly meetings were largely medical with beer and pretzels as an afterthought. With the passing of the years the medical portion of the evening programs became less and less distinct, the event becoming more and more a purely gastronomic affair and the former primitive beer and pretzels assuming gradually the form of a delicious five or six course dinner with rare sherries, still rarer Rhine wines and the inevitable champagnes in temperate abundance One may well grasp the essence of this faithful and happy brotherhood when one reads this last stanza of a poem written by Dr Sprague for the twenty fifth anniversary dinner—

\*Read at the Annual Meeting of the Massachusetts Medical Society Section of Dermatology and Syphilology June 3, 1935

†White Charles J.—Edward Wiggleworth Professor of Dermatology Harvard Medical School For record and address of author see "This Week's Issue," page 310

"Vor fünf und zwanzig Jahren wir schlossen unsern Bund  
Wie Arthur's Ritter wählten wir den guten Tafel  
rund  
Soll man in Wien gemüthlich sein, in Boston nicht  
fidel?  
War wohl bei uns kein Magen leer und durstig keine  
Kehl"

These were interesting men, all well born, all highly educated in languages, medicine, literature and natural history, all different in their looks, their sense of humor, their religious beliefs, their methods of life, but all indissolubly united in their first love—Vienna

One of these men must now occupy our attention for it was he who, first in Boston, devoted his medical life wholly to dermatology and continued to do so, often of necessity militantly, to within a few years of his death in his eighty-third year

James C White entered Harvard College very early in his seventeenth year and graduated in 1853 Charles William Eliot was his classmate and these two men were destined to become the protagonists in the bitter battle for a better Harvard Medical School waged against the then firmly intrenched private medical teachers in Boston

During these college years White worked faithfully at his prescribed studies but he devoted much time to the reading of good English, French and German literature, to the practical study of botany under the personal guidance of Professor Asa Gray and to the shooting and stuffing of birds for the Harvard Natural History Society of which he was Curator of Ornithology In 1856 he received from the Harvard Medical School the degree of Doctor of Medicine and was awarded a "dissertation" on Urinary Calculi

In this same year Dr White joined the Boston Society of Natural History and acted as Curator of Comparative Anatomy from 1858 to 1868 In 1856 he became a member of the Massachusetts Medical Society, was chosen anniversary chairman in 1881, was appointed orator in 1889 and served as president in 1892-1893 In September, 1856, began the year of foreign study and travel In 1857 the practice of medicine in Boston was begun In 1857 also came membership in the Observation Society and two years later in the Society for Medical Improvement, and its permanent chairmanship in 1879 In 1886 the much coveted honor of election to the American Academy of Arts and Sciences was conferred In 1876 the American Dermatological Association was founded and Dr White was chosen its first president and acted again in the same capacity in 1897 In 1907 he enjoyed the great privilege of serving as president of the Sixth International Dermatological Congress During the course of these many years Dr White was elected corresponding member of the French

and Argentine Dermatological Societies and honorary member of the Dermatological Societies of Italy, London, Vienna, Berlin, and New York and enjoyed also the distinction of having named for him a ward in the hospital of the University of Cagliari in Sicily

Dr White's first hospital position came in 1858 when he joined the staff of St Vincent's Orphan Asylum In 1860, as we have already recorded, in conjunction with Dr B Joy Jeffries he opened a dispensary for skin patients In 1863 he was appointed physician to outpatients at the Boston Dispensary In 1865 he was given the same position at the Massachusetts General Hospital and constituted the whole department Think of the growth which one generation has witnessed! In 1870 came the last change when Dr White assumed control of the skin department, a post which he held for thirty-three years And finally, with the foundation of the House Pupil Alumni Association in 1905 he became its first president

In 1863 a course of University lectures was established in the Harvard Medical School and Oliver Wendell Holmes and Dr White were appointed its first lecturers Subsequently, Dr White, with the title of lecturer, gave courses in dermatology in the department of clinical medicine In 1866 he was made adjunct professor of chemistry, and in 1871 professor of dermatology, a new chair in the Harvard Medical School and the first to be established in the United States

Despite all these arduous, quasi-public duties, time was found to mount many skeletons of animals, to act as state expert in chemistry, to prepare an almost complete herbarium of the wild flora of New England, to serve as medical examiner of a large life insurance company, to edit the *Boston Medical and Surgical Journal* and to serve as chairman of the standing committee of the First Church of Boston (Unitarian)

Throughout these long years Dr White strove persistently in public utterance and in private acts for the betterment of medical education and for the up-lifting of dermatology, and it is perhaps true that he took more pride in his share in the successful outcome of these endeavors than in any other of the many activities of his long medical career As a writer he was prolific and catholic and his titles extend to 364 numbers

Apart from medical work, the mainspring of his life, Dr White found time for wide reading and for travel, making six journeys to Europe and two to the Pacific Coast and Alaska.

He died in Boston from one of the infirmities of old age on January 5, 1916, after a life extraordinarily free from illness His was a long and useful career and he died contented

The year 1868 marks the second milestone in

Boston's dermatological history for on March 10 the City Hospital opened its Skin Out Patient Department under the guidance of Dr Howard Franklin Damon who held this position until his resignation in 1877 Dr Edward Wigglesworth was appointed his successor and served until his death early in 1896 Dr George H. Tilden received his first skin appointment at this clinic in 1881 and held his position until he resigned in 1894 Dr James S Howe began his services in 1887 and terminated them in 1907 Dr George F Harding came on the scene in 1893 and remained until his resignation took effect in 1907 Dr Harvey P Towle's name first appears in 1898 and he remained in the department until he left to go to the Massachusetts General Hospital Skin Department in 1903 Dr C Morton Smith's term of service began in 1904 and ended one year later Since then the following men have carried on the early tradition under wonderfully improved conditions

John H. Bufford	1905 (temporarily)
Francis J. Keany	1907—died on November 23 1916
Arthur P. Perry	1907 1918
Townsend W. Thorndike	1907—died on April 5 1928
William P. Boardman	1912 to date
George P. Howe	1914—died serving in the English Army in 1918
Maximilian C. von Groll	1918—died in October 1918
Walter T. Garfield	1920 to date
Jacob H. Swartz	1922 (for six months)
John G. Downing	1925 to date
Bernard Appel	1925 to date
Francis P. McCarthy	1927 to date
Abraham Blumenfeld	1929-1934
Fred N. J. Dube	1931 (served only one month)
C. Edward Green	1931 to date
Henry Benjamin	1931 to date
Irving Showstack	1932 to date
Sidney A. Sheffner	1933 to date
George Schwartz	1933 to date
Arthur M. Simmons	1933-1934
E. A. Lafreniere	1933 to date
Juan E. Clavell	1934 to date
Isadore H. Jaffee	1934 to date
Irving L. Cutler	1934 to date
James C. Brudno	1934 to date
Frederick L. Campbell	1934 to date
Ell E. Leeder	1934 to date
Charles Silverstein	1934 to date

Let us examine the lives of the pioneers of the City Hospital Clinic. Dr Howard Franklin Damon was born in Scituate, a descendant of the early settlers of this old Massachusetts town. He graduated from Harvard College in 1858 and from the Harvard Medical School in 1861 and died on September 17, 1884. He became in due time a member of the Massachusetts Medical Society, of the Boston Society of Medical Surgeons, of the American Medical Association, of the Boston Obstetrical Society, and a charter member of the American Dermatological Association.

It does not appear that he studied abroad but in 1860 he wrote a small brochure on the neuroses of the skin, in 1863 he received the Boylston Medical Prize for an essay on Leucocythaemia and in 1869 he produced an Atlas of Skin Diseases.

Dr Edward Wigglesworth, a worthy successor of a long and distinguished line of Bostonians graduates from Harvard College since 1651, was born on December 30, 1840, received his early education at the Boston Latin School and graduated from Harvard College in 1861 and from Harvard Medical School in 1865. He then gave five years to medical studies in Europe devoting himself especially to dermatology and on his return to Boston he continued this interest until his death in January, 1896. Like Dr White and Dr Jeffries ten years before him, he established a free clinic for indigent skin patients and continued this charitable work until he joined the dermatological department of the City Hospital in 1877 and became its head in 1894. For several years he was an instructor in dermatology at the Harvard Medical School. He was a member of numerous medical societies and became one of the founders of the American Dermatological Association in 1876, its vice-president in 1879 and its president in 1886. He was one of the founders of the American Archives of Dermatology and throughout his medical career was an ardent collector of dermatological books, atlases and models, in the end a splendid collection which he presented to the Harvard Medical School. Dr Wigglesworth did not limit his activities to dermatology for he was one of the founders of the Boston Medical Library, gave much time and energy to raising funds for the erection of the Boylston Street building of the Harvard Medical School, tried his utmost to secure registration of physicians in Massachusetts and worked ardently as a member of the health department of the American Social Science Association.

Dr George Horton Tilden was a native of Lowell, born on December 25, 1850 and dying in Paris May 30, 1916. He graduated from Harvard College in 1872 and from the Harvard Medical School in 1876. He served as house officer at the Massachusetts General Hospital and afterwards practiced in dermatology and syphilology and in genito-urology holding positions in these medical and surgical specialties in the Harvard Medical School and at the Boston City Hospital and at the Boston Dispensary. In 1884 he became a member of the American Dermatological Association and served as Secretary from 1886 until 1889 when he became Vice-President. In 1893 he went to Japan where he entered fully into the life of the country not as a traveler but as a true lover of the Japanese people and their manners and their customs. He became intensely interested in the ancient and honorable art of sword making,

eventually being accepted into the guild, a distinct honor even for a native. Subsequently he lived in Boston for some months and finally departed for Europe where he ended his days.

Dr. James Sullivan Howe was born in Norwood, Massachusetts, on July 7, 1858 and died in Brookline November 21, 1914. He graduated from Harvard College in 1878 and from the Harvard Medical School in 1881. Then came a year's study in Vienna and the subsequent practice of dermatology for thirty years. He joined the skin staff of the Boston City Hospital in 1887 and served the hospital well for twenty years and resigned for good and sufficient reasons. He was a sound dermatologist, a hater of slipshod methods and of ignorance. In 1888 the coveted membership in the American Dermatological Association came to him and in 1911 he was elected to the Vice-Presidency.

The third epoch in Boston's dermatological history began on April 1, 1870, when according to the annual report for that year of the Massachusetts General Hospital, "Dr. James C. White tendered his resignation as Visiting Physician and asked to be appointed as physician to a separate department for the treatment of skin diseases." In compliance with his request the Trustees voted that "some vacant rooms in the Hospital be prepared for the reception of patients with such diseases and that they may be occupied temporarily and experimentally by Dr. White for the treatment of such diseases. It is understood that the measure is still in the stage of experiment."

Note the last few phrases and especially the words "temporarily," "experimentally," and "experiment." They foreboded trouble! The Trustees of those days and especially one all-powerful member of the house-staff did not take kindly to new ideas, but let Dr. White describe the sequelae in his own words (autobiographically pp. 274-275).

"In 1870, after long-continued agitation on my part a ward for the care of skin diseases was established by the trustees in the face of great opposition on the part of the surgical staff and placed under my charge. The Massachusetts General Hospital was the first hospital in this country to take such a step. It was doomed, however, to an early death. This was the year when I delivered the introductory lecture to the medical class, in which I exposed the glaring faults of the system of education then existing in our school and placed the responsibility for them where they belonged. This aroused a violent and active hostility on the part of some members of the medical faculty and hospital staff, and war was declared against the new skin ward. The class of patients to be admitted to the ward was left to be determined by the superintendent. He excluded all parasitic diseases, all chronic cases, and syphilis. He also made the statement, communicated to me by

one of the visiting staff, that he would assure the closing of the ward within six months. Owing to this lack of support on the part of the administration, the persistent opposition of certain members of the surgical staff, and the lukewarm interest of the profession in the advance of specialties, the ward was closed. The Chairman of the Trustees, in expressing his sympathy, told me that it was impossible to stand up against the domineering will of certain members of the surgical staff and one of their own body. The punishment of the physician in charge was complete."

Dr. White retreated to his Out-Patient Department and remained thus hampered until his retirement in 1902 and it was not until after this event that Dr. Charles Goddard Weld, the ever-generous benefactor of the hospital, gave his ward of twenty beds to be devoted wholly to the care of dermatological and syphilological sufferers, but during all these long years the progress of Boston dermatology had been forced to suffer by the wilfulness and shortsightedness of certain selfish men.

Despite this grievous disappointment the dermatological department of the Massachusetts General Hospital grew rapidly in the number of its patients, and in its fame. Patients came from long distances to receive its benefits and in their turn afforded an opportunity to generations of medical students, undergraduates and graduates, to study at close hand the commonest and the rarest cutaneous disorders.

For eighteen years Dr. White, single-handed, carried this ever-increasing load, no clerk, no house-officer, no nurse. What a contrast with these days of swarming attendants of all descriptions!

In 1889 Dr. John Templeton Bowen, fresh from his foreign studies, received his appointment to the skin department and by his knowledge of the latest ideas of European dermatology and his aptitude for cutaneous micro-pathology added strength and breadth to the department. He served with distinction at the hospital and at the medical school, acting from 1902 until his resignation in 1913 as head of the two departments.

Subsequent appointments to the skin clinic are as follows:

Charles J. White	1895-1927
Frederick S. Burns	1900-1926
Harvey P. Towle	1903-1925
E. Lawrence Oliver	1911 to date
Loretta J. Cummins	1916 to date
C. Guy Lane	1919 to date
Arthur M. Greenwood	1921 to date
J. Harper Blaisdell	1914-1928
John H. Bufford	1913-1927
Jacob H. Swartz	1923 to date
Ethel M. Rockwood	1928 to date
Henry W. N. Bennett	1928 to date
Mildred Ryan	1929 to date
Francis L. Burnett	1931 to date
Myer M. Tolman	1931 to date

Charles E. Wells	1832 to date
Herman Groh	1932 to date
John Adams	1933 to date

This list would not be complete without the addition of the name of Margaret ("Peggy") Reilly who received graduate training in the skin ward, saw two years of active service in Europe during the war, came in 1916 to the skin department as social service nurse and has remained ever since, one might almost say as the guiding and guarding spirit of the clinic.

It would be a distinct pleasure to write of these numerous successors of James C. White who have worked so hard and faithfully to follow in his footsteps, but it would be beyond the scope of this paper which necessarily limits itself to the lives that have been completed.

The fourth chapter of Boston dermatology opens with the foundation of the Department for Skin Diseases at the Boston Dispensary in 1873 with Dr. Francis Boot Greenough in charge.

Dr. Greenough, a member of a distinguished American family, was born in Boston on December 24, 1837 and died on October 16, 1904. He graduated from Harvard College in 1859, spent one year in the Lawrence Scientific School of Harvard, studied architecture and medicine at Pisa and Florence for two years, acted for some months in 1864 as assistant surgeon in the United States Army, served as house pupil at the Massachusetts General Hospital, received his degree from the Harvard Medical School in 1866 and pursued his graduate medical studies for another year in Vienna. From the very first he devoted his especial interests to dermatology and syphilology and as the years passed he became a prime authority in genito-urinary diseases and syphilis. For eight years (1868-1876) he was Surgeon to the Carney Hospital. From 1875 to 1895 he was Clinical Instructor in Syphilis at the Harvard Medical School. In 1879 he was elected a member of the American Dermatological Association, served as one of its Vice-Presidents in 1887 and became its President in 1891.

Dr. Greenough retired from the Dispensary in 1897 after twenty-four years of service and Dr. Abner Post, who had been his collaborator since 1882, succeeded him and remained on active duty until 1913, continuing as consultant until his death in 1934, thus terminating a medical connection with this old institution for fifty-two years.

Dr. Abner Post was the son of Sylvester Gilbert Langdon but at twelve years of age he adopted his mother's surname. He was born in 1844 and died on April 20, 1934. He was a graduate of Yale College in 1866 and of the Harvard Medical School in 1870. His surgical internship was at the Massachusetts General

Hospital and before his gradual and final evolution into one of the distinguished syphilologists of the country he served as surgeon at the United States Marine Hospital in Chelsea, at the Boston City Hospital for many years and at the Children's Hospital. He served as Assistant Editor of the *Boston Medical and Surgical Journal* from 1881 to 1890. He was a member of the Massachusetts Medical Society, of the American Medical Association, of the American Association of Genito-Urinary Surgeons, and of the New England Dermatological Society. He was elected to membership in the American Dermatological Association in 1892 and served as its President from 1917 to 1919. He taught syphilis for thirty-four years at the Harvard Medical School from 1882 to 1906 as Instructor, and for the following five years as Assistant Professor and during his final quinquennial as Professor. Despite his discouragingly slow apprenticeship and advancement he never faltered in his devotion to his teaching duties. This faithful characteristic marked his fifty-two years' connection with the Boston Dispensary, thirty-one of which he spent in actual work, in the subsequent years remaining on the staff as consultant.

Many men have followed these two faithful pioneers and their names and the dates of their services to the Dispensary follow:

James S. Howe, M.D.	1896-1914
C. Morton Smith, M.D.	1901-1914
J. H. Bufford, M.D.	1908-1916
Clarence G. Lane, M.D.	1914-1912
J. Harper Blaisdell, M.D.	1914-1917
Loretta J. Cummins, M.D.	1916-1917
William H. Greene, M.D.	1917-1922
David L. Williams, M.D.	1917-1922
Henry J. Perry, M.D.	1919-1926
Alexander L. MacLaren, M.D.	1918-1930
Herbert H. Sawyer, M.D.	1918-1925
Clarence M. Casselberry, M.D.	1918-1925
Consultant	1926 to date
Walter T. Garfield, M.D.	1920-1926
John F. Martin, Jr., M.D.	1920-1921
Percy L. Dodge, M.D.	1921-1925
William G. Brooks, M.D.	1922-1923
William D. Wheeler, M.D.	1922 to date
J. Leon Grund, M.D.	1923-1926
Freeman C. Wight, M.D.	1925-1929
Harry W. Hammond, M.D.	1925-1928
Arthur M. Simmons, M.D.	1925 to date
Harry F. Friedman, M.D.	1926-1932
Austin W. Cheever, M.D.	1918-1932
Russell L. Spaulding, M.D.	1926-1931
Agnes G. Iversen, M.D.	1927-1931
Nels A. Nelson, M.D.	1929 to date
Israel M. Blumerfeld, M.D.	1929 to date
Henry C. M. DeWolfe, M.D.	1930 to date
Francis M. Thurmon, M.D.	1930 to date
Maurice M. Tolman, M.D.	1932 to date
Sidney M. Simons, M.D.	1929-30—1933 to date
Samuel S. Cargen, M.D.	1932-1933
Robert H. Goldfarb, M.D.	1934 to date

The fifth stage in the historical development of Boston dermatology was inaugurated in January 1891 when a Skin Department was insti-

tuted at the Carney Hospital with Dr John T Bowen as its head who served until 1895

The complete roster of this clinic is as follows

Dr George F Harding	1892-1902
Dr W G MacDonald	1895-1906
Dr Harvey P Towle	1897-1903
Dr F J Keany	1904—died in 1916
Dr Townsend W Thorndike	1904-1913
Dr William P Boardman	1910—resigned to enter the war
Dr G P Howe	1912—killed in the war
Dr J Brady	1915-1921
Dr W W Fennessey	1918—died in 1934
Dr William J Macdonald	To date

A sixth event in our local history was the establishment in 1913 by the Massachusetts General Hospital of a separate department of syphilis despite the bitter protests of the members of the skin staff, who felt that their expert opinion should outweigh the visionary views of certain all-powerful extremists. This revolutionary super-specialism evoked much adverse comment among American dermatologists who subsequently discussed this schism with some members of the skin staff.

A most excellent choice as chief of this department was made in the person of Dr C Morton Smith whose knowledge of this all-invading disease was most minute and whose devotion to this new clinic was and remained remarkable. To strengthen this already strong position Dr Abner Post was appointed consultant.

The following men served in this department

Dr George A Dix	1916-1924
Dr Henry D Lloyd	1916-1929
Dr Austin W Cheever	1917-1926
Dr Harry C Solomon	1920-1925
Dr Edward W Karcher	1921—died February 18, 1935
Dr Bryant D Wetherell	1919-1924

In 1929 the Hospital authorities reversed their former opinion and the care of syphilis was returned to the Skin Department with Dr E Lawrence Oliver as chief and Dr C Morton Smith as Special Consultant in Syphilis.

The seventh chapter in our history relates to the foundation of the New England Dermatological Society in 1915. This society is really the logical successor of the Boston Dermatological Club which was a small and intimate group of men of whom we shall hear more in the concluding paragraphs of this story. With the increase in the number of men devoting themselves to the study and the practice of dermatology it was felt by some of the members of this earlier club that it would be wise and fair to extend to the newcomers the advantages which the older men had enjoyed in their clinical meetings. Dr Harvey P Towle, with his usually active and progressive mind, was the ringleader in this praiseworthy development and after numerous consultations with men hereabouts and in our neighboring states he brought

this new dermatological body into being with Dr Abner Post as President, Dr Townsend W Thorndike as Vice-President and Dr Charles J White as Secretary, these men representing respectively the skin clinics of the Boston Dispensary, the City Hospital and the Massachusetts General Hospital.

This society has well vindicated the wisdom of the founders' decision and foresight. It has grown to a membership of seventy and its four annual meetings, held alternately at the Massachusetts General Hospital and at the City Hospital, allow its faithful and enthusiastic members to study and discuss many interesting, sometimes rare, examples of skin diseases.

A still further and widening development in the evolution of this Society is its coalition with all the numerous dermatological bodies scattered along the eastern seaboard from Maine to Washington, D C, into the Atlantic Dermatological Union which meets annually in one of its home ports.

The eighth milestone in Boston's dermatological progress was the founding of a skin clinic at the new Beth Israel Hospital in 1928. Dr Jacob H Swartz was appointed Chief and Dr E Lawrence Oliver, Consultant.

Since then the following men have received appointment to the skin staff:

Dr Austin W Cheever	1930 to date
Dr William D Wheeler	1930 to date
Dr Bernard Appel	1930-1933
Dr John G Downing	1930 to date
Dr Agnes C Israelian	1930 to date
Dr A Blumenfeld	1930-1934
Dr Maurice L Tolman	1932 to date
Dr Herbert Abel	1932—died in 1934
Dr Sidney Sheffner	1935 to date

The ninth and final marker (to date) in the life and steady growth of Dermatological Boston occurred last June (1934) when Dr Harvey P Towle, associated with Drs J H Blaisdell, W P Boardman, F S Burns, G A Dix, A M Greenwood, R Jacoby, C G Lane, E L Oliver, and C Morton Smith petitioned the Councilors of the Massachusetts Medical Society for permission to found a Section of Dermatology and Syphilology within the parent organization. A hearing was given by the Councilors and with only faint opposition the petition was granted and let us hope that this section may continue an enduring success as long as the science of dermatology remains a separate branch of general medicine.

Such is the formal though necessarily curtailed account of the development and evolution of Boston dermatology, a branch of medical science which has never been justly recognized or treated by the higher local medical hierarchy but which, despite many rebuffs and disappointments, has left its mark on the world's dermatological pages.

For the sake of future students of our dermatological past it would be a pity not to add

as a concluding chapter a verbal picture of the pioneers as they sat at table after the conclusion of the evening clinical meeting of the Boston Dermatological Club which was founded perhaps in 1888 and continued with changing personnel until it was fused, as previously stated, with the larger and more comprehensive New England Dermatological Society.

This earlier group was small and intimate, its patients were few but well chosen, discussion was informal but everyone present contributed his best. Then followed a suitably simple but delightfully friendly supper where the younger members listened to the wise and educated remarks of the elders.

Such a meeting took place in November, 1895. Dr. George H. Tilden was in Japan but the other charter members and one initiate were present.

Dr. James C. White, erect, dignified, ruddy checked, white-haired and bearded, courteous, stern in his professional moments but a delightful companion when "off duty" and able to talk authoritatively on many subjects.

Dr. Francis B. Greenough, distinctly tall but somewhat stoop-shouldered, an aristocrat to the tip of his fingers, with a charming smile playing about his mouth, a great lover of shooting and always accompanied on the street by one or more pointer or setter dogs, a delightful conversationalist.

Dr. Edward Wigglesworth, rather thick set, strikingly red faced with contrasting abundant, short-cropped, upstanding white hair, much in earnest, full of Latin and Greek quotations, a man to be admired and trusted like all his family for generations in America.

Dr. Abner Post, of good height with stooping shoulders, white-bearded, concealing evidently behind that beard a good many thoughts, wise, amusing and often cryptic, a man who had to be drawn out, a man of sterling qualities, perhaps unappreciated and hence introverted, a patient man and one ever thoughtful of an ambitious student.

Dr. James S. Howe, a large tall, athletic, out-of-door, bronze-faced man with a graceful moustache partially concealing a left-sided facial paralysis, a distinctly forthright man hating shams, impatient of stupidity, a cheerful, pleasant companion.

Of Dr. John T. Bowen we would like to say much but our tongue is tied for in this narrative personal remarks are limited to those who have passed on.

In subsequent years Dr. George F. Harding, Dr. John H. McCollom, Dr. Frederick S. Burns, Dr. C. Morton Smith and Dr. Harvey P. Towle joined the Club and with the passing years our elders, unhappily for us, disappeared from the scene but became unforgettable shadows of the irretrievable past.

The writer wishes to acknowledge with thanks his debt to the various hospital superintendents who have furnished him with their respective rosters and to certain biographers who have given him clues to the life histories of the men who figure in these pages.

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CHAIRMAN WHITE: Gentlemen—The next paper of the meeting will be Oral Manifestations of Bismuth by Francis P. McCarthy of Boston and Smith O. Dexter Jr., of Boston.

## ORAL MANIFESTATIONS OF BISMUTH\*

BY FRANCIS P. MC CARTHY, M.D.,† AND SMITH O. DEXTER, JR., M.D.†

THE use of bismuth in the treatment of syphilis is now so widespread that it is not generally known how recently the drug has come into use. Although bismuth was employed by Balzer as early as 1889 to treat syphilis, it fell into disrepute because of the very toxic preparation which he employed. Little was heard of bismuth in this connection until 1916 when Sutton and Robert observed its value in chicken spirillosis. Six years later in 1922, following experimental work on rabbit syphilis, Sazerac and Levaditi used it again in the treatment of human syphilis. Since that time bismuth has attained a position in the treatment of syphilis

second only to that of the arsenicals and has almost displaced the use of mercury.

The three drugs commonly used in syphilis have widely different properties from a therapeutic and toxicological standpoint. Arsenamine has the most active spirocheticidal power of the three and sterilizes infectious lesions with great rapidity. Its beneficial action is due almost entirely to this ability to kill the organisms. The exact mode of action of bismuth in syphilis is undetermined at the present time. That spirochetes disappear from infectious lesions under bismuth therapy has been amply demonstrated, but how far this action is due to a direct spirocheticidal power or to stimulation of the patient's resistance is unknown. Regardless of these theoretical considerations, bismuth is daily proving itself to be a practical and invaluable adjunct in the treatment of all stages of syphilis. Mercury, on the other hand, has

Read at the Annual Meeting of the Massachusetts Medical Society, Section of Dermatology and Syphilology, June 3, 1928.  
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a negligible direct effect on the organisms, but probably owes its action to its stimulating effect on the resistance of the host although the exact mechanism of this effect is unknown

From the viewpoint of toxicity the three drugs differ greatly. Arsphenamine has marked toxic properties which have been thoroughly investigated, and are generally known, while the stomatitis, nephritis, and general debilitating effects of mercury are also well known. The toxicology of bismuth is being extensively studied, and while it is the least injurious of all the drugs employed, yet it is far from innocuous.

Within the last few years a vast number of preparations have appeared on the market, differing widely in bismuth content, solubility, and method of administration. The most important preparations may be roughly subdivided into five groups:

- (1) Water soluble in water solution, e.g., bismuth sodium tartrate
- (2) Water insoluble, suspended in water, e.g., bismuth metal
- (3) Water soluble in oil solution, e.g., bismuth potassium tartrate
- (4) Oil soluble in oil solution, e.g., bismocymol, biliposal
- (5) Oil insoluble, suspended in oil, e.g., bismuth salicylate

These preparations show definite differences in rate of absorption and excretion, although in the first four groups the difference is not very great. However in the last group, e.g., bismuth salicylate, absorption and excretion are greatly delayed and hence accumulative mild toxic phenomena are more pronounced.

Bismuth is now a one route drug. Oral and injection methods have been proved valueless, and the intravenous route has been shown to be dangerous and ineffective. Beerman pointed out that almost all the immediate fatalities during bismuth treatment were due to intentional or accidental intravenous injection. The reason for its high toxicity intravenously is the close approximation of the toxic and therapeutically effective doses, as the toxic dose is 100 mg., and the minimum curative dose 90 mg. On the other hand, with the intramuscular route the toxic dose is three to ten times the effective therapeutic dose.

The rapidity with which bismuth is absorbed from the injection site varies with the type of preparation employed. With the more rapidly absorbed preparations the maximum bismuth concentration in blood and tissues occurs within a few hours. In experimental work it has been found that the principal depots of storage are the kidney, heart, lungs, and liver. It has also been observed that there are deposits of bismuth sulphide in the cecum. Probably the factors determining its presence here are sim-

ilar to those which cause precipitation in the buccal mucosa. The question of its penetration into the nervous tissues has been widely discussed, but according to Klauder and Brown the concentration in spinal fluid in human subjects and in the brain of experimental animals is almost negligible regardless of the preparation employed.

The question of its excretion has been carefully studied by Hanzlik and Mehrrens, Sollmann et al., and others. With easily absorbed preparations bismuth appears in the urine the day after administration, reaches a maximum on the second or third day, and then gradually diminishes in amount over three weeks when perceptible excretion has nearly ended. The excretion curve is much the same with water soluble, oil soluble, and oil suspension of the tartrate preparations, though time intervals are longer with the last two groups. Bismuth salicylate stands in a class by itself because of its greatly delayed absorption and excretion. Mehrrens and Hanzlik found that with the water soluble preparations in aqueous solution, after one or two injections had been given (equivalent to 22 or 44 mg. of bismuth) 45.2 per cent was excreted in the course of two weeks in the urine. Sollman et al. found lower figures with excretion from fifteen per cent to twenty-five per cent, in three weeks for all preparations except the salicylate. With this last preparation only four per cent was excreted in three weeks, though a longer follow-up period would greatly raise this figure, since minute amounts continue to be excreted for several weeks.

The toxic manifestations of bismuth are numerous and a vast number of cases of poisoning have been described. The skin, blood, liver, kidneys, gastro-intestinal tract and nervous system have been reported as the chief sites of strong toxic effects of the drug. By far the most common manifestation is bismuth stomatitis. Vigne in a series of 76,478 injections found that treatment had to be stopped in from eight per cent to ten per cent of cases. The reasons for ceasing treatment were classified as follows:

Stomatitis	72%
Asthenia and "grippe"	10%
Local pain (severe)	9%
General reactions	6%
Cutaneous eruptions	5%
Abscess (at site of injection)	3.3%

Irgang et al. have studied the oral complications of bismuth therapy in a large number of cases. They found a line in the gums in nearly 100 per cent of cases under treatment. Oral sepsis and the use of soluble preparations of bismuth seemed to hasten the production of this line. Any condition causing irritation of the gums predisposed to bismuth deposits and led to intensification of the local reaction. When deposits became sufficiently marked and coincident infection was present, stomatitis with ac-

tual necrosis and secondary infection was common Lewin (quoted by Mora) divided the oral changes into four stages

(1) Slight pigmentation occurring first on the lower incisors where tartar and organic debris were present. (2) A gingivitis developing in the region of the pigment. (3) and (4) Ulcerative and gangrenous patches in neglected mouths. In support of the fact that oral sepsis strongly predisposes to bismuth stomatitis it has been noted that significant degrees of involvement are much less common among well-to-do patients than in clinic practice

This present study is based on a series of 511 consecutive patients under present or recent bismuth treatment in the Skin Out Patient Department Clinic of the Boston City Hospital. The mouth of each patient was examined with special attention to the presence or absence of bismuth pigmentation, the condition of the gums and teeth, and the general oral hygiene. The adjacent buccal mucosa was carefully examined for the presence of contact areas of bismuth pigmentation. The amount of bismuth given the time interval since the last injection, and the period over which treatment had been carried out were obtained from the Out Patient Department records. Those cases with marked oral involvement had urine and blood examinations to exclude severe renal and bone marrow complications. The results are presented in detail along with the case reports of two patients with gangrenous stomatitis.

The bismuth preparation used in this clinic was the suspension of the insoluble bismuth salicylate in oil in dosage of from one to two cc. (1 to 2 grains) per week. The basic plan of treatment in this clinic at the same time this study was made was as follows

(1) Primary and secondary cases Twenty weekly injections of neoarsphenamine followed by fifteen weekly injections of bismuth salicylate followed by a four weeks' vacation. Subsequent courses of ten neoarsphenamine and fifteen bismuth salicylate injections

(2) Tertiary Ten neoarsphenamines followed by fifteen bismuth injections, followed by a four weeks' vacation and repetition of the course

The reasons for the use of the insoluble preparation are as follows

(1) Given in small dosage a continuous supply of heavy metal is obtained over the whole treatment cycle

(2) The difficulty in making patients come for treatment even as often as once a week makes desirable the use of a preparation which is absorbed slowly and whose action is prolonged over a long period of time.

(3) The rarity of severe toxic reactions and the excellent therapeutic results have justified the choice of this preparation

We have summarized the results of our studies in tabular form in presenting our findings.

In the study of the incidence of bismuth pigmentation of a series of 511 luetic patients, 400 of whom were actively under treatment and the majority of the balance treated within six months with bismuth salicylate, a very high incidence of pigmentary deposit of bismuth sulphide was noted in the oral cavity

#### 511 CASES

Pigmentation alone	194 cases
Pigmentation with gingivitis	142 cases
	386—65%

Of the 400 patients actively under treatment 278 or approximately seventy per cent showed pigment deposits in the gums or elsewhere in the buccal mucosa. Sixty patients in this group were edentulous, four of whom showed pigmentation. Eliminating this edentulous group 340 dentulous cases showed pigmentation in 274 or eighty six per cent.

In the remaining group of 111 cases treated with bismuth within a year, fifty-eight patients or fifty two per cent still showed pigmentary deposits of bismuth. Eliminating twenty-one edentulous cases, three of whom showed pigmentation ninety dentulous cases in this group showed pigmentation in fifty five cases or sixty one per cent. Three hundred and thirty six cases showed pigmentation out of the total of 511 cases studied or sixty five per cent who were actively or recently under treatment with intramuscular bismuth salicylate therapy

There was an associated gingivitis in 142 of the 336 cases. Whether this gingival inflammatory reaction was due to the bismuth deposit it is impossible to say as undoubtedly many of these cases had preëxisting gingivitis

#### EDENTULOUS MOUTHS SHOWING PIGMENTATION

51 Edentulous mouths—7 of which showed pigmentation

35 males	3 with pigment
46 females	4 with pigment
	7 or 9%

Buccal mucosa of cheeks	3
Tongue	1
Vestibule of mouth	2
Gums	1
	7

Only nine per cent of the edentulous group showed any evidence of pigmentation—all showing very slight evidence requiring careful search of the oral cavity for evidence of the deposit. The irritating pressure of dentures was the important single factor in this group

#### GRADE OF PIGMENTATION

Grade I	184
Grade II	123
Grade III—with contact pigmentation	80

The pigmentation was graded according to the intensity of the gingival staining with special reference to contact pigmentation

Grade I Cases showing a faint greyish or slaty black gingival linear pigmentation, confined to the gum crest localized or generalized in distribution and not associated with any clinical evidence of inflammatory reaction

Grade II These cases show a broader line of pigmentation, with a definite black discoloration of the gingivae, or pigmented areas other than the contact cases

Grade III All of the intensely pigmented cases were so classified, with an associated contact pigmentation of the opposing buccal mucosa. Our first impression in this type of case was that the process of imbibition was responsible for this pigmentation but we are now satisfied that the pigmented areas are in direct contact with the tartar on the opposing teeth and definitely indicate a blood stream deposit at the points of lowered resistance (*locus minoris resistentiae*)

LOCATION OF PIGMENT

Generalized gingival pigmentation.....	129
Localized gingival pigmentation.....	168
Tongue .....	10
Buccal mucosa of cheeks.....	7
Buccal mucosa of lower lip.....	8
Buccal mucosa of upper lip.....	6
Soft palate.....	5
Region of sublingual duct orifice.....	2
Tonsil .....	1

It was noted that an overwhelming number of cases, or ninety-two per cent, showed gingival involvement alone, and that most pigmentation that occurred other than on the gums was of the contact type. It was noted that localized collection of pigment was invariably in relation to tartar deposits at the necks of the teeth and the common location was the lingual surface of the lower central incisors. The labial surfaces of the lower and upper central and lateral incisors were also frequently involved

Extragingival pigmentation other than that caused by contact with teeth occurred more frequently on the dorsum of the tongue and the soft palate, was usually very slight, and was characterized by small pigmented areas

The most important single factor that was noted in all cases studied showing gingival pigmentation was the presence of tartar at the necks of the teeth. The incisor teeth where tartar is prone to be deposited in excess was the almost constant location for excessive deposits of pigment

Frequently the lingual and labial aspects of these teeth represented the only demonstrable deposit of pigment and pigmentation may easily be overlooked unless one examines particularly the lingual aspect of the gums of the lower central incisors

It was noted that pigmentation was rare in children under ten years of age as only one case out of ten examined showed a slight deposit on the gingival crest of the lower incisor teeth. The absence of tartar formation is undoubtedly the important factor for lack of pigmentation in youth

RECENTLY TREATED OF PIGMENTATION AFTER TREATMENT  
SHORTENS AT WITH BISMUTH

Preparation	Positive Pigment	Negative Pigment	% Positive
For two injections			
to 22 or 24 excreted			
After 1 Soll	12	14	46%
After 2 on fhs	18	22	45%
After 3 fhs	12	18	40%
After 4 fhs	5	15	25%
After 5 months to 9 months	11	41	21%

This table represents the group of dentulous cases that were under treatment with neoarsphenamine after finishing courses of bismuth therapy. Forty-two showed pigmentation and fifty-four were negative for pigment three months after discontinuing treatment. Our study indicates that bismuth deposits are very slow to disappear from the gums especially in marked cases, and show pigment even a year after treatment has ceased

CASE 1

J. S.—Aged sixty-four, white, male, single  
*Complaint* Sore mouth for three or four days  
*Present Illness* Patient has been receiving antiluetic treatment in the Out-Patient Department for a few weeks. Patient is a tertiary luetic, positive Wassermann test, although there is no evidence of skin or mucous membrane lesions due to syphilis. The

CONDITION OF THE GUMS AND GENERAL ORAL HYGIENE

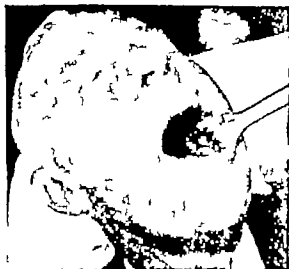
		Male	Female	Total	Percentage
Good .....	164	47	54	101	62%
Fair .....	150	88	40	128	85%
Poor .....	116	68	39	107	92%
Edentulous .....	81				
	511			336	

It will be noted from the above table that as would be expected the patient with poor oral hygiene and associated gingival lesions showed a much higher percentage of pigmentation

patient received three doses of bismuth salicylate at weekly intervals and three days after receiving the third dose reported at the Out Patient Department complaining of a sore mouth  
*Examination* showed a large necrotic and gangrenous

lesion involving the buccal mucosa of the left cheek extending from the third molar region to the cuspid region about the size of a twenty five cent piece. There was marked swelling of the cheek externally and a very foul odor to the breath. From the buccal mucosa to the right cheek in relation to the upper third molar is an area on the gum margin of the third molar tooth in relation to an area of tartar formation.

Smears of the gangrenous lesion were positive for Vincent's spirochete and fusiform bacilli. The lesion was treated with a neocarsphenamine paste. Four days later the patient visited the clinic again



1 Case No. 1—J. S. Gangrenous stomatitis buccal n. of left cheek showing extensive necrosis, gangrene and pigmentation.

and was given a dose of bismuth by mistake. Two days later the patient returned and showed a marked extension of the process which had extended up in the soft palate as far as the left external commissures of the lip. He was advised to enter the hospital for treatment but refused. The local lesion was treated with five per cent chromic acid and the patient was given intravenous injections of sodium thiosulphate. Patient remained ambulatory during the active stage of the condition. After two weeks time the process began to show marked improvement. Vincent's organisms disappeared locally and the local pain and discomfort rapidly improved. As the necrotic and gangrenous areas began to improve there developed a deep black pigmentation in the periphery of the area involved and on healing the entire area showed extreme pigmentation.

**Laboratory Findings** Hemoglobin 70% Red blood count 4 800 000 White blood count 8 100

**Differential count**

Polymorphonuclear leucocytes—80%  
Large mononuclear leucocytes—8%  
Small mononuclear leucocytes—11%  
Eosinophiles—1%

Polymorphonuclear leucocytes principally young forms and slight decrease in the number of blood platelets

**Urine** Specific gravity 10/10 Albumin, a trace Sediment shows few pus cells and rare hyaline casts

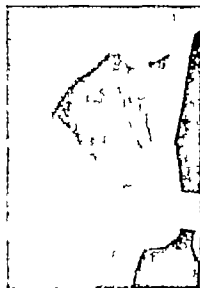
**Subsequent History of the Case** Examination of the month three months after the gangrenous process showed a residual pigmented lesion of the buccal mucosa of the left cheek about the size of a fifty cent piece with a small puckered scar. The pigmentation on the right cheek was still present.

In addition to the pigmentation of the cheek there still was some pigmentation present at the gingival margin.

Biopsies were taken of gingivae and buccal mucosa of cheek two months after healing of the gangrenous process. Blood and urine examinations were

essentially the same as on first examination. Wassermann test, positive

**Comment** This case is essentially the same type as Case 2. He shows a chronic nephritis with a marked susceptibility to bismuth deposit probably due to faulty elimination through the kidneys. The gangrenous process was much more severe and was aggravated by the dose of bismuth salicylate given



2 J. S. Three weeks after treatment showing gangrenous area filled in, with some of pigmentation at the periphery

after the gangrenous process had begun. The secondary Vincent's infection responded promptly to local treatment with neocarsphenamine and chromic acid. The biopsies taken during the gangrenous stage and two months later are discussed under pathological findings

**CASE 2**

**M. B.—Aged sixty colored, married male**

**Past History** First indication of lues two years ago when he had an ulcer on his left knee. Positive Kahn was found. The patient had been under treatment in the Medical Out Patient Department for last two or three years for hypertension and nephritis. No cardiac symptoms except mild dyspnea.

November 20 1932, after twelve treatments with bismuth salicylate the patient developed bismuth line and exfoliative dermatitis on trunk and buttocks (Last neocarsphenamine four months before). Given three injections of sodium thiosulphate and admitted to Skin Service where he stayed seven weeks

**Present Illness** The patient has been receiving anti-luetic treatment in the Out Patient Department for two years. Analysis of Out Patient Department record showed he had had three courses of neocarsphenamine and bismuth salicylate punctuated by several self-imposed vacations. No reactions with neocarsphenamine but during each course of bismuth toxic symptoms developed a bismuth line and exfoliative dermatitis after twelve injections for which he was admitted to the hospital abdominal pain after three treatments on another occasion and his present trouble after eight treatments. His last course of treatment was started in January 1934 and eight treatments were given, the last four at weekly intervals the month before admission. Three days after last treatment the gums became sore and on returning for another his oral condition was so bad that admission was advised

**Physical Examination** A thin, poorly nourished man, not acutely ill. Face slightly swollen. Teeth consist of a few dirty discolored carious snags on lower jaw although most of upper present but in similar condition. On free margin of gums around

teeth was a heavy black line with associated redness of gums. Mucous membrane of mouth red and inflamed. Opposite upper and lower incisor teeth and molars there were heavy black deposits in buccal mucosa of the cheek and upper and lower lips. The rest of the physical examination was negative except for cardiac enlargement with murmur at aortic area, and a blood pressure of 240/140. There is an ulcerative gangrenous lesion involving the gingiva in the region of the upper right

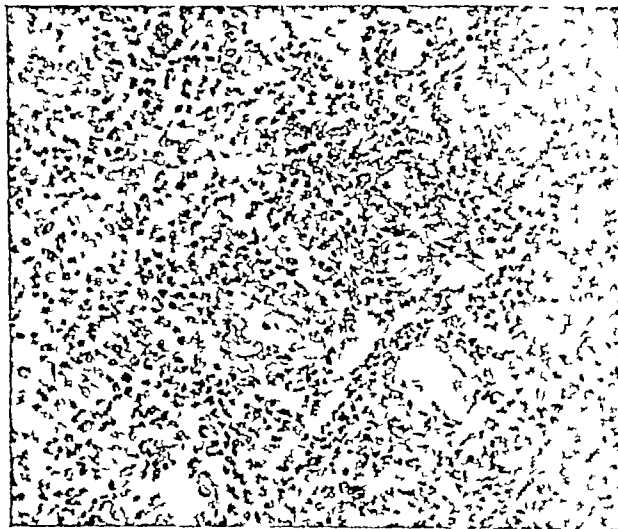


3 Section through gangrenous lesion of cheek showing necrotic exudate on the surface zone of pigmentation near surface wide zone of polymorphonuclear leucocytic infiltration and deeper zone of pigmentation and thrombosis of capillaries

cuspid and bicuspid region measuring about 1 cm in diameter. There is an associated fetid odor to the breath.

**Laboratory Findings** *Urine Examination*, slight possible trace to trace of albumin. *Sediment* fine granular casts on three occasions. *White blood cells* but no red blood cells.

*Blood*, hemoglobin 90 per cent. *Red blood count* 4,750,000. *White blood count* 4,200 to 7,300. *Smear* normal except for thirteen per cent eosinophiles. *Smear buccal ulcerations* positive for Vincent's or-



4 High power showing thrombosis of vessels in deeper zones with some pigmentation

ganisms, but negative after neoarsphenamine past application. *Nonprotein nitrogen*, 43. *Kahn*, negative.

*X-ray of chest*, hypertensive deformity of heart, bronchiectasis right middle lobe.

*X-ray of teeth*, marked oral sepsis with five abscessed teeth with marked periodontoclasia.

**Clinical Course** In the ward, the patient's oral condition improved rapidly with sodium perborate mouth washes and intravenous sodium thiosulphate. The gangrenous area rapidly cleared up, although the heavy black deposits remained. The patient was discharged after two weeks, condition improved, to the Out-Patient Department. The chart was normal throughout. The patient three months after discharge shows pigmentation of the gums.

**Comment** This patient as indicated in the past history showed previous severe reactions to bismuth therapy. In the first course he developed an exfoliat-



5 Bismuth pigmentation of gingiva with contact pigmentation of lower lip

ing rash after twelve treatments with bismuth salicylate. Again after three treatments he developed abdominal pain and treatment was discontinued. The oral gangrenous process followed after the eight treatments of bismuth salicylate.

The complicating nephritis was undoubtedly a factor in the production of the gangrenous stomatitis and previous reactions due to faulty elimination.

The incidence of necrotic or gangrenous processes in the mouth from bismuth salicylate therapy is extremely rare as these two cases represent the only ones that developed in the past eight years in the treatment of many thousands of luetics with this form of therapy.

Both of these cases were suffering from chronic nephritis and a relatively small amount of bismuth was given in each case. It will be noted that the response to treatment in these two cases was fairly prompt after the administration of bismuth was stopped, although the process at one time seemed to be spreading rapidly in Case 1.

Pigmentation by itself apparently has very little untoward effect on the patient but cases which show extensive gingival and contact pigmentation with marked gingivitis where relatively small doses of bismuth are given should be watched very carefully and a urine examination made for possible nephritis.

#### PATHOLOGY

The deposit of pigment in the gingivae and buccal mucosa of the mouth occurs in the corium and particularly in the papillary region. It is found as black amorphous granules of pigment tending to be deposited in the endothelium of the blood vessels and connective tissue cells al-

though much of the pigment seems to lie extracellularly free in the tissues. There is an associated inflammatory reaction characterized by an increase in lymphocytes and a few polymorphonuclear and plasma cells. There is no pigment found in the stratified squamous epithelium. In the gangrenous process the zone of pigmentation is very pronounced and there is an associated infiltration with polymorphonuclear cells with fibrin formation and capillary thrombi. A secondary infection with the Vincent's organisms is responsible, however, for the marked necrosis and gangrene which is superimposed on the necrotic process. The pigment is very slow to be absorbed or carried away by lymphatics and the average case of moderate or marked pigmentation takes several months to disappear.

The mechanism of formation of these gingival linear deposits is somewhat in doubt, but presumably it is the precipitation of bismuth sulphide around the capillaries. It is suggested that hydrogen sulphide formed from the decomposition products of food is absorbed by the gingival mucosa and there comes in contact with the soluble bismuth salts which have passed through the capillary walls.

The insoluble sulphide of bismuth thus produced acts as a local irritant and gives rise to a low grade gingivitis.

#### TREATMENT

The treatment of bismuth pigmentation is essentially prophylactic as indicated by the high incidence of the disease in the mouth that shows the presence of tartar or preëxisting pyorrhea and poor dental hygiene. A preliminary scaling of the tartar of the necks of the teeth before bismuth therapy is instituted and adequate care of the mouth during treatment will definitely tend to minimize the incidence of pigmentation.

In the treatment of the focal necrotic and gangrenous cases the use of a neosarsphenamine paste or five per cent chromic acid locally, if Vincent's organisms are found, is especially useful in controlling the secondary infection with these organisms. Internally, sodium thiosulphate injections are desirable although there is no definite evidence that this preparation has a specific effect in neutralizing the toxicity of bismuth preparations. Elimination through the kidneys or intestinal tract is very desirable in the toxic cases and if associated with leucopenia, the use of pentose nucleoid may be tried. Our two cases responded, however, with a minimum of treatment but in fulminating cases all the above suggested methods of treatment should be applied.

A selected group of severe gingival and contact cases was treated at the Tufts College Dental School clinic by thorough cleansing of the teeth removal of tartar deposits and debris to

hasten the absorption and disappearance of the mucosal pigmentation.

Many of these cases had not used tooth brushes for years and showed the results of this marked neglect in oral hygiene.

Brilliant results were obtained in this selected group of pronounced pigmentation with gingivitis in hastening the disappearance of the pigment deposits and allaying the inflammatory reaction of the gums.

#### COMMENT

The high incidence of bismuth pigmentation in the mouth taken in a series of 511 cases of syphilis under treatment in a hospital clinic indicates in this group of patients that local oral hygiene and tartar deposits seem to represent the important factor in this group.

The contact buccal mucosal pigmentation is shown to be definitely due to irritation from the opposing gingival irritant which is essentially tartar. Severe cases of gingival pigmentation and inflammatory reaction are relatively few in number and over a period of about ten years since this bismuth preparation has been in use the number of cases of necrosis and gangrene has been extremely rare. Therefore, this drug can be considered safe as a therapeutic agent in the treatment of syphilis as the presence of pigmentation and mild gingivitis seems to have no deleterious effect on the general health of the patient.

A series of urinary examinations on a selected group of severe cases of pigmentation with gingivitis were negative for evidence of nephritis. Both the cases herein reported had chronic nephritis and this condition is definitely a factor in the production of local gangrenous processes although susceptibility to the drug undoubtedly may play an important rôle.

Examination of the blood of a small group of cases showed no dyscrasia related to bismuth therapy.

In contrast to the hospital cases studied in this series a small control group of office patients under bismuth salicylate therapy showed a low incidence of pigmentation, about five per cent. These findings confirm our deductions that poor oral hygiene is the important factor which predisposes to pigmentation in the oral cavity.

#### SUMMARY OF FINDINGS

1 The incidence of pigmentary lesions of the oral cavity in a study of 511 dentulous patients receiving bismuth salicylate by intramuscular injection was approximately eighty per cent.

2 Edentulous mouths under treatment with bismuth showed a low incidence (9 per cent) and of a mild character.

3 In grading pigmentary lesions it was noted that the severe cases showed a so-called

contact pigmentary deposit in the opposing buccal mucosa

4 Two cases of gangrenous stomatitis (bismuth) with the pathological findings are discussed

5 Tartar accumulation with associated gingivitis was the important single factor predisposing to pigmentation

6 The incidence of bismuth pigmentation in private cases was very low about five per cent.

7 Chronic nephritis with associated faulty elimination is undoubtedly an important factor in the causation of gangrenous lesions of the oral cavity

8 Removal of tartar deposits with improved dental hygiene hastens the disappearance of pigmentation and tends to prevent further deposits

### DISCUSSION

CHAIRMAN WHITE The discussion will be opened by Dr Austin W Cheever of Boston

DR. AUSTIN W CHEEVER, Boston I don't see that Dr McCarthy has left very much for me to say He has described these lesions well and has photographed them He has done some good work on pathological studies

I have been particularly impressed as he pointed out, by the small number of cases of children who show any evidence around the teeth Even with our congenital syphilitic children, whose mouths are in very bad condition when they come to us, and where it is very difficult to get them into proper condition, there is very little pigmentation

I was surprised at the figures he quoted for the amount of actual stomatitis as compared with pigmentation It did not seem to me I had seen so much It might be well to remind ourselves of the difference from the days of mercury, before bismuth had been established as a useful drug, when we used to see a great deal of stomatitis, very foul breath, the loosening and loss of a number of teeth, and sometimes osteomyelitis of the jaw

CHAIRMAN WHITE Dr William P Boardman of Boston will continue the discussion

DR. WILLIAM P BOARDMAN, Boston The doctor spoke of intravenous bismuth not being quite so effective I take issue with him there We tried intravenous bismuth for a while, and found it very effective It was also very fatal, although we did not have that experience, so we stopped using it For healing the lesions, it was just about as effective as arsphenamine

He spoke of nephritis, and yet several cases have been reported of syphilitic nephritis where the patients did not do well with mercury but did do well with bismuth, but certainly it is a fact that if the kidney is not doing well, you have to watch the patient when you are using bismuth, although not so closely as with mercury The bismuth is secreted a good deal in the mouth through the mucous membrane I suppose that has something to do with the fact that these bismuth lesions appear in this region One of the earliest observations in bismuth therapy was the rapid healing of numerous membrane lesions

The absence of sore mouth and foul breath was what I was never able to explain in these cases In using mercury, before you get the lesions in the mouth, you often notice foul breath, and the patient complains of toothache With bismuth we get marked

gingivitis, yet the patient complains little, and when the treatment is ended it clears up in a short time

The doctor spoke of Vincent's infection The question arises whether it is a Vincent's infection or a bismuth condition, but the fact is that Vincent's organisms are found almost always in these bismuth stomatitis cases, probably as a secondary invader

The doctor shows how the bismuth does not deposit in the epithelium Under the microscope it is underneath the epithelium, and very marked in the papillae

Moore has called attention to a curious coincidence In giving silver arsphenamine and bismuth together, the patient developed argyria after a large amount of both, but did not develop argyria without the bismuth Possibly if you are giving silver arsphenamine, it would be better not to use the bismuth. Silver arsphenamine is not used much around here

As to the frequency of bismuth stomatitis, oral sepsis is certainly one of the underlying causes, as the doctor has noted We must look at the lingual aspect of the gums as well as the outside The pigment first shows on the lingual side of the gingivae

We are using bismuth almost to the exclusion of mercury, and I often wonder if there are really any definite statistics about the value of it. Certainly it is rather more pleasant to take, and the patients keep coming more regularly under bismuth than they ever did under injections of mercury, but I am not convinced that it is so much better in its permanent effects than mercury I do not believe we have any statistical evidence to that effect In clearing up the lesions, it works about as well as the mercury, if not better, but to give up mercury entirely, it seems to me, is a great mistake until we know more about the later results of bismuth Certainly bismuth should not be given alone, we know that much But whether there should be some mercury given in the routine treatment of syphilis, and not just arsphenamine and bismuth, is still to my mind a moot question

CHAIRMAN WHITE The question is open to general discussion

DR. C. MORTON SMITH, Boston I wish to say just a word in connection with what Dr Boardman has just stated, as to the effectiveness of mercury in certain cases that apparently have failed to show a satisfactory response to arsphenamine and bismuth It is one of the drugs to be kept in mind, and I think with a properly prepared mercurial cream used with discretion intramuscularly, results are often obtained which you fail to get with arsphenamine and bismuth, e.g., the cessation of recurrent lesions and the production at times of negative serological reactions

DR. RUDOLPH JACOBY I would like to ask Dr Smith the composition of the cream which he has mentioned.

DR. SMITH The formula is metallic mercury 20, anhydrous lanolin 30, chlorotone 2, heavy olive oil (Anton Chiris) 100 It must be rubbed up in a mortar with the oil very thoroughly, till no globules of mercury can be seen—M v = 1 grain of metallic mercury,—an average dose intramuscularly Massage the site of the injection thoroughly

CHAIRMAN WHITE I will call on Dr McCarthy to close the discussion.

DR. FRANCIS P MCCARTHY I neglected to state that the incidence of bismuth pigmentation in the oral cavity on private patients is very low as com-

pared with hospital cases. Probably less than 10 per cent of private patients show any pigmentary deposit in the gingivae. I am convinced that tartar is the outstanding factor as the predisposing irritant resulting in the collection of pigment in the gum tissues. It is very difficult to correlate the hydrogen sulphide theory as the important factor in the deposit of bismuth sulphide in the tissues es-

pecially where there is no break in the continuity of the overlying stratified squamous epithelium so that the actual reason for the deposit still remains somewhat obscure.

CHAIRMAN WHITE. The next paper is entitled "The Treatment of Psoriasis with an Organic Sulphur Compound" by Francis M. Thurmon of Boston.

## THE TREATMENT OF PSORIASIS WITH AN ORGANIC SULPHUR COMPOUND\*

BY FRANCIS M. THURMON, M.D.†

THE nearest approach of any study to the present investigation is that of L. Bory<sup>1</sup> who, in 1907, prepared a "glycerine in-sulphur" compound which he used in many disorders, including two patients with psoriasis. Bory's preparation contained "besides sulphur in colloidal and dissolved states, traces of acroleine, mercaptans and allylates." Small doses of this mixture were injected intragluteally and into the plaques of psoriasis, but the results were deemed too inconsequential to be published at that time. Later in 1917, '18 and '32, when colloidal sulphur began to assume greater importance in medicine, Bory cited his previous investigations, but revised his original formula to include not only sulphur in suspension but also guaiacol, eucalyptol and oil of sesame. This modification formed a true "colloid solution" which, according to Bory, when injected intramuscularly exerted a remarkable effect upon psoriasis.

Of the various preparations of sulphur employed in medicine colloidal sulphur has seemed to be the most effective. Its efficiency is based upon the finely subdivided state of its particles which provides a vast surface area in proportion to the total mass. Colloidal sulphur is the closest approach to a true solution of sulphur that is of effective application thus far described. When injected intramuscularly the colloidal preparations cause leukocytosis and fever. When given intravenously it produces a rise in body temperature to 103°F in from seven to ten hours that remains from thirty to forty hours. Thus, its usefulness in producing hyperpyrexia has been utilized in treating dementia praecox, general paresis, Wassermann fast syphilis, paralyses and other disorders of nerve and mental origin.

That the dermatological application of colloidal sulphur has certain limitations was shown by Miller<sup>2</sup> who stated that its value for cutaneous conditions was limited to those disorders which had responded to other forms of sulphur therapy. Seborrhea, seborrheic dermatitis,

acne rosacea, acne vulgaris and dermatomycosis responded well in most instances to colloidal sulphur, and as wet dressings in subacute eczema and dermatomycosis it had a certain value. He did not find the colloidal preparation to be of any appreciable value in the local treatment of psoriasis.

Sulphur is described as being insoluble in water, nearly insoluble in alcohol, slightly soluble in fat solvents and oils and freely soluble up to forty five per cent in carbon disulphide. This solution has an offensive odor that almost prohibits its use. No one, however, in so far as the literature reveals has described a sulphur in solution that is stable, bactericidal, isotonic with the blood, readily absorbed, of extremely low toxicity, and which may be employed intravenously in amounts large enough to be of therapeutic value, such as is the basis of the present presentation.

### INTRAVENOUS ORGANIC SULPHUR

The intravenous use of sulphur as herein described is new. The solution is a clear, straw-yellow to amber colored liquid with a strong sulphur odor. It is stable, bactericidal and isotonic with the blood.

The chemical analysis of this complex substance is incomplete. The total sulphur analysis of the material averages 0.185 per cent by weight, and is distributed possibly as thirty per cent allyl sulphide, twenty five per cent polysulphide, thirty five per cent allyl mercaptan, seven per cent polymer (insoluble material), and possibly three per cent thio acid. Each cubic centimeter of the final solution contains approximately two milligrams of sulphur.

The material may be separated into three distinct fractions, namely, an ether extract, an ethyl acetate extract, and an insoluble portion. It is possible that one of these three portions contains the active constituent, which, if true, will simplify matters. This phase of the study is in progress, but as yet, nothing definite may be said.

The solution may be administered with safety by any route into the human organism, that is to say, intravenously, intramuscularly, intracutaneously, subcutaneously, orally, by inhalation in the form of a spray, and by inunction as

From the Clinic of Dermatology and Syphilology of the Boston Dispensary.

Read at the Annual Meeting of the Massachusetts Medical Society Section of Dermatology and Syphilology June 2, 1932.

(Thurmon, Francis M.—Physician-in-Chief, Clinic of Dermatology and Syphilology The Boston Dispensary. For record and address of author see "This Week's Issue," page 310.)



an ointment It is of extremely low toxicity

Experimentally, in the dog, Young<sup>3</sup> has demonstrated that large amounts of the solution given intravenously produce a distinct pressor effect upon the parasympathetic system A similar effect has been observed clinically on four occasions in a single patient, an Italian male, aged forty-two years, who is receiving intravenous sulphur for dermatitis herpetiformis His reaction is characterized by bradycardia and mild air hunger, the heart rate slowing from a normal seventy-six beats per minute down to fifty-eight, the cardiac impulse being strong and of mechanical regularity This untoward reaction is quickly relieved by atropine sulphate gram 1/150 hypodermically, and is not nearly so alarming as the nitritoid reactions observed in arsphenamine treatment for syphilis

Its low toxicity is illustrated by the fact that fifty-eight patients with psoriasis have received a total of 1,337 intravenous injections (total 21,442 cc) of the preparation, each injection ranging from 5 cc to 25 cc over a period of the past eighteen months with only two patients manifesting untoward reactions of a major type Blood counts and examinations of the urine, repeatedly performed on patients during and following the sulphur intravenously, have thus far failed to reveal any abnormal change, except that occasionally patients will show a slight increase in the blood cell count and hemoglobin, the latter increasing from five to fifteen points, the white cells to a count ranging between 9,000 and 10,000, and the red cells, at times, increasing as much as 12 million per cubic millimeter when the count is below normal

The drug has been administered to patients without regard to age or sex, the youngest patient being an Italian boy, aged eight years, who, within sixteen weeks, received thirty intravenous injections totaling 337 cc, the oldest patient being an Irish male, aged seventy-three years, who received fifty-two injections in seven months, totaling 957 cc, each without ill effect

Of the fifty-eight patients treated there were the following conditions present in addition to psoriasis pregnancy, diabetes mellitus, alimentary glycosuria, biliary cirrhosis, infectious jaundice, postarsphenamine hepatitis, essential hypertension, cardiorenal disease, aortic dilatation and insufficiency, arteriosclerosis generalized, and orthostatic albuminuria The drug was administered to these patients and to two additional cases during the febrile period of erythema multiforme without untoward reaction Repeated examination of the optic fundi has failed to reveal a single toxic manifestation These facts indicate a low degree of toxicity

#### CLINICAL MATERIAL

During the past eighteen months eighty patients with psoriasis have been under observa-

tion, fifty-eight of whom received organic sulphur intravenously, and twenty-two were used as controls Of the fifty-eight patients treated, thirty-five were females and twenty-three were males These patients have had psoriasis for a total of 553 years, the shortest duration being seven days, the longest fifty-eight years, with an average duration of nine years Thirty-three of the cases had psoriasis ten years or longer previous to the beginning of this special type of treatment Of racial distribution there were Irish, American, English, French, Scotch, Canadian, Norwegian, Jewish, Italian, Lithuanian, Sicilian, Belgian and one American Negro

The psoriasis lesions were of the type and distribution generally described Six patients developed pustules within the plaques during the subacute stage of their eruption The scalp, nails and face were commonly involved, as well as the trunk and extremities Five patients had psoriatic papules on the soles and palms

The number of intravenous injections given was 1,337, total volume 21,442 cc, the average dose being fifteen cc The average treatment period was 9.6 weeks The longest observation and treatment period for a single case has been fourteen months, during which time the patient received 87 injections (total 1,512 cc) The psoriasis of this patient underwent complete involution, recurred during a four months' interim without treatment, and at present is well on the way toward involution

In all cases syphilis has been ruled out as an etiological factor by physical examination and negative blood Wassermann, Kahn and Hinton reactions

#### CLINICAL USE OF INTRAVENOUS ORGANIC SULPHUR FOR PSORIASIS

Intravenous organic sulphur has been found to be of value in the treatment of all types of psoriasis It is advisable to start each patient on treatment three times a week until ten or twelve injections have been administered For an adult, ten cc is the initial dose, the subsequent dosage ranging from fifteen cc to twenty-five cc, depending upon the response of the individual lesions From the beginning a bland ointment is used

R    Boric acid                    8 00  
      Aquaphor (Duke)  
      Lanolin aa q s ad    60 00  
Sig   Apply locally b i d

This ointment keeps the psoriatic scales soft and flexible, prevents and alleviates dryness, pruritus, and the irritation occasionally encountered in the thickened, roughened and fissured plaques It is without curative qualities in so far as the psoriasis is concerned, but does act as a lubricant Many of the patients prefer to use a bland oil locally instead of an ointment, their

preference running to olive oil, mineral oil, or one of the so-called antiseptic oils in common use on infants.

The first change noted after the initial two or three injections is that the psoriatic areas are transformed into a vivid pink to cherry red color. This color change is most noticeable in the smaller papules and at the periphery of the larger plaques. Pruritus, which occasionally is an annoying symptom, is usually controlled after one to four injections.

Within the first seven to ten days of treatment the individual lesions begin to show a color of clearing around their margins which is devoid of scales and presents a smooth pink refractive surface. The scales of the papules instead of being thick, adherent, silvery crusts that leave bleeding points after removal are by this time soft, thin, flexible, broken up surfaces that are easily removed and do not leave bleeding points when they are shed. At first there is a free generalized shedding of scales and the patient upon disrobing leaves the floor or rugs sprinkled with this fine, white powder-like desquamation, but later, there is very little scaling.

The process of involution continues at a pace varying with the individual response of each patient, until the areas are devoid of scales but are present as smooth, soft, pink, thin flexible papular elevations. Finally the papules become erythematous macular areas, easily blanched with pressure and eventually disappear when involution is completed. No pigmentation or roughness of the skin remains to mark the site of previous involvement.

The larger plaques undergo involution in a manner similar to their disappearance either spontaneously or with other forms of treatment. These areas which may cover an entire abdomen, thigh, leg, back, or sacrum, first undergo a general desquamation, which is followed by a transformation of the thick adherent silvery scales to a softer, thinner and more flexible type of scale which is easily shed without discomfort to the patient. The larger plaques not only grow thinner generally, but also show islands of clearing within the body of the plaques which gradually spread peripherally, leaving a series of interrupted papules marking the periphery of the previous plaques. In time complete involution occurs, leaving the skin with a clear texture no different than that of the normal skin for that particular individual.

Needless to say the large thickened plaques are the last to disappear. Some patients may require as long as six to nine months to undergo complete involution of their psoriasis, but when one considers that these cases have been existent for many years, this period for recovery does not seem excessive and what is more im-

portant, intravenous treatment is not continuous throughout the entire interval.

Each of the patients was ambulatory and carried on his usual daily occupation without loss of time or inconvenience other than the necessity of attendance for injections.

Following the initial ten to twelve injections, which at the most covers the first month of treatment, the patients are either given a rest from injections for two to three weeks, or are continued on intravenous treatment at seven-day intervals for a total of sixteen to twenty injections. By this time, that is to say somewhere between the tenth to the twentieth injection those areas that have not disappeared, seem to reach a stationary period in their improvement, and further continuous treatment is of no avail. When this stage is encountered the intravenous injections are temporarily discontinued but the local applications are carried out for the succeeding three to four weeks then intravenous therapy is resumed and the areas again begin to involute as rapidly as at the inception of treatment for that particular case. Occasionally stubborn and resistant psoriasis is encountered which chrysarobin, crude coal tar and sunlight will not materially affect. In this series there have been two such patients, one a physician's wife, the other a student nurse. For a time these two patients responded well but eventually reached a period where further treatment ceased to be effective. Their psoriasis was improved but did not entirely clear up and with them it was deemed too much an effort for the value received to carry on further.

Psoriasis of the scalp responds rapidly to this type of therapy. Hot oil shampoos are advised once or twice weekly and the bland ointment is rubbed thoroughly into the areas each night before retiring. Within two to three weeks the thick, matted, crusted and scaling scalp is reduced to a smooth erythematous surface which soon disappears, and often the areas denuded of hair begin to regenerate a new growth of soft fine hair.

Psoriasis of the nails shows a varied response. When the nails are long thickened and disfigured, it is best to remove them. But for the ordinary psoriatic nail which is pitted, thickened and disfigured but which may be kept clipped proximal to the end of the finger or toe, the response is better. With this type even though the involvement extends up into the matrix or nail bed, often the process is arrested and as the new normal nail grows from the matrix the psoriatic portion is clipped at the distal end. Eventually in three to seven months new nails clear of psoriasis may be formed.

**Recurrences.** The eruption of psoriasis pursues a cycle: there is a stage of progression or active evolution, a stage of quiescence, and at times a stage of spontaneous involution, or re-

gression From time to time, we observe periods of progression or regression which, owing to our lack of knowledge, we are unable to explain. There is, of course, a stimulation to epithelial cell growth with each outbreak of psoriasis. There is no doubt that the epithelial cell growth impulse may be intensified or weakened by the intravenous use of the organic sulphur herein described. Active, inflammatory and progressive psoriasis that is spreading rapidly can readily be brought under control. Occasionally, during the course of treatment, new lesions will appear. If they are few in number, treatment is continued, but should their appearance be widespread and several areas be simultaneously involved, it is advisable to discontinue the injections for two to three weeks, then treatment may be resumed.

In two of the early cases of this type, where treatment was pushed, the areas became large, erythematous, maculopapular and confluent. When treatment was stopped they cleared leaving soft normal skin. In another similar case a dermatitis was superimposed upon this flaming spread of psoriasis. Recovery occurred in three weeks and was characterized by a general exfoliation of the skin, without loss of hair or nails, and otherwise uneventful.

*Not a Cure* Intravenous organic sulphur as herein described is not a cure for psoriasis. With proper administration of the drug it is possible to control psoriasis and to effect a complete involution of the eruption. Remissions have been attained that have lasted six months and these cases are still under constant observation. Other patients in whom complete involution of psoriasis has been accomplished have had recurrences in less than six months, but with additional treatment at the incipency of such a recurrence it is possible to render it completely under control.

The results attained by this method of treatment were superior to the usual procedures commonly applied in the twenty-two patients used as controls in this series. The control cases received dietary management, and local treatment such as the Alpine Sun Lamp, Cold Quartz Ultraviolet radiation, sunshine, and ointments of various kinds including chrysarobin, collosol chrysarobin, the tars, ammoniated mercury, salicylic acid, precipitated sulphur, and arsenic in the form of Fowler's solution orally and nearsphenamine intravenously. Eighteen patients of the control series are still under treatment.

The more severe or extensive the psoriasis the more gratifying is the result attained with intravenous organic sulphur. For the mild case with only an occasional psoriatic area here and there, or an isolated plaque lying beneath an unexposed area, it is doubtful whether the intravenous therapy is merited, since the treatment occasionally requires too long a period in proportion to the value received. This type is

just as amenable to intravenous sulphur as the type with widespread lesions, but the continual repeated injections as contrasted with the lack of inconvenience of local therapy does not seem justified.

#### SUMMARY

1 An organic sulphur in solution has been described.

2 The technic of its administration and its use in fifty-eight patients with psoriasis has been described.

3 When administered intravenously the organic sulphur in solution has a decided and beneficial effect upon psoriasis.

#### REFERENCES

- 1 Bory, L. New method of treating psoriasis by a true solution of pure sulphur. Use of sulphur and eucalyptol in psoriasis. *Presse méd* 25 331 (June 7) 1917.
- Bory, L. Sulphur as a specific treatment in psoriasis. *Bull Acad de méd., Paris* 78 495 (Oct 30) 1917.
- Bory, L. Sulphur-oil injections for psoriasis. *Presse méd* 26 432 (Aug 22) 1918.
- Loeper, M., et Bory, L. Le Soufre en Biologie et en Thérapeutique. *P* 138-143, 1932.
- 2 Miller, H. B. Colloidal sulphur in dermatology. *Arch. Dermat & Syph* 31 516 (April) 1935.
- 3 Young, A. G. Personal communication.

#### DISCUSSION

CHAIRMAN WHITE. The discussion will be opened by Dr William J Macdonald of Boston.

DR WILLIAM J MACDONALD, Boston. *Mr Chairman and Fellows*—I think probably this contribution of Dr Thurmon's to the puzzle of psoriasis is well timed. I suppose amongst dermatologists who address society meetings the question of psoriasis never fails to come up. I think probably every time I address a meeting, somebody will come up and say, "Doctor, what do you know about psoriasis? Is there anything new?"

Well, dermatologists, in the past, and in the present too, have been very non committal on that point. This contribution of Dr Thurmon's is distinctly a step forward, because, although he very conservatively tells us he is not giving us a cure, he is giving us something worthwhile. I think the salient points of the paper are these: the ease and painlessness of treatment. Nobody likes injections either gluteally or subcutaneously. Less objection is expressed for the intravenous route. Where we have treatment which may be given intravenously, and which is non toxic and safe, at least we have something very worthwhile.

He also tells us two other very important points. First, as to psoriasis of the scalp. I suppose you will agree with me to-day that the hardest problem in psoriasis is the amelioration of the psoriatic lesions on the scalp. Girls will not put anything greasy on the scalp. Here Dr Thurmon tells us that intravenous organic sulphur is definitely, after a few doses, helpful to this condition. That is a very startling statement. I sincerely hope we will find that true. I hope the rest of us are going to have the same result.

Dr Thurmon's next statement is that it relieves the pruritus. Not all cases are pruritic, but at least a good number of them are. I congratulate Dr Thurmon upon telling us another drug with which we can meet and combat this horrible pruritus in psoriasis.

What else can be done for psoriasis? Fully 70 per cent of the audience are not dermatologists, and

they are here today not only to hear this paper but to learn what is good and what is inefficient. I think today the outstanding ointment is undoubtedly that drug about which Dr Stokes spoke at Cleveland dioxanthranol 1-8. It is put up in three strengths, and is marketed by Abbott & Co. As a local remedy today there is really nothing quite so efficient as anthralin ointment. It does pigment. It causes no marked dermatitis unless you get it very close to the eyes. I think allied with intravenous organic sulphur we can have two remedies going hand in hand.

I personally believe arsenic should be relegated to the limbo of the past. Patients will wander away and take it without your knowledge. I believe the x-ray should be given up although it is a splendid remedy for psoriasis if given conservatively. I think the ultraviolet light is useless in big psoriatic patches. It may be efficacious in small lesions and should not be discarded and is a safe resource.

Rolling it down today in the treatment of psoriasis we have Dr Thurmon's splendid contribution to this subject, allied with Dr Stokes' resurrection of this drug dioxanthranol 1-8. The only thing we have to take cognizance of is that this drug might be costly. I wonder how this will affect our private patients. They merit consideration as well as our clinic patients.

In concluding I want to thank you Dr Thurmon for the splendid paper and for the consistently hard work done on it.

**CHAIRMAN WHITE** Dr Bernard Appel will continue the discussion.

**DR. BERNARD APPEL, Boston** The battle with this dragon of psoriasis is still on including dietary management and control of intestinal flora, preparations that kill fungi, vaccines, radiations of electrical energy ointments and so on but we always come back to the department of chemistry with sulphur, arsenic, mercury and back to sulphur again. The atom of sulphur forms a very important part in the molecule of protein and therefore it is related to the biochemistry of the human body.

The general use of sulphur externally in psoriasis is only too well known, as is its relative ineffectiveness. But it is quite possible that we have here a form of sulphur which may be something new and something of great value. We know that the particular form of any element controls to a large extent its pharmacology. For instance arsenic, in the form of Fowler's solution, arsphenamine, and neoarsphenamine presents three different examples of pharmacodynamics. The use of sulphur in this particular form has been known to the arthritic clinic at the Boston City Hospital and although I am not authorized to quote the physicians in their procedures, I can say that they very kindly lent me some of their substance to use in psoriasis. My personal experience with this particular preparation is not extensive enough to enable me to form any opinion as to its therapeutic value, but I can corroborate Dr Thurmon's claims as to its relative harmlessness.

I think that any addition to our armamentarium in the treatment of psoriasis is welcomed by all of us. Those of us who have listened to the various new treatments of psoriasis as they arise are perhaps very justly skeptical, like the men who heard the boy cry "Wolf! wolf!" We cannot afford however to turn a deaf ear to anyone. We must continue to be grateful to anyone who continues to work this already well-harrowed field because he may turn up a gold nugget for us any day—or perhaps one of sulphur!

**CHAIRMAN WHITE** The paper is open for general discussion.

**DR. H. M. LANDISMAN, Boston** I believe Dr Thurmon should be congratulated on the excellent work he has demonstrated today in the treatment of psoriasis. I have had a little experience with some cases of psoriasis in my private practice. I felt, after a careful study of the disease, that it was due to a mild disturbance of the gastrointestinal tract and with that in mind I treated a number of cases and I seem to have had some success with those that I was able to follow along. There were only a few I might say that I feel I did well with.

I will mention what the drugs were that I use. I begin with calomel and magnesium sulphate solution regulate the diet, and then use the following preparations: Internally tannalbin, Ichthabin, an iron salt, bismuth and salol, and Fowler's solution and externally Ichthylol ointment and the Alpine Lamp.

My first treated case as above which did not recur was in 1918.

**DR. ARTHUR M. GREENWOOD, Boston** I want to congratulate Dr Thurmon on the thoroughness and conservatism of his work. I think we have to take all these newer experimental remedies with reservations however. Looking back over the records we see so many reputed cures of a disease that is liable to recrudescence. So not disparaging him at all I think such work has to be carried over a longer period of time. I think that similar and fully as good as results is the recent work of Dr Oliver and Dr Crawford. I cannot agree with Dr Macdonald as to the harmlessness of anthralin. I have seen fully as many cases of dermatitis in the 25/100 per cent strength as with chrysarobin.

**DR. JOHN G. DOWNING, Boston** I enjoyed this paper exceedingly and I would not have risen, except because of Dr Greenwood's remarks regarding anthralin ointment, which I wish to second. I have just discharged a patient who has been confined to bed for three or four weeks after using anthralin ointment on the feet, for a fungus infection. He had a very severe dermatitis accompanied by marked swelling of both feet, with large bullae which contained a peculiar brownish yellow serum.

**DR. E. LAWRENCE OLIVER, Boston** In regard to anthralin, we must realize that it is very closely related chemically to chrysarobin. Therefore there is no reason why we should not expect dermatitis in some individuals, even with very minute strengths. I think when anthralin is used it should not be started stronger than 1/20 of 1 per cent. I have seen 1/10 of 1 per cent cause quite a severe dermatitis. If we remember that anthralin is much stronger than chrysarobin we will use it with great care.

I wish to congratulate the reader of the paper on his excellent work, and hope that we will all get as satisfactory results as he.

**DR. MACDONALD** About the possibility of dermatitis accruing from anthralin this is a disease that has to be treated rather strenuously. It will produce dermatitis in certain cases. I have had cases of my own of very remarkable dermatitis coming from anthralin, especially on the scalp. But what I want to make clear is this. Of all the local applications we have to-day I think it is the best. I think we ought to dilute the preparation that comes from Abbott with vaseline or cold cream and if the patient is intolerant to it give it up. As Dr Stokes himself says it is extremely harmless to the skin. He emphasized that it will cause very few reactions,

even around the eyes. You will find it described in a recent number of the *Journal of the American Medical Association*.

I am very sorry that Dr. Downing and Dr. Oliver have had such experiences. If they are willing to lessen the strength of the ointment, possibly they won't get such results in the future.

CHAIRMAN WHITE: Will Dr. Thurmon close the discussion?

DR. THURMON: In closing I wish to thank these gentlemen for their discussion. I do not believe

there is anything particular to add, other than what I have said, except that I think it is interesting that here is a sulphur preparation which may be given intravenously with safety, which is the first time that that has been accomplished, that is, in amounts appreciable to be of therapeutic value.

CHAIRMAN WHITE: The next paper is a discussion of "The Diagnosis of Industrial and Non-Industrial Skin Diseases" by Dr. John G. Downing.

Dr. Downing showed and commented on lantern slides during the address.

## THE DIAGNOSIS OF INDUSTRIAL AND NON-INDUSTRIAL SKIN DISEASES\*

BY JOHN G. DOWNING, M.D.†

THE skin, being the protective organ of the body, has suffered from trauma ever since man began to work, and references of injuries are found in the early ages. The first definite occupational dermatitis was described by E. Kaempfer in 1712, it was caused by lacquer varnish. Willan in 1798 reported skin diseases occurring among metal workers, grocers, bakers, and shoemakers, and since then, there has been a steady increase in literature on dermatoses due to industry.

The tremendous growth in industry has brought the workmen in contact with physical, chemical, and vital agencies which have introduced new hazards. The records of the Massachusetts Department of Labor and Industries show that forty new industrial poisonous chemicals were introduced in a single year. The figures of the Massachusetts Industrial Accident Board show that for the year ending June 30, 1933 there were 96,144 cases of injuries reported, of these, 31,769 lost more than one day from work. There were 410 disturbances of the skin. Two hundred and sixty-five industrial disease cases were investigated by industrial inspectors during the year ending November 30, 1934. An examination of these same data indicates that seventy per cent were diagnosed as dermatitis. Glazers, wheelmen and seasoners, who handle skins treated with chromic acid and other strong solutions in tanneries, claim thirty per cent of the total of 182 cases of dermatitis. Seventeen per cent of the total morbidity is associated with the wet finishers, color mixers, backtenders and dyers in textile mills, who come in contact with various dye, caustic and acid solutions. The next highest prevalence is found among shoe and shoe finding workers with eleven per cent of the cases, and among rubber goods workers with eight per cent of the cases. The remaining cases occurred in a rather broad industrial classification.<sup>1</sup>

It is apparent that we do not have so many

skin injuries as other countries, for in England in 1927 Overton showed that of 1349 industrial cases, 979 (or 72 per cent) were skin infections.<sup>2</sup>

In New York for the year ending June 30, 1932, 653 cases of occupational diseases were reported to the State Department of Labor, of which, 230 were skin diseases, showing that one out of three cases applying for compensation was a cutaneous disorder.<sup>3</sup>

There are very few occupations which are exempt from occupational skin diseases for the causes of these eruptions are numerous and difficult to demonstrate, so that, it is essential to know the substances used and the various processes of the work in question. Frequently it is necessary to solicit the aid of the plant engineer to obtain definite facts regarding the physical and chemical backgrounds. The majority of these cases are fairly clear cut, and so, it is not difficult to diagnose and predict the course of the skin eruption. However, in doubtful cases, every possible angle must be considered, for with compensation as a verdict, in order to be just to the patient and the employers, one must avoid uncertainty and be able to differentiate an industrial and non-industrial skin disease. As soon as an eruption appears on the skin of most workers (whether banktellers or laborers), they immediately search for the cause in their work and, though the latter may be engaged in work where there are irritants present, one must not be too hasty in blaming the occupation for frequently there are just as many causes outside of the work. Then too, there are workers who, when told that the condition is due to their work, are just as positive that it is not. It is often difficult for the patient and the employer to understand why a substance, with which a man has been in contact for years without the slightest amount of trouble, can suddenly be the cause of a severe inflammatory disease of the skin, and it is almost impossible to convince them. However, the medical man with the knowledge of infectious diseases, serum reactions, and protein sensitivities, can readily understand this fact. Fortunately, only a small fraction of workers exposed to the

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same conditions in their occupations are affected by them, just as only a relatively few people are poisoned by ivy or other plants.

The majority of the eruptions due to occupations come under the classification of *Dermatitis Venenata*, that class of inflammations which are produced by contact with external irritants whether of a solid, liquid, or gaseous nature and which may belong to the mineral, vegetable, or animal kingdom.

The loose use of various terms has led to more or less confusion, such as Contact or Artificial Dermatitis, Industrial or Occupational Dermatitis, and Trade Eczema. The loose use of the word eczema has been the most confusing. Formerly eczema covered a large group of skin eruptions whose etiology was unknown, but with the stimulus started by the search for the irritant in industrial eruptions, a great deal of knowledge has been obtained regarding this unknown quantity, in fact, the groundwork of the present knowledge of eczema was founded in this particular branch of medicine. Dore and Franklin<sup>4</sup> define eczema as "an inflammatory condition of the skin originating without known external irritation and characterized in some stages of its evolution by serious exudation." Eczema and dermatitis are identical microscopically and macroscopically, however, in the latter, the source of irritation may be known and can be applied or withdrawn at will, it runs a definite course and begins to subside when the irritant is removed, lesions develop rapidly on the areas of contact showing a marked asymmetry and the severity depends on the strength of the irritant, the extent of the surface in contact, and the length of exposure, it can easily be reactivated by reapplying the irritant. Whereas, the condition we call eczema, arises spontaneously without any apparent cause, its distribution is not related to any external irritant but may affect all areas in succession or simultaneously it has no definite course and tends to recur frequently, probably due to some constitutional peculiarity. The words industrial dermatitis<sup>5</sup> are more descriptive, in that they indicate the type of lesion and the causative factor.

Routine examination and frequent inspection of employees will reveal a beginning lesion which early treatment may abort (if they are instructed as to the value of the early detection of infections and impressed with their danger, they will report skin eruptions more frequently). In determining whether an eruption is industrial the history is of prime importance. Careful and repeated questioning of the patient is necessary not only in regard to his present work, but also his past occupations, and whether he has ever had any previous skin eruptions. History taking may be very difficult especially if the patient is a foreigner, the use of interpreters

is very unsatisfactory. The patient may know very little regarding the process of his work, and he may think that he is coming in contact with some substance which is not actually present. A visit to the factory or a talk with the plant engineer may be necessary for it is of the utmost importance to know these factors, note should be taken as to whether the process has been changed recently, or whether some new substance has been introduced, for we find more accidents in new industries than in old. The method of cleaning at home, or at work, is also important for here may be the causative factor, such as the effort to remove stains with strong alkalies.

The time of onset is important with regard to its relation to work days and holidays, and its progress at these times. The areas involved, and the order in which other parts were affected may be important clues. The patient's description of the beginning subjective symptoms such as pain, itching, etc., together with his description of the initial lesion are helpful hints for it may have started with a slight burn or cut to which aggravating treatment was applied, or the patient may have a slight bacterial or fungous infection similarly overtreated. It is also well to inquire regarding the patient's hobbies and pastimes. An outlined card containing various facts such as age, nationality, family and past history is helpful.

The entire surface of the skin (whether erupted or not) should be studied, experience discloses to the industrial physician whether the eruption is the type which usually appears after contact with the irritants used, for as a rule, industrial dermatoses, under the same conditions, produce fairly similar eruptions, so that, the lesions should be consistent with the history of exposure to certain irritants. He should know whether there are agents in the patient's work which would produce a dermatitis and which are active enough to further its spread. The location of the lesions is important for a dermatitis tends to remain limited to the areas of contact.

It is well to remember that the eruptions of industrial dermatoses may be almost as varied as those of syphilis. An industrial dermatitis usually starts as a brilliant redness or erythema with small vesicles which tend to remain discrete, they increase only as long as the irritant is present, exudation is not marked and when the cause is removed the vesicles and exudate begin to decrease. However, eruptions from an internal source may appear anywhere and show minute vesicles which rapidly form and coalesce with marked exudation, and which recur without apparent cause.

The time of onset may vary from a few hours to one or more weeks depending on the severity of the irritant the eruption may consist of merely an erythema plus edema these disap-

pear rapidly and the skin may simply desquamate. During the stage of edema, we get all types of wheals and papules, in severe cases vesicles and bullae appear. As a rule, these contain clear fluid except in plant poisoning, where they may be hemorrhagic, exudation then appears which later dries and there is the formation of crusts. After the vesicles and exudation dry, the skin becomes infiltrated and with the loss of elasticity, fissures appear along the lines of the joints, the skin then shows accentuation of the normal markings with scaling and pigmentation. A certain group of irritants such as oil and coal tar will produce a folliculitis with pustules.

With the cause revealed, prognosis is clear and the treatment obvious. In a true industrial dermatitis, you should have a fairly definite probable cause, it is easy to confuse these occupational skin disturbances with those due to a congenital or an acquired skin disease such as those from toxins, food allergies, and septic or mycotic organisms. The difficulty here is that they do not have a definite etiological factor such as syphilis, tuberculosis, or anthrax. Focal infections should be searched for, routine blood examinations are important. Fungous infections may precede a dermatitis due to external substances or a dermatitis may afford entrance to a subsequent fungous disease and while suffering from either, the patient may become more sensitive to other factors to which he was formerly immune.

There are substances which will produce the same result whether taken internally or applied externally, for example, quinine.

An important point to remember is that some people may react to a substance after only a few hours' contact, while others may be immune for years.

A useful method in the search for the suspected substance is the performance of patch tests. If the substance is a liquid, a piece of linen is soaked with the substance and this is placed in direct contact with the skin, if a dry substance is used, it should be applied dry and also moistened, it should be applied to the skin in the same manner and covered with an impermeable tissue held in place by an adhesive strip. The suspected substance should be allowed to remain in contact with the skin for twenty-four hours. In doubtful cases, it is a wise plan to use a normal skin for a control. Positive tests show themselves in redness, edema, papules, or vesicles appearing in a period of from twenty-four hours to a week or ten days, however, the interpretation of these tests is difficult for they are useful only in certain types of skin diseases and may show reactions which are not true positives. Then, too, a negative test does not necessarily exclude the occupation for the test cannot duplicate the influence of the workers' environment, for example, soap itself may show a negative test but when a man is exposed for

hours in front of a steaming vat of soap, he still can have an industrial dermatitis despite the result shown by the patch test. The tests are important also in an attempt to discover the external irritants outside of a man's work. Here the private physician has the advantage for he will have more cooperation from the patient. He can test him out with various substances such as shaving cream, hair tonic, and plants. This procedure is difficult for the industrial physician because the man seeking compensation is not apt to try to disprove his case.

Fungous diseases are frequently mistaken for occupational eruptions for only a few occupations can cause a direct fungous infection. The most difficult to differentiate are those secondary fungous eruptions which are known as epidermophytids and trichophytids especially when the patient shows vesicles only on the palms and fingers. However, the presence of an active focus elsewhere is fairly good evidence. Microscopic examination and cultures are of little value for the "ids" are generally sterile.

Despite the careful study of the work, patch tests, and laboratory aids, there still remains an undetermined group the etiology of which cannot be solved.

Outside of the fungous diseases, a differential diagnosis is fairly clear cut between dermatitis venenata and those diseases of internal origin such as erythema multiforme, urticaria, and pityriasis rosea. Impetigo and scabies are frequently found, and they are apt to be very confusing, especially the latter, in women patients who deny an eruption on any part of their body except the hands and forearms.

In industrial dermatitis cases, remove the cause and in the severe cases recovery will be hastened by prescribing rest in bed and applying a soothing compound. All cases will respond more rapidly if they are removed from all possible contact with the causative factor, but this removal may end the worker's return to that trade, for on his return to work, he may suffer a recurrence of his dermatitis. However, this susceptibility is not limited to persons who have had an industrial dermatitis, but is sometimes found in workers who have handled irritants for years with impunity, and after a lay-off or vacation, return to their occupation and promptly suffer a dermatitis simulating an anaphylactic reaction. If possible, continue the man at work for some seem to develop an immunity, however, a change of occupation may be necessary. The recovery from an industrial eruption depends to a great extent on the individual affected, it depends on the patient's cooperation in his treatment. Some believe that as long as they are not exposed to their trade, they can do work such as gardening and cementing at home. When cases become prolonged with repeated attacks, search should be made for irritants at home, secondary infection, systemic disease, a constitutional eczema, or malingering.

ing, for, with the irritant removed, and after allowing sufficient time for the occupational dermatitis to heal, the original irritant cannot be held wholly responsible. The problem of conscious or unconscious aggravation or continuance of the eruption is difficult to solve. One may be convinced that the patient is a malingerer, especially when a recently healed disturbance of the skin recurs, on the day of an Industrial Board hearing, worse than it has been since the onset, but it is impossible to prove it to the satisfaction of a third person.

Prevention is of supreme importance and the more or less universal use of gloves would prevent many injuries, hand contact, in some cases, could be replaced by machine labor. Instructions should be given to each employee regarding personal hygiene. Frequent inspection and examination of the employees cannot be overstressed. The workers should be able to remove the traces of their work with non-irritating cleansing solutions, they should have im-pressed on them the value of changing their clothing at the end of the day's work.

It is difficult to readjust a man who has been engaged in doing a certain job for years and it is in this group of patients who feel that they have lost their trade that we find a prolonged sequela of dermatitis factitia which may be hysterical or definite malingering.

#### REFERENCES

1. Personal communication with W. H. Lehmberg.
2. Overton B. Industrial dermatoses: their causation, recognition, prevention and treatment. *Brit. J. Dermat.* 41: 235 (July) 1929.
3. Subberger M. B. and Wise, F. Industrial dermatoses. *Am. Med. (Special Section)* 29: 4 (June) 1933.
4. White, James C. *Dermatitis Venenata: An Account of the Action of External Irritants Upon the Skin.* Boston: Cupples and Hurd, 1887.
5. Dore B. Ernest, and Franklin, John L. *Diseases of the Skin: A Handbook of Dermatology for Practitioners and Students.* London: Toronto: Melbourne and Sydney: Cassell & Company Ltd., 1924.
6. Lane C. Guy. Essential factors in recording of skin diseases due to occupation. *J. Indust. Hyg.* 5: 366 (Feb.) 1924.
7. Bloch Bruno. Occupational skin diseases from the biological point of view. *J. State Med.* 33: 373, 1930.

#### DISCUSSION

CHAIRMAN WHITE. The room is large and wide so I am going to ask the discussors to come forward and face the audience. Dr. Lane will begin.

DR. C. GUY LANE, Boston. I was much interested in listening to this paper of Dr. Downing's, and I would like to emphasize numerous points in his paper if time permitted but I am going to emphasize only certain features with regard to diagnosis.

In the first place I think that any dermatitis limited to hands and arms alone should at least awaken suspicion of industrial causation. In other words I believe occupation as a factor should be included. It is important enough to put it as strongly as that.

Secondly I think that in a case referred for an opinion regarding industrial causation we should be absolutely sure we are dealing with an industrial dermatitis and not with lichen planus or erythema multiforme or fungus infection. We frequently find applicants claiming an occupational factor when some other non-industrial condition exists. As Dr.

Downing has already mentioned, just because an individual is working with a possible irritating factor that factor need not be causing the dermatitis. With a physician the antiseptics used may not be the cause of his particular dermatitis.

I am reminded in connection with these dermatitis cases and the matter of detection of them relatively early of a case I have seen recently—a man working as a hairdresser mostly waving with a very extensive eczema of both hands especially the right. He came in contact with the alkali used in the wave. This eczema was of ten years duration practically continuous, with a little relief at times when he had had vacations. He had had treatment five or six years ago by one physician who gave him a few doses of x-ray but told him inasmuch as the condition did not respond it was inadvisable for him to continue with the x-ray. Notwithstanding this patient went to another physician who gave him as the patient says five or six times that dose and in the course of three years he had approximately twenty-five or thirty x-ray treatments and now the man shows not only chronic eczema but the beginning of changes seen in x-ray dermatitis. Here, early detection and refusal to treat while the cause was still going on would have avoided a long future of sad events for this particular patient. Early detection I consider extremely important.

Dr. Downing has emphasized very well the need for having certain standards in regard to the diagnosis of these cases. Criteria for diagnosis of industrial skin diseases. I think first we should have a definite history of exposure to something we know may cause the particular condition. Secondly the history of attacks upon exposure to this particular agent, especially if it is a dermatitis or eczema, and clearing up upon removal of that particular cause. Thirdly eruption in the patient consistent with this particular cause. We all realize the different type of eruption in keloid or radium-dermatitis from that in ordinary dermatitis or eczema. Fourthly there should be correct time relationship bearing in mind the recent work of Osborne of Detroit, showing there is a longer latent period between exposure and eruption than we have supposed. The incubation time in industrial dermatitis is relatively short, but in keloid or radium-dermatitis it is relatively long. Fifthly there should be the lack of history of exposure to agents which might cause a similar eruption outside the occupation.

With these points in mind we can make a more sure diagnosis of occupational skin disease.

In closing I wish to call attention to the matter of disability from occupational skin disease. That disability may be partial disability only temporary perhaps or permanent partial disability. On the other hand cases occur in which disability is total possibly temporary total disability followed by ability to return to work, or it may be permanent total disability disabling a man from permanent work as a serious surgical injury may do.

CHAIRMAN WHITE. The discussion will be continued by Dr. J. Harper Blaisdell.

DR. BLAISDELL, Boston. Mr. Chairman, *Felloes of the Section*—The story of industrial dermatitis is really a serial in three parts. The first part is the correct identification of the industrial dermatitis. The second is the successful treatment of it. The third is the restoration if possible, of the patient to his occupation.

Now under the identification of industrial diseases the most helpful step in recent years is the use of the patch test but the patch test cannot supplant experience and judgment on the part of the doctor and that doctor who has the inductive skill of a Sherlock Holmes will come more nearly



to evaluating his cases correctly than one who simply takes the word and very sparse history of the patient.

There are one or two things that possibly might be of interest under the question of correct identification. It has been my experience that a dermatitis, either primary or recurrent, which occurs on Monday or Tuesday, or forty-eight hours after a holiday, is more apt to have incidence in week end pleasures than in the industry.

The second part, the successful treatment, is complicated today very greatly by two factors, first, by secondary fungus infections. The average horny-handed son of toil is generally not a victim of fungus infections while at work. But let his skin be broken by dermatitis, and a very large per cent will acquire fungus infection, which being a sequela of industrial dermatitis, exposes him to treatment extending over weeks and months, far beyond the loss which would have been incurred by the primary injury. The second factor, growing more and more prevalent, is the question of what I call minor malingering. Under different conditions of elapsing compensation, a great many men and women find they can prolong the dermatitis by trauma voluntarily applied by mild scratching, or scrubbing the hands with soap and water. Dr Downing has told what I have seen so many times, where a man up for a hearing for the stopping of his compensation, unquestionably produces by such means a dermatitis which will continue him on compensation. They are not dramatic malingering cases, but they are common, and other than a matter of opinion, are impossible of detection.

On the third point, restoration of the worker to his former occupation, I wish to speak a little more at length, because here is a problem of vast economic importance to the community at large, which in the last analysis pays the bill for all of us. It is a phase to which I think the doctors have, until now, paid very little attention for several reasons, ignorance on the part of the employee, ignorance on the part of the employer, and complaisance on the part of the insurance companies, that are only too glad to get the man off their list, and inability of the doctor to carry out simple suggestions when the man returns to work. As an example, I recently saw a woman, one of several hundred employees, who habitually used daily a common, ordinary, black electric tape to protect her fingers in light mechanical work in which she came in contact with sharp edges. This black electric tape was used in several thousands of yards by hundreds of employees with out trouble, and yet she came in with acute dermatitis, which a patch test showed was due to the electric tape. Breaking down this tape, it was found to be composed of several forms of rubber, asphalt, resin, and barium sulphate. The material causing the trouble was the resin. She cleared up promptly under treatment, and in this instance it was easy to return to work, protecting her fingers with ordinary adhesive tape.

Another example was a man, a printer, with a large earning capacity. He was on the point of stopping after years of chronic dermatitis due to pigments. We used General Electric Hand Cream No 406, which is a cream composed largely of soap and silicate. He was able to apply this material to his hands and arms and have no further dermatitis. The use of this particular cream is limited somewhat because it is soluble in water. But it can be used where a patient is coming in contact with many other types of liquid.

On the other hand there is the case of a shoe worker who by repeated tests over many years shows he is sensitive to the finished form of leather, as it is used in the shoes. That particular man has

been on compensation ten times. He is now on compensation, with his hands 100 per cent well, and sitting perfectly tight on \$18 a week, with the prospects of continuing that until his 500 weeks of disability are used up. At present there is no solution for that man that either the insurance company wants to work out, or that I have been able to.

CHAIRMAN WHITE This subject is open for discussion.

DR. WILLIAM J. MACDONALD, Boston The only thing I will cite, in congratulating the speakers, Dr Downing, Dr Blaisdell and Dr Lane, is this, just the evidence of one industrial case. I want to mention a very interesting case published by a dermatologist from another city. It was that of a man who had facial dermatitis which would not clear up. The dermatologist sent him south for a vacation, and the eruption completely disappeared. On return to his occupation it returned. He went away again, came back, and it reappeared. This time the dermatologist paid a visit to the man's home. His hobby was making bows and arrows. When he made them, he drew them like this (indicating). In this case it was dermatitis from the wood. Very often a visit to the patient's home will find the cause.

DR. B. THURBER GUILD, Boston I enjoyed the papers very much. There are one or two comments which I should like to make. The first concerns the procedure of which Dr Downing spoke. His patient was sensitive to bronze powder, I believe. If, as I assume, that was a metal sensitization it seems to me that wetting the powder would so dilute the perspiration that there would be less likelihood of obtaining a positive reaction on the skin.

When an allergen of this nature comes in contact with the skin the crude metal is converted by means of the perspiration into a chloride or sulphide salt which is soluble and therefore capable of irritating or sensitizing the cells of the skin. Water would so attenuate the salt that it might be too weak to cause a reaction, at least within a few hours' time.

Another point is that we should be very careful to differentiate a sensitive skin and sensitized skin. That, I believe, would help in the better classification of these conditions and in directing the investigation of the cause of the trouble.

The presence of resin in the electric tape was significant. In the cases of several patients who have shown a dermatitis following the application of ordinary zinc oxide adhesive plaster, I have patch tested them to zinc oxide ointment and to the resin supplied me by a large manufacturer of adhesive plaster. In these instances the resin was always shown to be the cause of the trouble and never the zinc oxide, though heretofore the latter has been considered the sensitizing agent. If the young lady who was sensitive to the electric tape was not influenced by the application of adhesive plaster, it would be interesting to me to know whether there was resin in that particular plaster.

CHAIRMAN WHITE Any further discussion? If not, will Dr Downing close?

DR. DOWNING I wish to thank the gentlemen for their kind discussion, and to elaborate on Dr Guild's. I think that point about applying the substance dry is very important, because there is no question in some cases that a dry substance can be either fixed by the water, or whatever is used as a diluent, so if a patient is working with a dry substance it is important to patch test with the dry material.

There was an interesting case of a girl who developed herpes simplex and shortness of breath from contact with a certain powder. The powder turned

out to be lycopodium. By keeping her away from the powder the symptoms disappeared. There was an instructive observation in that case not only were the patch tests negative, but a mild superficial scratch test was negative and when the scratch test was done by an allergist who scratched very deeply there

was a marked reaction. This girl was sensitive to the lycopodium.

CHAIRMAN WHITE. A final paper on "Fungus Diseases of the Skin" will be read by Dr. Arthur M. Greenwood.

## FUNGUS DISEASES OF THE SKIN\*

BY ARTHUR M. GREENWOOD, M.D.†

**N**EARLY 100 years have passed since fungi were recognized as a cause of skin disease, and it is twenty five years since the publication of "Les Teignes", Sabouraud's classic work on the subject. My wish is to outline, in the time at my disposal, the accomplishments of these twenty five years in the morphology, etiology, biology and therapy of certain fungus diseases of the skin. It is manifestly impossible to give credit to all the workers in this field or to cover the mass of literature, and a survey such as this is necessarily a personal estimate of events and methods.

The first careful clinical study of a group of these cases was made by Djálleddin Monkhatar in 1892<sup>1</sup>, followed by Whitefield, Kaufmann, Wolff and Sabouraud. In this country Ormsby and Mitchell<sup>2</sup> were the pioneers in an able article published in 1916, and it is a tribute to their work to see to-day how accurate their report was in the light of our present knowledge.

It is not possible to go into textbook details of clinical description. No new clinical varieties have been described since Dr. Charles J. White's description in 1919<sup>3</sup>, except for the recognition of the skin manifestations of infections by monilia, saccharomycetes and cryptococci.

Knowledge of the bacterial and fungus flora of the normal skin is essential in studying its parasitic invaders. I have been unable to find any report of the finding of a known pathogenic hyphomycete on the normal skin and investigations undertaken with this object in view have been negative<sup>4</sup>.

Benham and Hopkins<sup>5</sup> in 100 normal young adults recovered monilia albicans from the skin or nails in no cases. Other yeastlike organisms chiefly cryptococci and mycodermata were recovered in seventy two per cent. Greenbaum and Klauder<sup>6</sup> found yeastlike organisms in thirty five or 150 normal skins investigated. None of these were monilia.

Concerning the bacterial inhabitants of the normal skin, staphylococci are probably present in all cases. Greenwood and Rockwood<sup>7</sup> found them in 100 per cent of interdigital spaces of the feet in diabetics. Haxthausen<sup>8</sup> found them in eighty five of ninety two cases of normal skin

Owing to the necessity for special bacteriologic technique to recover streptococci from the skin when staphylococci are also present the results of the usual cultural methods are of no value in judging as to whether streptococci are normal inhabitants of the skin. It is probable when they are present, and certainly when in any numbers, that they are of pathologic significance. It may be fairly concluded that pathogenic hyphomycetes, monilia albicans, and streptococci are not normal inhabitants of healthy skin and if present in skin lesions are of etiologic significance.

Yeastlike organisms such as cryptococci, being inhabitants of normal skin, may or may not be of etiologic significance when recovered from skin lesions. It has been proved that they are causal in certain cases<sup>10, 11</sup> but their presence does not always imply pathogenicity.

Although we may become increasingly accurate in the diagnosis of fungus diseases of the skin from clinical appearances, the final recourse is to the laboratory. There is undoubtedly a tendency to attribute too many dermatoses to fungi without adequate investigation. Mitchell<sup>12</sup> has pertinently called attention to this tendency. As he states, dermatoses resembling epidermophytosis may be bacterial, mycotic or occupational and "fungi which are so few as to escape detection by the intensive efforts of an experienced technician are not capable of producing lesions of the type under discussion."

The laboratory procedure for the finding of fungi in epidermal scales is simple but the time and persistence necessary for a report of value are not ordinarily available to the busy unassisted physician, and hurried examinations by the inexperienced are valueless. A very recent advance in the laboratory investigation of these cases is the elaboration of a technique for staining fungi in epithelial scales by Swartz and Conant. This should materially add to the accuracy of our laboratory investigation of clinical material and has already been of great service in apparently proving that the much discussed "mosaic" fungus is not a fungus.

Looking back over twenty five years of mycological investigation of these pathogenic fungi, we are impressed by the thoroughness and accuracy of Sabouraud's original work. From the clinical standpoint, little if any, change has been made by investigators since the date of publication of "Les Teignes" and it becomes

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increasingly evident that the linkage of specific clinical manifestations with specific fungi, except in the most general way, is probably impossible and perhaps unimportant. There is, however, a geographical distribution of species and varieties with some corresponding variations in pathogenicity which is to be worked out as influencing therapy. For instance, the *Microsporum* of the Pacific Coast are apparently distinctly less difficult to eradicate than in this vicinity, and corresponding differences may be found in the species of *Trichophyton*s.

Determination of the specific infecting fungus in any given case is important in considering therapy. Lewis<sup>13</sup> has shown that ringworm infections of the scalp caused by *Microsporum lanosum* can be cured by local measures alone and that the more radical and difficult treatment by x-ray is not necessary in such cases. Infections by *Microsporum Audouini* are not curable by local treatment and require x-ray epilation. It has been my experience that infections with *Epidermophyton* are easier to cure than the cases in which the infecting fungus is *Trichophyton Interdigitale*, and the finding of *Monilia Albicans* in a lesion adds distinctly to its seriousness as well as suggesting the co-existence of a deficiency disease. These are problems for the clinical mycologist and can be worked out when accurate clinical and mycological reports on the pathogenic fungus flora of different sections of the country are available. Davidson and Gregory<sup>14</sup> have reported a list of fungi infecting man in Manitoba, and this procedure should be followed by workers in this line in all sections of the country. Further investigation of the species and varieties of the pathogenic fungi is for the trained mycologist, a difficult task and not practicable for the clinician untrained in mycological research and unfamiliar with the intricacies of mycological classification, and such a mycologist should be on the staff of every large hospital and medical school. The marked variation of species of fungi under differing conditions of growth has led to the naming of many unjustified species, and several attempts at simplification of classification have been made in recent years. Of these, the most recent by Emmons<sup>15</sup> appears to me the most reasonable. It is probable that many species thought to have distinctive cultural appearances and producing characteristic organs in culture are only varieties formed by differing conditions of growth. It has been shown by Emmons<sup>16</sup> that one species may pass through a number of changes of color in culture and may from time to time produce organs thought to be characteristic of other species. He believes that certain "species" are varieties of one variable species. It seems to me that a classification such as Emmons proposes would do much to simplify a confused situation, especially in the taking and collating of a fungus census of the country.

## BIOLOGIC INVESTIGATIONS

Plato and Truffi first demonstrated that an organism affected with trichophytosis and a healthy one reacted differently to the injection of a filtrate of a culture of the infecting organism. Bloch<sup>17</sup> established the laws of biologic reactions in such cases. His researches showed that deep trichophytosis was not solely a cutaneous affection. It brought about alterations in the whole skin and sometimes in the internal organs, this was shown by an increase in leucocytes, swelling of glands, and sometimes of the spleen.

The biologic character of these changes was shown by the reaction of the patient to subcutaneous or intradermal injections of trichophytin and is analogous to the tuberculin reaction. It is more intense as the infection is more intense, is very slight for superficial trichophytosis, and practically nil for microsporiasis. It is not specific to each variety of organism but common to groups, each of these groups having its own endotoxin.

Sensitization may last years after the attack. Bloch thought that the sensitization was not humoral, that it was attached to the cells of the skin and that passive transfer was not possible. This has since been disproved. He held that the inflammation in the sensitized areas was a favorable reaction designed to counteract the invading fungi, possibly by the destruction or immobilization of their toxins or by the elimination of the focus, and that, just as in syphilis, there was a definite relationship between the degree of inflammation, the strength of the allergy, the number of organisms and the evolution of the disease. This he considered as illustrated by microsporiasis and onychomycosis which last long and show great numbers of fungi because their localization produces a minimum of allergy.

The study of hypersensitiveness led to the creation of a new group of dermatoses, the Trichophytids. Jadassohn and his school in 1911 called attention to these manifestations. It was found that after intracardial injections of spores into animals an eruption of disseminated papules appeared, these developed differently according to whether the animal was normal or had been sensitized by a previous fungus infection. The eruption appeared as one of five types: Lichenoid, scarlatiniform, pustular, nodular like erythema nodosum or polymorphic like erythema multiforme.

Bloch thought that the variety of fungus was not important but that it had to be capable of setting up a deep trichophytosis. This, however, has since been shown not to be necessary. For the production of Trichophytids a considerable degree of hypersensitiveness is necessary and this occurs late in the infection. Bloch also

demonstrated that the hypersensitiveness was greater near the focus of infection. He was in doubt as to what factor brought on the allergic reaction when it came in contact with the sensitized skin toxin, fungus element in the blood stream, or fungus element from without. A similar question arises in tuberculids, in syphilis it is known to be the spirillum. It seems practically certain that any of the three toxins, or fungus elements from within or without may act as the antigens.

Since Bloch's investigation the whole subject has been developed by various workers. Williams<sup>16</sup> in 1925 from clinical observations deduced the occurrence of allergic eruptions with epidermophytosis of the glabrous skin and proposed the name Dermatophytid to include both these and the Trichophytids known to occur with the deep ringworm infections.

Investigations by W. Jadassohn<sup>17</sup>, Sulzberger<sup>18</sup>, and Peck<sup>21</sup> have verified the accuracy of this hypothesis. It has also been proved that Trichophyten sensitiveness can be demonstrated by contact tests, producing an eruption of an eczematous type<sup>22</sup>, and that urticaria, hay fever and asthma may be manifestations of hypersensitiveness to fungus toxins<sup>23, 24</sup>.

It may therefore be accepted as proved that a primary infection with pathogenic fungi, either deep or superficial, sensitizes the cells of the skin, and the subsequent dissemination of toxins or fungus elements may produce secondary reactions, generalized or localized near to or distant from the original focus, which manifest themselves either as dermatophytids, as eczema, as urticaria, asthma or hay fever.

From the point of view of this summary we are most interested in the dermatophytids since they have been evoked to explain a dermatosis which has given no little trouble to dermatologists, the palmar and digital vesicular eruptions, persistent and recurring, which clinically suggest fungus origins but in which fungi cannot be found even after the most careful and persistent laboratory search. According to Williams' hypothesis these are allergic reactions in which the negative microscopic findings are to be expected. This view has ample support, especially by Peck's experimental reproduction of the entire chain of reactions in the human subject<sup>18</sup>. The validity of this conception of palmar and digital dermatophytids has been questioned by Scholz<sup>5</sup>, and Tolmach and Traub<sup>6</sup> in a discussion of the results of a series of their own observations concluded that the diagnosis of dermatophytid in many cases was unwarranted. It seems to me that we must admit the occurrence of dyshidrotic and eczematous eruptions of the palms and fingers produced at times by actual invasion of these areas by pathogenic fungi and at times appearing as an allergic reaction. Whether, in addition to these, there is a true dyshidrosis having no rela-

tion to either of the above causes is not, as yet, established and it must of course be admitted that there are many cases of eczematous eruptions in these areas which have no connection with pathogenic fungi.

In recent years the importance of fungus infections in relation to industrial disability and compensation has been recognized and many questions difficult of solution have arisen in this connection. In general it is now held that a primary fungus infection is not compensable unless its source can be proved to be a contact in the industrial plant concerned and that chronic recurring mycotic dermatitis aggravated by heat and moisture is not compensable, it being considered a condition common to all existence and to all industry. When, however, an industrial dermatitis predisposes to the spread or exacerbation of a chronic mycotic infection or when a mycotic infection immediately follows an industrial dermatitis it is held to be compensable on the basis that it is a sequel of a condition arising from the worker's employment<sup>25, 26</sup>. Obviously the most painstaking investigation devolves upon those of us who would undertake to decide these questions with fairness.

The limits of a paper such as this necessitate a very brief and inadequate consideration of an important and interesting group of fungus infections, those caused by yeastlike organisms. Langenbeck in 1839 first described a fungus as the causal organism of thrush. It was later named *Oidium albicans*, and is now known as *Monilia albicans*. It is in recent years that careful investigation of this group of fungi has been taken up and its importance appreciated. The difficulties involved in the mycological study of this group and the impossibility of their accurate identification and classification without complicated laboratory procedures has led, as in the other pathogenic fungi, to a confusing multiplicity of varieties and names. This situation has, in recent years, been much simplified by various workers, in this country notably Benham, and Stovall and Bubolz, using as criteria in addition to cultural appearances, fermentation, agglutination and agglutinin absorption reactions.

The skin pathogens in this group known at the present, pretty generally fall into three groups: the monilia, saccharomyces and cryptococci. Of the monilia, one, *Monilia albicans*, is by far the most important. It is known to be the causal organism in thrush, and the thrush like infections of the mouth seen in pernicious anemia and other deficiency diseases, of infections of the vaginal mucous membrane and surrounding skin seen in diabetics and in pregnant women of limited or extensive infections of the glabrous skin, from comparatively transient intertrigos to extended and even fatal infections, of perleche, onychia and paronychia. Elsewhere than the skin it may infect the

bronchi and lungs and is a constant inhabitant of the intestinal tract in sprue, although not its cause. It has never been proved to exist as a saprophyte on normal skin but may live thus in the intestinal canal. It is particularly resistant to treatment in most instances and this resistance may be, and probably is, due to the failure to remove the underlying condition of the host which makes the monilia infection possible, whether it be a deficiency, glycosuria or some other factors of which we are ignorant. I believe the presence of a monilia infection always necessitates the consideration of factors outside the presenting dermatologic picture.

The two other groups, saccharomyces and cryptococci, are of less serious import as far as our present knowledge goes, but nevertheless often difficult of cure. Their presence in a skin lesion does not necessarily imply pathogenicity, since, as mentioned elsewhere, they may live as saprophytes on the skin. They have been found, assumed to be and in certain cases proved to be the cause of intertrigo, perlèche, paronychia, lesions of the nails, certain eczemas, and a very troublesome condition of the glabrous skin, cryptococcosis epidermica, described by White and Swartz.<sup>29</sup>

In 1928 MacLeod and Dowling<sup>30</sup> published investigations which appeared to prove that seborrheic dermatitis of all types was a pure fungus infection with the *Pityrosporon* of Malassez. Recent work in this country on the same subject, I believe, is confirmatory but not yet published. It is an important addition to our knowledge of fungus diseases and suggestive in the further investigation of psoriasis which we so often see developing from an apparent seborrheic dermatitis. There is no known successful specific treatment for these groups of organisms and their therapy will be considered under the general treatment of fungus infections.

#### THErapy

The results of treatment of fungus infections of the skin are not, as a whole, therapeutic triumphs, and it is quite generally agreed by the most experienced that very few cases are ever permanently cured. It is a fact, however, that the great majority of cases tend to get well themselves provided that conditions unfavorable to the growth of the fungi are provided and that irritating "cures" are not used. It is our duty to make this clear to our patients, and while not underestimating the seriousness of certain types of the infection, we should not so overwhelm them with details of treatment and prophylaxis as to drive them straight to the druggist where they are sold a package of some proprietary remedy which is either so strong as to set up a dermatitis more incapacitating than the original infection, or so inert as to have no effect whatever. If the patient is fortunate, he will

get one of the inert preparations. If he is unlucky, he will use one of the proprietary high explosives and will have, in addition to his original infection, a dermatitis venenata and possibly a generalized allergic reaction. I think the members of this section will agree that many of our office and hospital cases are of this variety.

Of fundamental importance in considering therapy and prophylaxis are the facts that fungi grow best in epithelial structures and epithelial debris in the presence of heat and moisture and darkness, and that cleanliness, the avoidance of heat and the production of dryness are essential and basic factors in therapy.

Another consideration to be emphasized is that we should differentiate in our treatment the areas of actual fungus invasion and the manifestations of allergy. The failure to do this is a frequent cause of therapeutic disaster, for it is obvious that the application of an active fungicide to an area of allergic reaction will only make matters worse. If we are unable to differentiate the two conditions it is much better to treat neither with fungicidal substances. We have to consider that reactions of resistance and immunity in most of these cases do not take place in amounts sufficient to be of therapeutic value since most fungus infections occur in the uppermost skin layers where the fungi do not come in contact with living allergic tissue. We should consider that any condition, internal or external, leading to increased perspiration, favors the growth of fungi. Increased sugar concentration in the skin has been held to favor fungus growth, but except for the tendency toward yeast infections around the genitalia in glycosuria, I know of no proof of this assertion. Fungus infection of the feet in diabetics, while not more frequent, is more serious than in non-diabetics, because of the opportunity it offers for secondary infections.

Two fundamentals of treatment should be (1) The elimination of factors favoring fungus growth such as the prolonged maceration of the skin by the wearing of and exercising in wool socks, heavy boots, heavy gloves, heavy wool underwear and athletic supporters, (2) the avoidance of too active applications to the actual infected areas and the use of bland substances on the allergic reactions.

In general, three types of cases present themselves. (1) The acute vesiculopustular. On the hands or feet this type is best treated by soaks and wet dressings, either of liquor alumini acetatis 1:16, potassium permanganate 1:2,000 or weaker, metaphen 1:3,000, or boric acid, four per cent. If the pustular element is prominent a chlorinated solution is valuable. This is carried out during the day, and boric ointment or an ointment of salicylic acid and sulphur two to six per cent in vaseline, or a borated dusting powder with ten to twenty per

cent tannic acid added is used at night. It has not been my practice to use x ray in any dosage in the acute cases although it has been recommended. I believe the risks of medico-legal complications are too great to compensate for any possible gain in this variety which is so liable to prolonged and explosive exacerbations, for which the use of x ray is certain to be held responsible. Neither strong Whitfield's ointment nor any of the proprietary modifications of his formula should be used, not only on account of the danger of dermatitis, but also because a violent attack on this type of the disease is likely to produce a generalized allergic reaction.

(2) The subacute type, either vesicular or macerated, and (3) the chronic varieties I believe in the long run are best treated by sulphur and salicylic acid ointment, six per cent strength in vaseline, or by Whitfield's original formula

Acid Benzolic	57	XXV
Acid Salicylic	57	XV
Paraffin mollis	3	II
Oil Cocos nuciferae	ad	3 I

Either of these ointments may have added one per cent of thymol. Certain cases do well with Castellani's carbolfuchsin paint, or other dyes. Iodine in one per cent alcoholic solution or as in Strickler's formula,

Iodine Crystals	1.3
Potassium Iodide	1.9
Acid Salicylic	1.9
Boric acid	3.9
Alcohol 50%	ad 60.0

is at times effective but in view of its proved fungicidal value<sup>11, 12</sup> in vitro its use has been disappointing and seems to prove the difference in action of many substances when the human skin is substituted for the test tube.

X ray, in the subacute and chronic cases, is of distinct value used in fractional doses, having in mind its limitations and dangers. Used as a palliative measure and often giving great temporary relief, it should never be forgotten that patients who "shop around" are certain in the end to get sufficient radiation to produce permanent damage to the skin exposed. We should never x ray patients without ascertaining the amount of previous radiation they may have received.

The use of trichophytin in my experience has been of no demonstrable value in any series of cases. It may be that newer methods of preparing the trichophytin<sup>13</sup> and its use in higher dilutions as recommended by Templeton<sup>14</sup> will give better and more consistent results.

I have had comparatively little experience with the use of inhalations of ethyl iodide as perfected by Swartz. Theoretically it should be useful in the recurring allergic manifestations caused by fungus elements brought by the general circulation to the sensitized skin and

in massive actual infections. Probably its use is not for the inexperienced, nor in the general run of unselected cases.

I have named but a few of the multitudinous preparations and substances used in the treatment of epidermophytosis and I do not at all mean or wish that what has been said concerning therapeutics should be taken as a counsel of despair. I have only meant to point out that as in so many therapeutic procedures there is an art in the use of a few well tried remedies, and that having in mind their limitations and powers, and knowing as well as possible in the present state of our knowledge what we are treating and what we may expect to accomplish, the results are, in a great majority of cases, excellent. What seems to controvert this statement is not so much poor results in treating the presenting case as the undoubted frequency of re-infections.

This brings us to the important subject of prophylaxis. Several facts are pertinent in considering reinfection. First, in most cases no immunity seems to be conferred by a previous attack of fungus infection. Secondly, fungi can grow on practically all the fabrics and materials which we wear. Thirdly, fungi can grow on the hair and epithelial debris, and the algal and bacterial slime which may accumulate on and in the cracks of wooden, cement, brick and tile floors.<sup>15</sup> Fourthly, the addiction of our generation to the frequenting of gymnasiums, baths and locker rooms where ideal conditions for the growth of fungi obtain, and the tendency of the generation to exercise violently and perspiring in unsterilizable socks and body clothing. It would be interesting to know whether the Romans, whose bathing habits were almost as unbridled as ours, were similarly afflicted with epidermophytosis. Fifthly, we have to consider the rather general indifference to the importance of the subject by health authorities and by those having in charge public baths, gymnasiums and locker rooms. This indifference is becoming less noticeable, and more and more prophylactic measures are being used with a distinct diminution in the number of infections where such measures are properly carried out. Sixthly, of considerable importance is the incomplete disinfection of most clothing by standard laundry procedures. Bonar and Dreyer<sup>16</sup> showed that the fungicidal action of standard laundry practice at that time (1932) was effective for white cotton fabrics but doubtful for woolen and colored materials, and that the use of standard dry cleaning solvents on fungi in fabric had a negligible killing action in exposures of one to two hours. Articles ironed and pressed in laundries are subjected to a temperature of approximately 160°C (320°F), which is well above the thermal death point for the usual pathogenic fungi. Prophylactic procedures in public sources of infection should consist in some such compulsory footbath as that advocated by Osborne and

Hitchcock<sup>36</sup>, a one per cent solution of sodium hypochlorite changed every two days. This seems to have been effective where used, although as an actual fungicide this solution has to be in contact with infective material much longer than occurs in a footbath as used in baths and gymnasiums<sup>36</sup>. Floors of showers should be scrubbed daily with soap powder, as mere flushing with water is ineffective. Shower baths are active sources of infection and every precaution should be taken to prevent or remove the algal and bacterial slime which accumulates on their floors. More cases of infection were found in a group of nurses occupying a dormitory with showers than in a similar group using tubs only (Massachusetts General Hospital). The most effective preventive against foot infection in baths and locker-rooms is the wearing of unlined rubber bathing shoes. It is a very safe rule never to walk barefoot on any flooring or floor covering. We cannot bring about the wearing entirely of white cotton material but it is definitely the safest material to wear next the skin, and there is no reason why sterilizable cotton socks cannot be worn next the feet, especially if they are to be subjected to heat and moisture and dirt. Perhaps most important in prophylaxis is the meticulous cleanliness of the feet, flexures and folds of the skin, with careful drying after washing and the use of dusting powder.

We have reached the end of this discussion but not the conclusion of the subject. We, as dermatologists, cannot accept the present situation in regard to fungus diseases as even approaching solution, and it is our problem to carry this study to a point where definite and specific therapy is possible.

## REFERENCES

- 1 Djellaleddin-Moukhtar. Trichophytie des régions à épiderme corné épais (plante du pied, paume de la main). *Ann de dermat. et syph* 152, 1892.
- 2 Ormsby, O. S., and Mitchell, J. H. Ringworm of hands and feet. *J. A. M. A.* 67 711 (Sept. 2) 1916.
- 3 White, C. J. The question of epidermophyton infection. *J. Cutan Dis* 37 501 1919.
- 4 Greenwood, A. M., and Rockwood, E. M. Skin in diabetic patients further studies. *Arch Dermat. & Syph* 21 98 (Jan.) 1930.
- 5 Stumpf, W. Über saprophytisches Vorkommen von Hyphomyceten auf klinisch gesunder Haut unter besonderer Berücksichtigung der Mosaic fungi. *Arch f Dermat u Syph* 170 449, 1934.
- 6 Weisz, E. Die Pilzflora des menschlichen Fusses. *Arch f Dermat. u Syph* 170 485 1934.
- 7 Benham, R. W., and Hopkins, A. M. Yeastlike fungi found on skin and in intestines of normal subjects, survey of 100 persons. *Arch Dermat. & Syph.* 28 532, 1933.
- 8 Greenbaum, S. S., and Klauder, J. V. Yeast infections of skin. *Arch Dermat. & Syph* 5 332 (March) 1922.
- 9 Haxthausen, H. Les streptococques épidermiques étudiés par une nouvelle méthode de culture. *Ann de dermat. et syph* 8 201 1927.
- 10 Greenbaum, S. S., and Klauder, J. V. Yeast infections of skin. *Arch Dermat. & Syph* 5 332 (March) 1922.
- 11 White, C. Studies in mycotic dermatitis, superficial yeast infections of the glabrous skin. *New York State J. Med* 27 1116 (Oct. 15) 1927.
- 12 Mitchell, J. H. Amycotic dermatoses simulating ringworm and erosio interdigitalis blastomycetica. *Arch Dermat. & Syph* 19 669, 1929.
- 13 Lewis, G. M. Ringworm of scalp, curability without deplating measures of infections caused by animal microsporons. *Am J. M. Sc* 189 364 (March) 1935.
- 14 Davidson, A. M., and Gregory, P. H. List of fungi infecting man in Manitoba. *Canad. J. Research* 7 233 (Aug.) 1932.
- 15 Emmons, C. W. Dermatophytes, natural grouping based on the form of the spores and accessory organs. *Arch Dermat. & Syph* 30 337 (Sept.) 1930.
- 16 Emmons, C. W. Pleomorphism and variation in the dermatophytes. *Arch Dermat. & Syph* 25 987 (June) 1932.
- 17 Bloch, B. Travaux Originaux, Les trichophytides. *Ann de dermat. et syph* 2 1, 1921.
- 18 Williams, C. M. Dermatophytid complicating dermatophytosis of glabrous skin. *Arch Dermat. & Syph* 13 661 (May) 1926.
- 19 Jadassohn, W. Beitrag zur Genese der Allergie bei Impfmykosen. Der Uebertritt von Sporen aus dem cutanen Impfherd ins Blut mit Entwicklung von hämatogenen Hautmetastasen. *Arch f Dermat. u Syph* 153 476, 1927.
- 20 Versuche über Pilzzüchtung auf Organen. *Arch f Dermat u Syph* 155 203 1928.
- 21 Sulzberger, M. B. Pathogenesis of trichophytids, spontaneous passage of formed elements (spores) from primary lesion into circulating blood. *Arch. Dermat. & Syph* 18 891 (Dec.) 1928.
- 22 Peck, S. M. Epidermophytosis of the feet and epidermophytids of the hands, clinical, histological, cultural and experimental studies. *Arch Dermat. & Syph* 22 40 (July) 1930.
- 23 Sulzberger, M. B., and Lewis, G. M. Trichophytin hypersensitiveness demonstrated by contact tests preliminary report. *Arch Dermat. & Syph* 22 410 (Sept.) 1930.
- 24 Hopkins, J. G., Benham, Rhoda W., and Kesten, Beatrice M. Asthma due to a fungus. *Alternaria J. A. M. A.* 94 6 (Jan 4) 1930.
- 25 Ramirez, M. A. Trichophytin sensitization case report. *M. J. & Rec* 132 382 (Oct 15) 1930.
- 26 Scholz, Moses. Epidermophytids as a clinical conception. *Arch Dermat. & Syph* 25 812 (May) 1932.
- 27 Tolmach, J. A., and Traub, E. F. Epidermophytids and trichophytin reaction. *Arch Dermat. & Syph* 28 560 (Oct.) 1933.
- 28 Blaisdell, J. Harper. Epidermophytosis as an industrial disease. *Urol and Cutan Rev* 31 414 (July) 1927.
- 29 Osborne, E. D., and Putnam, E. D. Industrial dermatoses, with special reference to allergy and mycotic dermatitis. *J. A. M. A.* 99 972 (Sept. 17) 1932.
- 30 White, C. J., and Swartz, J. H. Cryptococcosis epidermica. *Arch Dermat. & Syph* 18 692 (Nov) 1928.
- 31 MacLeod, J. M. H., and Dowling, G. B. Experimental study of pityrosporon of Malassez its morphology, cultivation and pathogenicity. *Brit. J. Dermat.* 40 139, 1928.
- 32 Schamberg, J. F., and Kolmer, J. A. Studies in chemotherapy of fungus infections. *Arch Dermat. & Syph* 6 746 (Dec.) 1922.
- 33 Schamberg, J. F., Brown, H., and Harkins, M. J. Chemotherapy of ringworm infection, preliminary report. *Arch Dermat. & Syph* 24 1033 (Dec) 1931.
- 34 Krueger, A. P., and Templeton, H. J. Preparation of trichophytin. *Arch Dermat. & Syph* 30 9 (July) 1934.
- 35 Templeton, H. J. Trichophytin—its use according to allergic principles. *J. Allergy* 5 521 (July) 1934.
- 36 Bonar, L., and Dreyer, A. D. Studies on ringworm funguses with reference to public health problems. *Am J. Pub Health* 22 909 (Sept.) 1932.
- 37 Osborne, E. D., and Hitchcock, B. S. Prophylaxis of ringworm of feet. *J. A. M. A.* 97 453 (Aug 15) 1931.

## DISCUSSION

DR. ARTHUR M. GREENWOOD, Boston. I appreciate the opportunity to present a paper at the opening of this most recent chapter of New England Dermatology.

I have reached the end of this discussion, but not the conclusion of the subject. I believe that we as dermatologists cannot accept the present situation in regard to fungus diseases as even approaching solution and I think it is our function to carry this subject to a point where definite and specific therapy is possible.

CHAIRMAN WHITE. Before calling on the discussers of this excellent paper, I wish to remind them of the by-laws that no one must exceed five minutes.

DR. JACOB H. SWARTZ, Boston. Mr. Chairman and Members of the Section on Dermatology—I am very

grateful for the privilege to discuss so excellent and complete a summary of Fungi Pathogenic to Man. I really have nothing to add but I shall attempt to emphasize a few of the points brought out by the speaker.

1 The importance of correct diagnosis. I remember not so long ago when even the most experienced dermatologist hesitated to make a clinical diagnosis of fungus infection of the skin without a microscopic and cultural checkup. Today the pendulum has swung in the other direction the clinical diagnosis of fungus infection is made freely without microscopic checkup thus making the statistics on the instances of fungus infection unreliable. Even with direct microscopic examination one is apt to err because of the numerous artefacts which simulate budding yeast cells or even branching hyphae which can easily be mistaken for fungi.

Dr Greenwood has mentioned a stain which has been recently developed by Dr Conant and me. The purpose of this stain is to make possible a more correct microscopic diagnosis by eliminating some of the artefacts I have just mentioned particularly the elimination of the mosaiclike structures which are still interpreted by some as fungi. The technique of the stain is simple. It takes only a few moments longer than the accepted potassium hydroxide method and is as follows: the scale to be examined is treated with 5 per cent potassium hydroxide and then immersed in water for two to three minutes to wash out the potassium hydroxide. The scale is placed on a slide and a drop of lacto-phenol cotton blue is added and a cover slip pressed on the preparation. The preparation is slightly heated. In the case of a thick preparation or nail material after washing out the potassium hydroxide it is stained with a 1 per cent alcoholic solution of cotton blue and then mounted in clear lacto-phenol. The epidermal cells are stained light blue while the protoplasm of the hyphae is stained a dark blue. This particular stain is an advantage for teaching purposes and will, probably turn out to be the method for making permanent preparations.

2 The importance of the identification of the species. Dr Greenwood has mentioned that tinea capitis caused by the *Microsporum Audouinii* is more resistant to treatment than that which is caused by *Microsporum lanosum*. He has also mentioned that epidermophytosis that is caused by the trichophyton family is more resistant to treatment than that caused by the epidermophyton family. He also mentioned that the yeast organisms as a group particularly the *monilia albicans* and the *cryptococcus* are more resistant to therapy than the ring worm family. I fully agree with him.

3 A word about ethyl iodide inhalations in the treatment of fungus infections. It is not a panacea for fungus infections but is very helpful when intelligently used, particularly in the severe cases and in cases which are accompanied by an allergic manifestation, that is, an idea.

4 In closing I wish to make a plea for a mycological department in the medical school and hospital. Medical mycology at present is in a chaos and it is only through the cooperation of the clinician and the medical mycologist that this very important field will be simplified and made useful to all branches of medicine.

CHAIRMAN WHITE: Dr Ethel M. Rockwood. It is very pleasant to see a lady on the program.

Dr. ROCKWOOD Boston. It may be of interest to give you an idea of the frequency with which we have isolated the fungi most common in this section of the country.

In scalp infections *Microsporum lanosum* occurred nearly three times as frequently as other fungi and four times as often as *Microsporum Audouinii* which is essentially an institutional infection.

Of the glabrous skin *Microsporum lanosum* occurred twice as often as the other dermatophytes.

In foot infections *Trichophyton interdigitale* was four and one-half times as common as epidermophyton and also four and one-half times as all other fungi.

In groin lesions epidermophyton was cultured three times as often as other fungi, but, in groin lesions as a whole epidermophyton occurred in only one-third of cases cultured or one out of every three and one-half cases, the others giving a growth of *staphylococcus aureus albus* or *citreus* and a very occasional *Monilia albicans*.

*Microsporum Fulyum heretofore* considered as an infrequent invader has been isolated four times. *Trichophyton purpureum* and *Trichophyton* of the gypsum and niveum groups have also been recovered.

Cultures from chronic paronychia have yielded *Monilia albicans* more than six times as often as other yeastlike organisms.

Isolations from the intertriginous areas have yielded yeast organisms so infrequently and pure culture of *staphylococcus aureus albus* and *citreus* so consistently on repeated examination that it is suggestive that these latter may play other than a saprophytic rôle.

CHAIRMAN WHITE: The paper is open for general discussion. This is a very wide very important question. Somebody should say something or ask something.

Dr. GUILD: I hesitate to inject myself twice into a dermatological meeting.

CHAIRMAN WHITE: Quite all right.

Dr. GUILD: I would like to suggest that other sensitizations may easily follow in the wake of a primary fungus infection. Both Dr. Downing and Dr. Bialesdell stated that fungus infection more easily affects a skin primarily devitalized by trauma. It is also true that a skin affected by fungus infection more easily acquires sensitization to other substances, dyes, metals, fabrics or what not. One may be continuing the treatment of a fungus infection (or sensitization) when that allergen has ceased to be the cause of dermatitis and the real cause is some unsuspected material of quite a different nature.

CHAIRMAN WHITE: Any further discussion? Dr. Greenwood, will you close?

Dr. GREENWOOD: I have nothing special to add except to emphasize what I barely mentioned in my paper and what Dr. Swartz did emphasize the importance of having a trained mycologist attached to our hospitals and medical schools. It is an extremely technical job and one which would be useful not only to us dermatologists but to the mycologists also. I hope that all of us who have any influence will use it to bring this condition about.

CHAIRMAN WHITE: Ladies and Gentlemen—We have come to the end of our program and the Chair wishes to thank the readers for their valuable and interesting papers and for the discussions thereon.

At the beginning of the meeting this section elected as Chairman and Secretary for next year Dr. Harvey P. Towle as Chairman and Dr. Jacoby as Secretary. Unfortunately I have this telegram from Dr. Towle: "Sorry to miss the meeting. Sent to bed for the day."



The Chairman will ask Dr Jacoby to take the chair and close the meeting

CHAIRMAN JACOBY I thank you for this honor and privilege Is there any further business to come before this meeting?

DR LANE *Mr Chairman*—I wish to move a vote

of thanks for the retiring officers and a vote for their courtesy in this first meeting of the section

VOICES Second the motion

(The motion was put and carried The section meeting closed)

## REPORT OF A FATAL CASE OF FLUORIDE POISONING\*

BY LEO MALETZ, M D †

A FATAL case of sodium fluoride poisoning was recently observed at the Danvers State Hospital In view of the fact that fluoride poisoning is so infrequently reported it would seem opportune to report this case with a general summary of the subject

The first cases were reported in 1889 by Baldwin<sup>1</sup>, an American chemist, who gave an excellent description of fourteen cases, one of which was fatal In 1911 Hickey<sup>2</sup> reported a fatal case in a ten-year old girl In 1915 Stanton and Kahn<sup>3</sup> reported the case of an infant, nineteen months old, who recovered In 1920 Kockel and Zimmermann<sup>4</sup> described two fatal cases In the same year Vallée<sup>5</sup> reported seven cases with recovery In 1923 several authors reported cases, McNally<sup>6</sup> described four deaths due to sodium fluoride with a review of the literature Sommelet<sup>7</sup> reported two cases of fluosilicate poisoning, of which one was fatal Kurtzahn<sup>8</sup> also reported a case of fluosilicate poisoning which was fatal Heinz and Haas<sup>9</sup> reported one fatal case of sodium fluoride poisoning in that same year In 1924 Bizot<sup>10</sup> reported a fatal case Lührig<sup>11, 12</sup> reported two cases of fluosilicate poisoning in 1924 and 1925, both of which were fatal In 1925 Dyrenfurth and Kipper<sup>13</sup> reported a single fatal case In 1928 Marcovitch<sup>14</sup> reported a fatal case of fluosilicate poisoning Fullerton<sup>15</sup> in 1930 described a single fatal case In 1933 Sharkey and Simpson<sup>16</sup> described eight cases with one fatality They also made an excellent review of the literature, reporting in all, forty-one cases

In the state of Massachusetts there have only been two cases thus far reported, those of Hickey in 1911 and Fullerton in 1930 The reports of the Chief Medical Examiner of the City of New York (citing Sharkey and Simpson) contain records of eighteen fatal cases in the period of 1918 to 1930 In commenting on the comparative infrequency of this condition, we find that the files of the U S Public Health Service contain no records of previous cases

Contributions to the study of the toxicology of fluorides and alkaline fluoro-silicates were made by Janaud<sup>17</sup> in 1923 Floyd DeEds<sup>18</sup> in

1933 presented an intensive study of the entire subject of fluoride poisoning with special emphasis on chronic poisoning In the same year McClure<sup>19</sup> described the physiological effects of fluorine

In all we have been able to find reports of fifty-nine cases of sodium fluoride and six cases of silicofluoride poisoning, of which total fifty-five per cent were fatal

Sodium fluoride is used most commonly in insecticides and is a common constituent of roach powder It is frequently dispensed in containers similar to those used for saline laxatives or baking powders Insecticides containing sodium fluoride are commonly stored in medicine cabinets or on the kitchen shelf This substance has also been mistaken for powdered sugar and flour Most of the cases reported were accidental

Sodium silicofluoride has a greater toxicity than sodium fluoride although the mechanism of the toxicity is the same, being due to the common fluoride radical The mechanism is one essentially of calcium deprivation Fibrillary twitchings of the muscles and "paralysis of the central nervous system are produced"<sup>18</sup>, these patients presenting the clinical picture of tetany There is also vasomotor paralysis with subsequent fall in blood pressure In acute poisoning where fluoride is taken by mouth there is a strong local irritating action on the mucous membrane of the stomach and small intestine, particularly of the stomach Coagulation of the blood is abolished because of the binding of the calcium with fluoride<sup>18</sup>

The sequence of symptomatology is usually as follows Within five minutes after ingestion patients complain of severe epigastric pain followed by severe retching and vomiting, abdominal burning, and general prostration Shortly afterwards diarrhea develops followed by muscular cramps, progressing to spasmodic muscular contractions of the arms and legs When seen by the physician, the patient is usually in mild shock In addition cyanosis of the skin and mucous membranes, excessive perspiration and salivation, with corresponding great thirst, has also been frequently observed, death occurring in most cases from three-quarters of an hour to four hours after the onset, although in some cases it is delayed for twelve hours Death is said

\*Read before the Massachusetts Psychiatric Society February 27 1935

†Maletz, Leo—Assistant Physician, Danvers State Hospital For record and address of author see This Week's Issue page 380

to be due to failure of the cardiorespiratory center in the medulla, usually occurring quite suddenly. Rigor mortis is said to set in prematurely. The lethal dose for human beings has been estimated at approximately five grams.

The treatment recommended is gastric lavage with ten per cent aqueous solution of calcium chloride or lime water, copious amounts being used. This procedure converts the soluble sodium fluoride to insoluble calcium fluoride. Magnesium sulphate produces the same effect. Tetany, which is produced by the binding of the fluoride with serum calcium, may be combated by the intravenous administration of ten per cent calcium chloride or the intramuscular injection of parathormone. Shock treatment should be instituted. Despite this treatment patients may expire suddenly, Sharkey and Simpson having reported a case in which death occurred suddenly after the patient had apparently improved.

**REPORT OF A FATAL CASE.**—This case presented the characteristic features observed by other authors. The patient (H. F.) aged forty-one was a very well developed muscular male individual who had rarely been ill previously. On the morning of September 26, 1934 the patient was working in the kitchen assisting the chef to prepare a batch of hard sauce consisting essentially of powdered sugar and butter. While mixing the sauce the patient sampled quite a liberal quantity. The time interval elapsing from the ingestion of the hard sauce to the onset of symptoms could not be determined but appeared to be within the range of a few minutes to one hour. The patient reported to the chef that he felt sick and that there seemed to be something wrong with the sauce. He left the kitchen and went outdoors where overcome by weakness, he was compelled to lie down. He then developed nausea, retched violently and succeeded in expelling most of the gastric contents. Following this he perspired profusely. The patient, when seen, was in mild shock and complained of marked weakness. His skin was cold and clammy, temperature 97.0, pulse rapid 120. Gastric lavage was immediately instituted with four per cent sodium bicarbonate solution. Shock treatment was given. A saline purgative magnesium sulphate two ounces was administered. At this time the nature of the poison was not known. The patient responded to the treatment, the temperature approached normal and the nausea and vomiting subsided. Several hours after the onset the patient commenced to complain of generalized muscular cramps involving particularly the facial muscles. The muscular cramps lasted several hours and then began to subside. At this time it was felt that the patient's general condition was much improved when suddenly while attempting to talk to an attendant he complained of shortness of breath and marked difficulty in breathing, became pulseless and suddenly expired six hours after the onset of symptoms. Blood studies performed shortly prior to death revealed a white blood count of 20,600 differential count: Polys. ninety-two per cent, Lymphocytes six per cent, Monocytes two per cent, Basophiles 1/3 per cent. Blood serum calcium performed on postmortem blood was 5.8 mg. per 100 cc.

The autopsy performed by Drs. Anna M. Allen and Charles C. Joyce on the following day revealed the following findings. The face had a distorted appearance, the eyes were sunken, conjunctivae in-

jected pupils unequal, the left 0.4 cm. the right 0.6 cm. There was a continuous oozing of dark red liquid blood from the cut blood vessels of the muscles. Along the right border of the heart and posteriorly were numerous small epichordal hemorrhages. The posterior aspect of both lungs presented many petechial subpleural hemorrhages. The bronchial mucous membrane was slightly congested. On section there were diffuse reddish patches scattered throughout, that appeared to be extravasations of blood. The intestines were a grayish yellow in color thin walled, shiny very slightly distended and the blood vessels in the walls were engorged. The contents of the small and large intestines were liquid throughout and the mucosa somewhat swollen and creamy white in color. The duodenal mucous membrane showed a few small, irregular reddened patches scattered here and there. Kidneys. Weight 350 grams. The surfaces were smooth and deep pink in color. The organs were firm capsules thin stripped without difficulty revealing a smooth congested cortex. On section the cut surfaces were considerably congested and swelled slightly over the capsule. (Extreme acute passive congestion with advanced cloudy swelling of the kidneys has been reported by other authorities.) The brain in this case was negative except for congested cortical blood vessels. Other organs were not remarkable.

In investigating the source of the fluoride it was determined that the powdered sugar had been contaminated with roach powder and in this way the fluoride had been introduced. Roach powder bears a close resemblance to powdered sugar. Samples of the roach powder, hard sauce, powdered sugar as well as the stomach and contents, cecum and contents, spleen, heart and heart's blood and sections of the liver, brain, kidneys, lungs and large intestine were sent to Dr. Boos, toxicologist, for examination.

Analysis of the powdered sugar revealed thirteen per cent roach powder. The hard sauce as prepared contained eleven per cent roach powder. The roach powder was found to consist of 55.9 per cent sodium fluoride and 44.1 per cent of sodium silicofluoride. Analysis of the organs was as follows. The appearance of the stomach mucosa was eloquent of the terrific local irritant action of the fluoride preparation, contained brown fluid, proved to be altered blood. The stomach yielded a trace of fluoride. The cecum contained a brown fluid of thin pea soup consistency. This fluid had a pronounced alkaline reaction and gave a test for magnesium fluoride and sulphate. It appeared that the amount of magnesium present in the cecal contents was not sufficient completely to convert the alkaline sodium fluoride into neutral magnesium fluoride. The cecal contents by analysis contained approximately six grains of this powder. The liver, kidneys, spleen, large bowel, lungs, heart, and heart's blood all yielded a positive test for fluoride varying however considerably in degree. The sequence of these organs as given indicates the order of intensity of the test.

The chef had also partaken of the sauce, however taking only a very small quantity. He noticed that the hard sauce tasted peculiar and ordered the entire batch thrown out. Within a few moments he also experienced the same symptoms of weakness, nausea and vomiting but to a lesser degree. When seen by a physician shortly after the nausea and vomiting had subsided and the patient at this time complained only of weakness and had no other complaints. He very rapidly recovered his strength and in several hours felt quite well. The only treatment was two ounces magnesium sulphate administered orally.

## SUMMARY

We are reporting an additional fatal case of sodium fluoride poisoning with a general review of the subject

The symptomatology is as follows The patient after ingestion of the poison soon complains of severe epigastric pain, followed immediately by nausea, severe retching and vomiting, and generalized prostration These symptoms are shortly after followed by diarrhea and muscular cramps, progressing to spasmodic contractions of the extremities, and clinical evidence of tetany

The treatment recommended is as follows copious gastric lavage with ten per cent calcium chloride, weak lime water, or magnesium sulphate This procedure converts the soluble fluoride into insoluble calcium or magnesium fluoride The tetany should be combated by intravenous calcium fluoride or intramuscular parathormone Shock treatment should be instituted

Pathological examination reveals local irritating action on the mucous membrane of the stomach and intestine, as exemplified by minute hemorrhages and congestion Irritation of the lungs also occurs as evidenced by congestion of the bronchial mucous membrane and petechial subpleural hemorrhages Extreme, acute passive congestion with advanced cloudy swelling of the kidneys has also been reported<sup>10</sup> Coagulation of the blood is abolished because of the binding of the calcium with fluoride

Sodium fluoride and sodium silicofluoride are common ingredients of insecticides and roach powders and may be easily mistaken for Epsom salts, powdered sugar, or baking powder The author wishes to emphasize again the toxicity

of these substances and to suggest as others have, that containers be properly labeled "Poison." Disguising these powders by coloring matter would appear wise

The author wishes to acknowledge the assistance and cooperation of Dr Clarence A Bonner and Dr Melvin Goodman

## REFERENCES

- 1 Baldwin, H B The toxic action of sodium fluoride J Am Chem Soc 21 517, 1889
- 2 Hickey, Charles H The danger of fatal poisoning from roach and other insect powders containing sodium fluoride Bull Mass Board of Health 6 341, 1911
- 3 Stanton, J N and Kahn, Max Sodium fluoride poisoning J A M A. 64 1985, 1915
- 4 Kockel, F R, and Zimmermann Poisoning with fluorine compounds München Med. Wchnschr 67 777 (July) 1920
- 5 Vallée C Non fatal poisoning by sodium fluoride J de pharm et chim 21 5, 1920 (Cited by DeEds, McNally, and Sharkey and Simpson)
- 6 McNally, W D Four deaths caused by sodium fluoride J A M A 81 811 (Sept 8) 1923
- 7 Sommelet, M Sur un cas d'intoxication mortelle provoquée par le fluorsilicate de sodium Bull de Sc Pharmacol 30 211, 1923
- 8 Kurtzahn Gertrud Suicide by fluorsodium silicate Deutsche med Wchnschr 49 319, 1923
- 9 Heinz and Haas Poisoning by sodium chloride München Med Wchnschr 70 565 (May 4) 1923
- 10 Bizot, A R Sodium fluoride poisoning Kentucky M J 22 156, 1924
- 11 Lührig Chem Ztg 48 613 1924 See Reference 18
- 12 Lührig Chem Ztg 49 805 1925 See Reference 18 (Cases cited by Floyd DeEds)
- 13 Dyrenfurth, F and Kipper, F Fluorine poisoning Med Klin 21 846 (June 5) 1925
- 14 Marcovitch, S Studies on toxicity of sodium fluosilicate J Pharmacol Exper Therap 34 179, 1928
- 15 Fullerton, W W Two rather uncommon fatal cases of poisoning New Eng J Med 203 423 (Aug 28) 1930
- 16 Sharkey, T P, and Simpson, W M Accidental sodium fluoride poisoning J A M A. 100 97 (Jan 14) 1933
- 17 Janaud, L Contribution to the study of the toxicology of fluorides and alkaline fluoro-silicates Thesis Paris Jouve and Company, 1923
- 18 DeEds Floyd Chronic fluorine intoxication Medicine 12 1, 1933
- 19 McClure F J Review of fluorine and its physiological effects Physiol Rev 13 277 (July) 1933
- 20 Webster, Ralph Legal Medicine and Toxicology Philadelphia & London W B Saunders Company 1930

## PAN AMERICAN GROUP ELECTS DR ROMERO AS SECRETARY

Dr Herman Romero of Chile was elected secretary of the Pan American Medical Association, at the recent "Floating Congress" of the association

Dr Romero was also elected one of the regional administrators for Chile, the announcement added, and the Academy of Medicine of the University of Sao Paulo, Brazil, has made him an honorary member

Dr Arturo Scroggie Vergara of Chile was named one of the vice presidents of the association, which is composed of leading physicians and surgeons from North, South and Central America.

Physicians after attending the Rio de Janeiro meeting of the association express themselves as deeply appreciative of the courtesies extended to them by the Brazilian Government They further report that the congress proved highly instructive—*N Y Times*

## MORTALITY RATES

Telegraphic returns from 86 cities, with a total population of thirty-seven millions for the week ending August 10, indicate a mortality rate of 95 as

against a rate of 97 for the corresponding week of last year The highest rate (21.7) appears for Nashville, Tenn, and the lowest (4.3) for Yonkers, N Y The highest infant mortality rate (24.6) appears for South Bend, Ind., and the lowest for Camden, N J, New Bedford, Mass, Omaha, Nebr, Peoria, Ill, Somerville, Mass, Spokane, Wash., Tacoma, Wash., Trenton, N J, Waterbury, Conn, and Youngstown, Ohio, which report no infant mortality

The annual rate for 86 cities is 11.8 for the thirty-two weeks of 1935, and the same rate appears for the corresponding period of the previous year

SUMMARY OF DEATHS AND DEATH RATES (ANNUAL BASIS) FROM AUTOMOBILE ACCIDENTS PER 100,000 ESTIMATED POPULATION FOR 86 CITIES FOR CORRESPONDING PERIODS OF 1935 AND 1934

	Week ending		First 32 weeks	
	Aug 10, 1935	Aug 11, 1934	1935	1934
Total deaths	148	151	5,030	5,063
Death rate	20.6	21.0	21.9	22.0
Deaths due to accidents in city	109	112	3,987	4,034
Death rate	15.2	15.6	17.4	17.6

# CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C. CABOT M.D.

TRACY B. MALLORY, M.D., *Editor*

CASE 21341

## PRESENTATION OF CASE

A thirteen year old American schoolboy entered complaining of the spitting of bright red blood

At the age of three his mother noted blood in his stools associated with weakness and pallor. At that time he was studied at another hospital for about a month following which his spleen was removed. The patient improved rapidly and was discharged in two weeks. He had no recurrences of the melena and appeared to be in good physical condition.

On the evening before admission he complained of a sore throat and went to bed quite early. The following morning his throat was still sore and in addition he complained of mild frontal headache. In the early afternoon he developed nausea which was soon followed by the vomiting of a cupful of rather thick black material not recognized as food. About fifteen minutes later he again vomited about a pint of bright red blood with clots. Six hours before entry he passed a loose, watery, almost black stool and a few hours later frank red blood. A few hours before entry he vomited again. This time there were many clots and bright red blood amounting to about a quart.

During the past ten years he had been quite pale although active and apparently entirely healthy. There had been no previous attacks of bleeding, hematuria, or red or tarry stools. He did not bruise easily.

His father and mother were both living and well. One brother, aged sixteen was living and well. There was no family history of tuberculosis or hemorrhagic manifestations. He had had measles and chickenpox. A tonsillectomy had been performed six years before entry.

Physical examination showed a well developed and nourished boy in no acute distress. The skin was pale. No purpuric lesions were noted. The heart and lungs were negative. The blood pressure was 85/40. There was a left upper rectus scar apparently the site of the previous splenectomy.

The temperature was 102°, the pulse 120. The respirations were 24.

Examination of the urine was negative. The blood showed a red cell count of 2,630,000 with

a hemoglobin of 60 per cent. A smear showed numerous platelets. The white cell count was 14,650, 82 per cent polymorphonuclears. The stools were semisolid and all gave positive guaiac tests. The bleeding time was two minutes, the clotting time one and a half minutes. A Hinton test was negative. A liver function test was normal. The icteric index was 3.

X ray examination showed a slightly dilated esophagus with numerous large venous channels projecting in the mucosa involving the lower two thirds. There was no evidence of obstruction. The stomach and duodenum were normal.

On the day of admission he vomited about 18 ounces of blood half of which was clotted. He was given a transfusion of 500 cubic centimeters. He did fairly well for about a month although he continued to have a slightly elevated temperature. About one month after admission at about 4 a.m. he suddenly vomited a large amount of blood. This was repeated the following day after which he was given a transfusion of 700 cubic centimeters. His red blood cell count dropped to 1,100,000, with a hemoglobin of 35 per cent. He vomited more blood the following day and was again transfused. He developed slight swelling and tenderness of both parotid glands. For the next two weeks there was no further bleeding although his temperature still remained elevated. During the seventh week he began to complain of generalized steady epigastric pain which was not relieved by morphia. His pulse and blood pressure were normal. There was slight spasm in the left upper quadrant although the remainder of the abdomen was very soft. Little peristalsis was heard except in the left upper quadrant lateral to the splenectomy scar, where active, rather high pitched peristalsis was heard. None was seen. At 9 p.m. that day his abdomen was still spastic and peristalsis was now present in the right half of the abdomen and absent in the left. His temperature was 102.2°, the pulse 120. His condition remained about the same and two days later his abdomen had become much more distended. He went into shock and died that day.

## DIFFERENTIAL DIAGNOSIS

DR. WYMAN RICHARDSON. We have very little data in regard to the first illness. I am going to consider that he had at the age of three the same disease at least to some extent, that he died of and discuss it from that point of view. He had bleeding at the age of three which was apparently related to splenectomy. There are not many conditions you can think of that will show that. I think we can cross out the rarer erythroblastic anemias. I do not feel sure that splenectomy is of value in these cases. This boy is a native born American and certainly has not the Mediterranean type of erythroblastic anemia. If he had the same disease then as now I think we can disregard purpura

because at the present time he has normal bleeding time, numerous platelets and no evidence of purpura in the interval. I will rule out purpura on that basis. Hemolytic jaundice can be considered. He has no evidence of icterus at the present moment and I doubt if he had it then. Therefore, we wonder why his splenectomy resulted in so prompt relief of the bleeding. I think the reason is that the splenic artery was tied off. Cirrhosis of the liver can occur at the age of three and must be considered in this situation, and, finally, the form of splenomegaly which may be associated with cirrhosis of the liver and which also may be associated with obstruction in the splenic and other veins.

We now consider the present illness with the ten year interval of freedom. What bearing has that on the original diagnosis? If he had cirrhosis of the liver with some enlargement of the spleen it seems likely that other symptoms would have become apparent in the interim. He has developed only one new finding, that is, this question of dilated esophageal veins.

#### X-RAY INTERPRETATION

DR RICHARD SCHATZKI. These pictures represent the lower third of the esophagus. Here is the diaphragm. The esophagus was slightly dilated without evidence of obstruction near the region of the cardia. The normal relief of the esophagus shows narrow, longitudinal, parallel running lines. You do not see them here. Instead, we have these thick bands of decreased density which are characteristic of dilated veins protruding into the lumen.

#### DIFFERENTIAL DIAGNOSIS CONTINUED

DR RICHARDSON. I take it then that there are esophageal varices in this boy and presumably he is bleeding either from those or from dilated veins in the stomach.

A thirteen year old boy is not usually an alcoholic and the ordinary association of alcohol with portal cirrhosis is perhaps excluded here. If this is cirrhosis it must be considered most likely syphilitic and although we cannot rule that out absolutely there is no evidence of the stigmata of congenital syphilis, and he has a negative Wassermann. That is as far as we can go in ruling it out.

We rule out hemolytic jaundice. He had an icteric index of three and apparently no evidence of recurrent jaundice.

The other problem then is whether this picture can be explained on another basis, namely primary splenomegaly. We do not know that the spleen was enlarged at the age of three. Presumably it was, with some obstruction of the splenic vein and with the possibility that that obstruction had advanced to involve the portal vein and cause portal obstruction with some cirrhosis in association, and also cause dilatation of the esophageal veins.

If we go on to the last part of the story we suddenly discover that he was not, as might have been expected, bleeding to death. We find all the emphasis on the abdomen. I think that is significant. Just what this tinkling peristalsis going from one side to the other is, I do not know, except that he had something causing pain and distention and probably obstruction, enough to cause a good deal of emphasis to be put on it in a long paragraph in this history.

If we assume he has an obstructive lesion in the portal vein, it is proper to guess that it might involve some of the mesenteric radicles. One other thing about the various rare blood diseases—there is no evidence that such existed. We have no description of the smear. We assume it is relatively normal. There is no evidence of a gastrointestinal ulcerative lesion so it comes down to a question of cirrhosis of the liver or splenomegaly, probably of the type with obstruction in the splenic, portal, and possibly of the mesenteric veins. I have avoided the term Banti's disease because I do not know just what it means. As it was described originally it is a condition with an enlarged spleen and gastrointestinal hemorrhages with thromboses of the splenic vein. I will in this case make a diagnosis of splenomegaly with obstruction in the veins that I have mentioned, probably with secondary changes in the liver of a mild cirrhotic nature.

#### CLINICAL DISCUSSION

DR RICHARD M SMITH. I saw him at the first admission to the Children's Hospital. At that time he did have an enlarged spleen. He came in with an attack of hemorrhage very much like the one for which he entered here. We considered at that time that the diagnosis was the condition which Dr Richardson has refused to name and about which we felt very much the same as he does. It is the condition described under the title of Banti's disease or splenic anemia, or thrombophlebitis of the splenic vein. We believe that the primary lesion is due to obstruction and not to dysfunction of the spleen as was originally believed. The picture is easily explained on that basis. A collateral circulation is established with marked esophageal varices from which bleeding takes place.

We have seen quite a series of children with this condition at the Children's Hospital, fifteen altogether. They have all died of uncontrollable hemorrhage. There is a child at the hospital now whom I saw this morning who has been bleeding for three days and may possibly die. The removal of the spleen seems to offer temporary relief. The patient presented here has gone the longest of any of our series without a recurrence of bleeding. We have another child who went eight years. Eventually they all have a hemorrhage and die due to the inability to

control the bleeding. There are two or three other matters which ought to be mentioned in connection with this condition. Dr. Richardson spoke of the abdominal pain which is not an unusual characteristic when you have an advancing thrombosis involving other radicles of the portal system. It would be interesting to know what the platelet count was after the hemorrhage was over. I notice in the report that the platelets were elevated. It has been noted and it has been our experience that with continued elevation of the platelet count there is likely to develop a secondary thrombosis. We know it is a common or not a rare complication following splenectomy for any reason and in this condition it is more likely to occur than in others. It is also true that some of these children develop an intestinal obstruction due apparently to adhesions. We have had one such patient and there are others reported in the literature. This attack of bleeding followed an acute infection. It has been true in a considerable number of our cases that some intercurrent infection apparently precipitates a recurrence of the bleeding. We have been interested in trying to consider the possibility of what we should do next in order to control the bleeding. Removing the spleen of course takes out of the portal circulation roughly twenty per cent of the blood and yet it is not sufficient to prevent recurrence of hemorrhage although they may be well for a considerable period of time. It has been suggested that tying the coronary vessels or vessels in the gastrophrenic omentum may be of value. It has been tried in a number of cases apparently with some success. We were greatly disappointed in the child who is now in the hospital bleeding, because her coronary vessels were tied about four months ago and we hoped that it would be effective in preventing subsequent hemorrhage. It has not been. Another suggestion is that one might attempt to establish better collateral circulation through the omentum and abdominal wall. I think that offers some hope, although it has not been particularly successful in varices due to cirrhosis of the liver. The patient of ours who has gone the longest, with the exception of this boy, without a recurrence of hemorrhage after splenectomy did subsequently have a hemorrhage. Dr. Ladd operated upon her and tied the coronary vessels. In that child the collateral circulation was well established. The omentum was bound firmly to the abdominal wall. I do not know whether it is significant but the child who has had hemorrhage eight or ten times presented at operation no appearance of gluing of the omentum to the abdominal wall and the superficial vessels on the abdomen were not enlarged. Another child whom we have followed for eight years has never had a recurrence of hemorrhage but has had repeated attacks of abdominal pain which we have interpreted as fresh thromboses. She has a remarkable en-

largement of the vessels of the chest and abdomen. In other words, she has established a circulation through the omentum. At the present time we can promise very little to benefit this condition and can predict almost certainly recurrences of hemorrhage and probably a fatal outcome.

DR. BETH VINCENT. I came in touch with this case in the medical wards and saw the patient frequently during the time he was under observation in the hospital. We recognized the condition and hoped we might be able to do something such as Dr. Smith has suggested but never had the opportunity because the acute abdominal episode intervened before the boy was in sufficiently good condition, following the hemorrhages, to warrant operation. At the time of the acute episode the diagnosis was either intestinal obstruction due to adhesions following splenectomy or a thrombophlebitis of the portal vein and radicles resulting in gangrene and perforation of the intestine, an evident diagnosis, I think, to make under the circumstances.

In considering this case it is well to review what Dr. Osler called splenic anemia. You will remember his definition was "a chronic progressive disease due to intoxication of unknown origin, associated with splenomegaly, anemia, leukopenia, and with a pronounced tendency to massive hemorrhages from the stomach." He said nothing, I think, in his description about any lesion of the portal vein or the splenic vein. I shall leave it to Dr. Mallory to comment on that phase of the subject.

I want to devote just a moment to the treatment that Dr. Smith has suggested. We are pretty certain what the result is going to be in these cases of portal thrombophlebitis. Splenectomy, usually, does not prevent bleeding from the esophageal varices and the patients die of hemorrhage or else they die of a recurrence or an extension of the portal thrombophlebitis, which results, as in this case, in mesenteric thromboses and gangrene of the intestine. To take out the spleen in these cases is rational, I think, because by removing the spleen and tying the splenic arteries you do for a time, certainly, diminish greatly the amount of blood that must return through the portal system. When the return of blood through the portal system is obstructed it passes upward by a collateral circulation which gives rise to esophageal varices. These are susceptible to trauma, they rupture, and the patient has massive hemorrhage. If one has taken out the spleen and wishes to go farther, to tie off the coronary vessels that are conducting the blood into these varices is rational enough if you can supply some other avenue for the blood to go back into the heart. The only way I can conceive of doing that is by an omentopexy, or possibly by attaching a portion of the omentum to the under surface of the liver to conduct some of the blood back through the

liver There is only one other method that I can suggest, if one has the courage to do it That is to make an Eck fistula, an anastomosis between the mesenteric vein and the vena cava I do not know just what the end result would be of shunting most of the portal blood through the vena cava with very little going through the liver These cases often live a long time, in spite of the hemorrhages There was a girl of twenty-one in the ward recently When she was seven years old, under the same circumstances as this case, I took out the spleen She had hemorrhages before the splenectomy and has had them ever since Perhaps sometime we may attempt one of the operations I have suggested

#### CLINICAL DIAGNOSES

Banti's disease (postsplenectomy) with esophageal varices and hemorrhage  
Retrograde mesenteric venous thrombosis  
Peritonitis

#### DR WYMAN RICHARDSON'S DIAGNOSES

Splenomegaly  
Thrombosis of splenic, portal and mesenteric veins  
Slight cirrhosis of liver?

#### ANATOMIC DIAGNOSES

(Banti's disease)  
Thrombosis, old, of portal and splenic veins  
Thrombosis, fresh, of superior and inferior mesenteric veins  
Gangrene of the ileum, with perforation  
Peritonitis, acute generalized.  
Esophageal and gastric varices  
Operative scar Splenectomy

#### PATHOLOGIC DISCUSSION

DR TRACY B MALLORY The autopsy in this case was done with extreme care by Dr Castleman, and I think gives a very complete answer to most of the clinical picture We started with a firm conviction that we were going to find obstruction in the portal circulation Of course, the commonest cause of that is cirrhosis of the liver and about two-thirds or three-fourths of the cases showing a clinical picture like this will show cirrhosis of the liver There are, however, a very significant number of cases in which the liver is perfectly normal, and the first glance at the liver showed that that was probably the case here Our attention was therefore immediately turned to the portal vein and it was found that that was completely thrombosed, and most of its radicles as well It was quite evident that these thrombi were of distinctly varying age In gross we could find an old, fibrous, completely organized thrombus, involving almost completely the portal and the remnants of the splenic vein When we looked for the superior

mesenteric vein we found two vessels of almost equal size running parallel courses One of them was completely obliterated by an old organized thrombus, whereas the parallel vessel running right along beside it, evidently a collateral which had formed some years ago, completely filled with fresh thrombus The terminal seven feet of ileum were gangrenous, and there was beginning peritonitis

When we came to examine the vessels microscopically we were able to carry back the story a little farther There were three distinguishable ages of thrombi First there was an old organized and a partially recanalized one, years old, which without doubt went back to the onset of his present illness, more than ten years ago Secondly, there was a much more recent thrombus which nevertheless showed some degree of organization and might be anywhere from two to five weeks old The development of that thrombus probably coincided with the onset of the acute hemorrhages Then there was a final fresh thrombus which accounted for the gangrene of the intestine and exodus

The liver was essentially normal It was not cirrhotic There were in it four small localized nodules, each about one centimeter in diameter, which were perfectly round and caseous On microscopic examination they showed a caseous center with a fibrous capsule, but no giant cells or mononuclear phagocytes, nothing to identify their origin They could be healed solitary tubercles They could be gummata, although there is no evidence of syphilis in this case I think it is conceivable that they could be partially healed infarcts of the liver The remainder of the liver was normal Functionally they could not have been of any significance

We have had several cases fitting more or less closely the so-called Banti's syndrome in the last four or five years that have interested us a great deal because there has been little or no cirrhosis but we have been able to demonstrate thrombosis of the splenic or the portal vein In 1910 Dr Wharthin reported seven cases showing the characteristics of the splenic anemia symptom complex and in all of these he was able to show obstruction of the portal system We have had only one case out of a half dozen here in which we have failed to show the same thing That obstruction of the splenic vein can easily be missed was shown very prettily by one case which we have already presented here Some of you will remember it, a man with a splenomegaly of years' duration, no anemia, until he suddenly had an extremely severe hemorrhage He was given a great many transfusions, put back into shape for a splenectomy, which was done with apparent success, although some weeks after he left the hospital he died suddenly, probably of pulmonary embolus At the time of operation it was impossible to identify the splenic vein The

same was true on gross examination of the specimen but when the hilus of the spleen was sectioned we were able with the aid of the microscope to demonstrate the remnants of the splenic vein with its characteristic elastic lamina still present and its lumen completely filled with fibrous tissue and small canalizing vessels. The surrounding tissue was full of very thin walled widely dilated newly formed veins. That is a case which would have gone down in the record as one of splenic anemia without evidence of portal obstruction if it had not been examined microscopically with this particular point in view. I feel very strongly that there are few if any cases of the splenic anemia syndrome in which you cannot find portal obstruction. It may be necessary to use special technique and a great deal of care to demonstrate it, however.

## CASE 21342

## PRESENTATION OF CASE

A sixty five year old English steamfitter entered complaining of abdominal pain of two weeks' duration.

Approximately one and a half months before entry he began to have attacks of diarrhea followed by constipation about once a week. One month before entry he had tarry stools on one or two occasions. Two weeks later he awoke with a dull aching pain in the abdomen about the region of the umbilicus. He was constipated at the time and vomited. The pain gradually grew worse for a few days and then was relieved by a bowel movement. During this period he had similar attacks two or three times a week, each associated with severe constipation and preceded by diarrhea. Two days before entry the pain suddenly became very severe and was accompanied by severe vomiting day and night. The vomitus consisted of recently eaten food and a white frothy phlegm. A physician prescribed an enema which relieved the pain. He had one red stool during this period. His appetite had been good. There was no jaundice. He had lost a great deal of weight but did not know how much.

The family and marital histories are non contributory.

The past history is negative except for a slight to moderate urinary difficulty consisting of burning, dribbling, incontinence and nocturia. He passed only a small amount of urine each time. He denied venereal disease.

Physical examination showed a well-developed but poorly nourished man. The skin was dry. The heart and lungs were negative. The blood pressure was 140/85. In the right lower quadrant there was a firm, non tender, round mass about 5 centimeters in diameter. The prostate was normal.

The temperature was 99°, the pulse 88. The respirations were 18.

The urine was negative. The blood showed a red cell count of 3,840,000 with a hemoglobin of 60 per cent. The white cell count was 9,500.

A barium enema passed as far as the ileocecal valve but could not be forced through the valve into the ileum. There was distinct defect in the cecal tip. The remainder of the bowel appeared normal.

A phenolsulphonphenalein test showed 45 per cent excretion after three hours, 15 per cent being excreted in the first hour. The non protein nitrogen of the blood was 86 milligrams per cent.

On the third day operation was performed. On the first postoperative day he developed coarse tracheal rales. Numerous rhonchi were heard throughout both lungs, especially at the bases. He rapidly failed and died on the third postoperative day.

## DIFFERENTIAL DIAGNOSIS

DR. MARSHALL K. BARTLETT. A history of weekly attacks of alternating diarrhea and constipation for six weeks, with tarry stools on two occasions, in a man of sixty five years of age, should mean malignancy of the colon until such a lesion is definitely ruled out.

The attacks became worse and more frequent. For the two weeks before admission they occurred two or three times a week. They were accompanied by pain referred to the region of the umbilicus and associated with severe constipation and vomiting. On each occasion the pain was finally relieved by a bowel movement. The exact nature of the pain is not described. There was one "red stool", probably due to fresh blood.

This is the story of repeated episodes of subacute intestinal obstruction, with spontaneous relief of each attack. The nature of the vomitus is not of particular significance. There had been extensive weight loss.

The urinary symptoms revealed in the past history do not seem to fit into the picture and I do not believe that they are related to the patient's present disease.

Physical examination confirms the loss of weight, and there is a firm non tender round mass about 5 centimeters in diameter felt in the right lower quadrant. Barium enema shows a distinct defect in the cecal tip, and no barium passed into the ileum. Blood examination shows a moderate anemia. The nonprotein nitrogen is normal and the phenolsulphonphenalein test shows an excretion of the dye which is within the lower limits of the normal range.

The other conditions which must be considered in the differential diagnosis of this lesion in addition to malignancy, are appendiceal abscess and tuberculosis of the cecum.

In a man of sixty five, tuberculosis of the



cecum would be quite a rare lesion. Gross hemorrhage from an acid-fast lesion in this region, while possible, is much less common than from a malignant tumor. It is also unlikely that a tuberculous process of sufficient extent to give the hemorrhage and weight loss that this man has had would remain localized as a "firm non-tender mass 5 centimeters in diameter."

Appendicitis is, of course, the most common lesion in the right lower quadrant and must be considered in every case involving this region regardless of the age of the patient. Hemorrhage from an appendix abscess is exceedingly rare, but it does occur. I know of one such case. Here again the discrete localized nature of the palpable mass is not suggestive of an inflammatory process originating in the appendix.

Although both tuberculosis and appendicitis must be considered, it seems to me that all the data in this case point to a malignant growth of the colon, presumably carcinoma, with intermittent attacks of intestinal obstruction, except the location of the lesion. Carcinoma of the cecum typically ulcerates and bleeds but does not cause obstruction. In this case, however, with the lesion in the tip of the cecum, it would seem possible that the growth has involved the region of the ileocecal valve sufficiently to cause the degree of intestinal obstruction which this patient has had. The fact that none of the barium enema passed into the ileum does not help particularly one way or the other, as this may happen with a normal ileocecal valve.

The most probable diagnosis seems to be a malignant lesion of the cecum, probably carcinoma, with repeated attacks of subacute intestinal obstruction. On the day after operation he developed a major pulmonary complication, the exact nature of which it is difficult to make out from the facts given. He died on the third postoperative day. My impression would be that he had a bilateral bronchopneumonia.

#### CLINICAL DIAGNOSES

Carcinoma of the cecum  
Bronchopneumonia

#### DR MARSHALL K BARTLETT'S DIAGNOSES

Carcinoma of the cecum  
Bilateral bronchopneumonia

#### ANATOMIC DIAGNOSES

(Adenocarcinoma of the ileocecal valve) with a metastasis to the liver  
Operative wound. Resection of the cecum and portions of the terminal ileum and transverse colon and ileotransverse colostomy

Lobar pneumonia, right lower  
Bronchopneumonia, left lower  
Peritonitis, acute generalized  
Pleuritis, chronic fibrous  
Endocarditis, acute terminal, aortic

#### PATHOLOGIC DISCUSSION

DR. TRACY B MALLORY. The patient was operated upon under ether anesthesia and a growth about the size of a tennis ball was found in the terminal portion of the cecum close to the ileocecal valve. A one stage operation which included resection of the cecum, ascending colon and 15 centimeters of the ileum was done. The cut end of the ileum was anastomosed to the transverse colon.

Examination of the specimen in the laboratory showed that, as Dr Bartlett had predicted, the obstruction had been produced by involvement of the ileocecal valve. The tumor completely encircled it and also involved the blind end of the cecum at the base of the appendix. It showed several areas of ulceration, the largest 1.5 centimeters in diameter, and to one of them may safely be attributed the single bowel hemorrhage. Although several lymph nodes were found which seemed definitely enlarged, microscopic examination failed to show any evidence of metastasis to them.

The autopsy showed a slight degree of generalized peritonitis although the anastomosis between the ileum and the transverse colon appeared in perfect condition and there was no evidence of infection about the sutures. Death was caused without much question primarily by pulmonary involvement. There was a massive lobar pneumonia of the right lower lobe and several small patches of more recent bronchopneumonia in the left lower lobe. Both apices showed extensive old tuberculous scars with numerous small areas of calcification. If a chest plate had been done the differential diagnosis would probably have been made more difficult. The heart was normal in size but showed marked calcification and evidence of a recanalized thrombus in the circumflex branch of the left coronary artery. There were no areas of infarction, however. A slight acute terminal endocarditis was present in the aortic valve. The liver showed a single small metastatic nodule, one centimeter in diameter, so far up beneath the diaphragm on the right lobe that it is not surprising that the surgeon had not felt it. The gall bladder contained a small stone. The kidneys were within normal limits in view of the patient's age. The urinary symptoms were readily explained by a distinct prostatic hyperplasia which was sufficiently marked in the median lobe to have resulted in hypertrophy and moderate trabeculation of the bladder wall.

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## THE MEDICAL SOCIETY AND THE MEDICAL PROFESSION

IN the Annual Discourse delivered at the June meeting of the Massachusetts Medical Society in Boston, Brace Paddock had written: "In order for the state society best to fulfill its purpose it must embrace the whole profession." Death had closed his lips only two weeks before the Annual Meeting so that he could not defend his thesis, but it stands as a challenge to the Society.

The challenge lies in the conflict of realities of 1964 licensed physicians in the state, only 5054 are members of the Massachusetts Society and many of these 1960 physicians are not wanted in the Society. The problem presented by the physicians who do not want to join the Society need not be considered now.

Why is it that so many physicians are not wanted in the Society? It is this situation that presents the challenge. Without resorting to circumlocutions, the substantial reason is that the Society, jealous for the traditions of the

past, and the high standards of medical practice which it has consistently attempted to preserve and uphold and raise, and still attempts to maintain, fears the influence of these "ineligible" physicians. The justification for this fear need not be gone into now, but its confirmation is widespread throughout the United States among persons and organizations interested in the welfare of the medical profession and in the protection of the public against unqualified medical practitioners. Many of these physicians, ineligible for membership in the Society in Massachusetts, would be ineligible even to take the examination for licensure in any other state.

But these "ineligibles" are practitioners of medicine duly licensed by the Massachusetts State Board of Registration in Medicine! There is then a sharp difference of opinion as to reasonable requirements for the practice of medicine between the Board acting under the statute and the Society.

Perhaps the Board ought to give a more rigorously exclusive examination there is no numerical dearth of physicians in Massachusetts and if the number of new practitioners were markedly reduced over a period of years, the public might suffer little harm.

It has been suggested that the statute should be changed, and if generally accepted standards are taken as a criterion, this should be done. There seems to be no reason why Massachusetts should favor commercialism, by permitting the continuation of the giving of low grade medical education in schools which it has chartered. The good name of the Commonwealth suffers.

Perhaps the Society should lower its standards and adjust them to the facts of medical practice as they exist in Massachusetts. In any case the present situation is intolerable and on the Society as the self appointed guardian of the profession lies the chief responsibility for bringing about the much needed change, whatever wisdom may show it to be.

## SERODIAGNOSTIC TESTS FOR SYPHILIS

THE recent report\* of the committee investigating serologic methods for the diagnosis of syphilis emphasizes the value of the techniques devised during the past fifteen years. There are two general methods in vogue, the modifications of the old Wassermann complement fixation technique and the variations of the precipitation method. The latter are simpler in principle since they require the use of but one reagent (antigen) in addition to the patient's serum.

Cummings, H. R.; Hazen, H. H.; Sanford, A. H.; Kneear, J. W.; Simpson, W. M. and Vonderlehr, R. A. J. A. M. A., 194 2015 1945

herniation or rupture of the intervertebral disc is more descriptive than "prolapse of the nucleus pulposus" as coined by Schmorl (Fig 1)

#### HERNIATION OF DISC INTO LUMBOSACRAL CANAL

*Incidence* Of the twenty-three patients with this type of lesion, only four were women. At the time of operation the youngest was twenty years, the oldest sixty-four. The ages thirty to

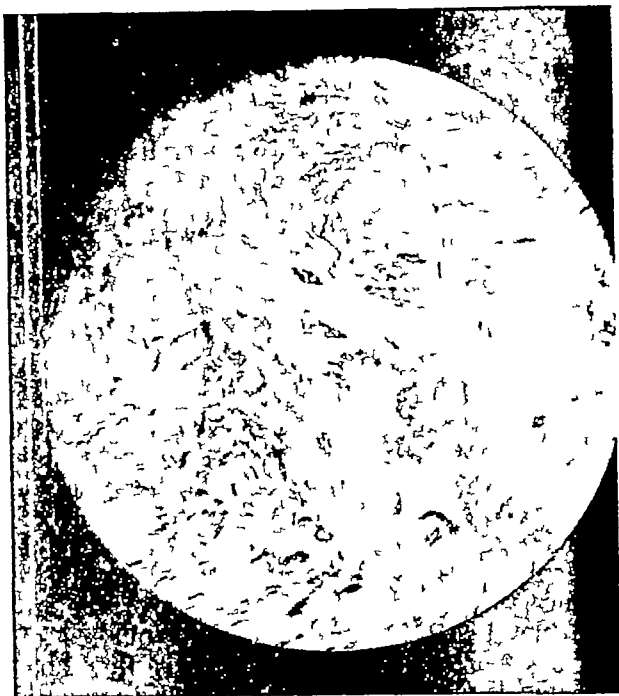


FIG 1 Microphotograph from specimen obtained at operation L C M G H No 325587. Material from annulus on the left and from nucleus on the right.

fifty furnished two-thirds of all the cases. No racial disposition was indicated.

*Etiology* A satisfactory history of antecedent trauma was obtained from fourteen patients and specifically denied by five. In only seven (one-third of all the cases) did it seem certain that an accident was followed immediately by the symptoms for which later the operation was performed.

It would be of interest to correlate as factors in causing rupture of a disc the physical development, body mechanics and nutritional state of the patients. This study, however, was not made. All we can say is that the work engaged in at the time of the rupture represented a wide variety of indoor and outdoor activity and that the individuals afflicted were not conspicuous for under- or over-development, nor were they otherwise, with one exception, chronic invalids.

As a typical example of the group under discussion the following case history is given.

CASE 1 D S., No 342673 M G H, a man of slight build, forty-four years old, machinist in a cotton mill, complains of low back pain of two years' duration, radiating to the right but-

tock and down the posterior aspect of the right thigh and leg. There is no pain elsewhere and no difficulty with sphincters. The present symptoms are similar to pain experienced six years ago which came on suddenly when lifting a heavy bale of cloth, necessitating bed rest for five weeks. In the intervening four years he has been well and active.

He stands and walks with a list forward and to the right, bends body forward with caution and associated flexion of the right knee. There is tenderness on pressure over the right sacroiliac joint and increased pain in this region on straight leg raising which is greatly limited on this side. Although gluteus, hamstrings and calf appear a little softer and smaller on the right, than on the left side, no appreciable weakness is observed, and sensory loss is limited to hypesthesia of skin over the external aspect of the lower right leg. The sole reflex abnormality is absence of the right Achilles jerk.

Combined lumbar puncture with needles at L1-2 and L5-S1 spaces shows no block, both fluids clear, colorless and in every respect normal except for elevation of protein, 59 mg and 67 mg respectively. (It is almost certain that both needles were above the tumor.)

X-ray after lipiodol injection into L1-2 space shows a concave defect in the lipiodol column outlining a rounded mass in the canal on the right side between the fifth lumbar vertebra and the sacrum.

At operation a piece of ruptured disc was found at the place indicated by lipiodol, and observed to press directly on the fifth lumbar root.

*Symptoms and Signs* As the site of the lesion in our cases varied so little, and the size of the herniated portion of the disc was found to be so uniform, it is not surprising that symptoms and signs should be similar. It is more in the course of the disease than in the nature of symptoms that we find individual differences.

*Sensory Symptoms and Signs* Pain was the first symptom in every case, and it was for relief of pain that all except two sought relief, in two only, disability was of prime importance. The pain was usually described as an ache in the low back, usually just to one side or the other becoming paroxysmal on turning, stooping, coughing and sneezing whereupon it would radiate outward over the buttock and down the back of the thigh, and at times the back of the leg also. Not infrequently the pain commenced in the mid-line and radiated down the back of both thighs, but unilateral distribution was the rule, even though symptoms had lasted many months. Pain in the perineum also was present in three patients. In only one was the pain referred to the anterior aspect of the thigh.

To minimize the pain, many patients assumed a slight stoop in walking and standing, and on examination the lumbar muscles were found in protective spasm. Tenderness even on gentle percussion over the low spine, lumbosacral ligaments and sacroiliac joint was commonly present, and yet rarely was the sciatic nerve tender on deep palpation. Notwithstanding, straight

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Cummings H. S., Hazen H. H., Sanford A. H., Shepard J. W., Simpson, W. M., and Vonderlich R. A. J. A. M. A., 104:2662 1935

Identical samples of blood taken from known syphilitics and non-syphilitics were submitted in the present study to the authors of various American methods of testing. Every precaution was taken to insure conditions approximating those met with in practice.

For the detection of syphilis when present, several of the precipitation methods appear distinctly superior to all but one of the complement-fixation tests. The number of specimens tested was perhaps not large enough to allow accurate evaluation of the liability of the tests to give false positives, but none of the methods with a high rating for sensitivity appear to be unduly prone to this fault, particularly if we exclude tests on patients with leprosy, malaria, and perhaps tuberculosis.

Physicians in Massachusetts will be pleased to know that the Hinton test, which is the method routinely employed at the Wassermann Laboratory of the Massachusetts Department of Public Health and at a number of hospitals, ranks as one of the best methods in use.

Gratifying as these results must be to the serologist, it is evident that the physician cannot rely entirely on blood tests if he is to approach perfection in the diagnosis of syphilis, for approximately twenty per cent of the cases of untreated primary syphilis and fifteen per cent of those of late syphilis were not detected by any single method. Evidently much progress has been made but more is still possible.

### AN UNJUST CONCEPTION OF MEDICINE AND PHYSICIANS

THE letter by a layman which appears on page 382 of this issue, presents the emotions and criticisms of a patient after release from a hospital. His reactions to the noise and his feeling that many hospitals are not well located will be endorsed by the medical profession. He probably does not know that the growth of a city places hospitals at a disadvantage in many particulars, but with great institutions such as exist in Boston the moving of them to better localities is impracticable under existing conditions. Many of the discomforts and even dangers incident to disease are very much overbalanced by modern hospitals. Full appreciation of our correspondent's complaints about noise exists with hospital authorities and staffs. But we may be excused for most positive condemnation of the last statement in the letter.

This shows either that the writer of the letter has not acquired his mental equilibrium or that he is wholly unappreciative of the attitude of the medical profession toward human suffering. Every sane-minded person deplors war and doctors are, for the most part, normal.

Organized medicine is striving to prevent hu-

man suffering and there is no alliance with war makers.

To include doctors with pigs of any sort is an insult which cannot be passed over without resentment.

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

WHITE, CHARLES J. A.B., M.D. Harvard University Medical School 1893. Edward Wigglesworth Professor of Dermatology, Harvard Medical School. Chief of Dermatological Department, Massachusetts General Hospital. President of American Dermatological Association. Chairman of Dermatological Section of the American Medical Association. His subject is "The History of Dermatology in Boston." Page 339. Address 259 Marlborough Street, Boston, Mass.

MCCARTHY, FRANCIS P. M.D. Tufts College Medical School 1905. Professor of Oral Medicine, Tufts College Dental School. Assistant Visiting Physician for Diseases of the Skin, Boston City Hospital. Pathologist, St. Elizabeth's Hospital and Quincy City Hospital. Address 371 Commonwealth Avenue, Boston. Associated with him is

DEXTER, SMITH O., JR. A.B., M.D. Harvard University Medical School 1933. House Physician, Fourth Medical Service, Boston City Hospital. Address Boston City Hospital, Boston, Mass. Their subject is "Oral Manifestations of Bismuth." Page 345.

THURMON, FRANCIS M. B.S., M.D. Harvard University Medical School 1926. Assistant Professor of Dermatology, Tufts College Medical School. Physician-in-Chief, Clinic of Dermatology and Syphilology, The Boston Dispensary. Consultant in Dermatology, Boston Floating Hospital. His subject is "The Treatment of Psoriasis with an Organic Sulphur Compound." Page 353. Address 520 Commonwealth Avenue, Boston, Mass.

DOWNING, JOHN G. A.B., M.D. Harvard University Medical School 1915. Assistant Professor of Dermatology, Tufts College Medical School. Assistant Dermatologist, Boston City Hospital. Dermatologist, Beth Israel and St. Elizabeth's Hospitals. His subject is "The Diagnosis of Industrial and Non-Industrial Skin Diseases." Page 358. Address 520 Commonwealth Avenue, Boston, Mass.

GREENWOOD, ARTHUR M. A.B., M.D. Harvard University Medical School 1902. Dermatologist, Massachusetts General, New England Deaconess, Palmer Memorial, Huntington and Pondville Hospitals. His subject is "Fungus Diseases of

the Skin." Page 363 Address 416 Marlborough Street, Boston, Mass

MALETZ, LEO M.D Tufts College Medical School 1932 Assistant Physician, Danvers State Hospital. His subject is "Report of a Fatal Case of Fluoride Poisoning" Page 370 Address Danvers State Hospital, Hathorne Mass

## MISCELLANY

### THE NOMINATION OF DR. FRANCIS R. MAHONY

Governor Curley has nominated Dr Francis R. Mahony of Lowell for membership on the Board of Registration in Medicine. Action by the Council, according to custom is deferred for a week.

This is designed to fill the position occupied by Dr Hovey of Springfield whose term has expired

Since Dr Mahony is a member of the Massachusetts Medical Society he is under the law not eligible for this position unless one of the three members of this board who are also members of the Massachusetts Medical Society shall have resigned.

## CORRESPONDENCE

### THE RELIABILITY OF THE HINTON TEST

The Commonwealth of Massachusetts  
Department of Public Health

August 5 1935

Editor *New England Journal of Medicine*,

Dr John Adams, Jr., of Boston believing that some confusion may have been created in the minds of many physicians by the substitution of the Hinton test for the Wassermann in the Department's laboratory has asked the Department to discuss the following types of cases

1 If there is no history of either acquired or congenital syphilis no clinical evidence of infection a negative spinal fluid negative blood Wassermann and Kahn, but a persistently positive blood Hinton is the diagnosis of syphilis justified and should the patient be treated intensively?

2 If a patient has received antisyphilitic treatment for a number of years for an old infection (adequate under Wassermann standards) is clinically free from infection, has a negative spinal fluid and negative blood Wassermann and Kahn, but a persistently positive blood Hinton should further treatment be given?

3 If a patient has early syphilis (primary or secondary) and has had continuous and energetic treatment for one or two years is clinically free from infection has a negative spinal fluid and all blood tests except the Hinton test are negative should the patient receive further treatment?

4 If a patient has a negative Hinton test, may central nervous system syphilis be excluded as a possibility?

These questions obviously may be stated briefly as one How reliable is the Hinton test?

Physicians become confused by a new test because they compare it with the old without questioning the specificity of the old. That is like doubting the efficiency of a modern automobile because one has always driven a ten-year-old model. The recently discontinued Wassermann test was superior to the one originally done at the Department's laboratory. The newer precipitation tests notably the Kahn and Hinton are superior to the complement fixation test.

The recent evaluation of the outstanding blood tests by the United States Public Health Service places the Hinton test among the most nearly specific of any in use in this country. Specificity is measured both by the ability of a test to detect syphilis when it exists and its failure to give falsely positive results. The Hinton test not only ranked with the best in each of these values but was superior to the Kahn standard diagnostic test by 5.1 per cent in the detection of syphilis. The complement fixation tests on the whole, made a very poor showing in the detection of syphilis.

No laboratory test is infallible but it is apparent that the physician is far less likely to be in error if he depends upon the results of repeated Hinton tests than if he depends upon the less specific Wassermann in the same situation.

Physicians must also bear in mind that

1. The term "negative history" is by no means absolute and is much less reliable than repeated Hinton tests. Many patients known to have syphilis give no history of early lesions or other evidence pointing to infection either because they have observed none or have forgotten or wish to forget. Women, particularly miss the primary lesion because of its location in the vagina. Many an extra genital chancre has been missed or diagnosed as something else and forgotten. Innumerable infections have been discovered through blood tests alone.

2. The term "clinically negative" is not absolute and far less reliable than repeated Hinton tests. Physicians vary in their ability to detect visceral syphilis. Unless he is an experienced internist and has available a variety of laboratory aids (x-ray electrocardiograph, etc.) he may fail to detect clinical evidence of infection, not to mention a slowly extending involvement which has not reached a clinically detectable stage.

3. The age of the patient must be taken into account as well as the duration of the infection. Given an infection of undetermined duration in a young person, it is safe to presume that it is sufficiently recent to deserve intensive and sustained treatment. Old people who have had syphilis for years, but who have no complaints or evidence of infection other than positive blood tests may do very well on mild intermittent treatment or on no treatment at all. Early syphilis or clinically active

syphilis deserves rigorous treatment, whatever the age of the patient. Syphilis in pregnant women or in women of child bearing age must have attention in any case.

4 A negative Hinton test does not exclude central nervous system syphilis as a possibility. However, the Hinton test will be positive in most cases of this form of the disease.

A patient with primary or secondary syphilis deserves a minimum of a year and a half of intensive treatment, without vacation, regardless of serology. Most syphilologists continue treatment thereafter, if necessary, until the blood serology has been negative for from six months to one year, under treatment. If the serology cannot be reversed after two to four years of treatment, and the spinal fluid is negative, further treatment may be modified according to the circumstances.

The treatment of long standing infections must be determined by the individual case, taking into account previous treatment, clinical activity, the age of the patient, pregnancy, etc. The objective is to keep the infection under control rather than to reverse the serology. The patient who has had a reasonable amount of treatment, but whose serology cannot be reversed to negative, must be handled as any "serologically-fast" case would be, even though the sensitive Hinton test is used. Blood tests are qualitative. They detect syphilis, but give no indication of its activity or of the extent of the infection. Although the future may bring better understanding of the serologically fast case, the best that can be said today is that any person with persistently positive blood has syphilis and must be watched, if not treated, with that in mind.

The Department suggests that physicians accept the Hinton test as one of the most specific tests available, in that it is falsely positive with extreme rarity and detects syphilis as well as, if not more frequently than, any other test in use. It should not be suspected of nonspecificity by comparison with the Wassermann or any other test. Its specificity has been studied against known infections and known freedom from infection for many years. The Department adopted it then, only after consultation with many syphilologists who had had experience with it.

The Department wishes to express its appreciation to Drs William P Boardman, Austin W Cheever, Walter T Garfield, Rudolph Jacoby, E Lawrence Oliver, C Morton Smith, and Francis M Thurmon, for their advice and to Dr John Adams, Jr, for asking the questions which have given the Department this opportunity for discussing the Hinton test.

Yours truly,

N A. NELSON, M D, Assistant Director,  
Division of Communicable Diseases

#### REFERENCE

1 J. A. M. A. 104: 2083 (June 8) 1935

#### A LAYMAN PUTS A QUESTION TO THE MEDICAL PROFESSION

Lying in bed five weeks or more in a room of one of the most highly developed hospitals of New England, in the course of which time I was rolled into the operating room twice for those intrusions by a surgeon into the recesses of my anatomy which are called "major operations", I added a great deal to my high previous regard for hospitals, nurses and doctors.

One becomes thoroughly aware of the existence of two social worlds — the world of the well and the world of the sick. The world of the well was going past the windows of that hospital in a torrent of devastating noise. It seemed incredible that a great building full of sick people should be so disregarded by the city authorities.

Why should not traffic be diverted so as to leave hospitals with some degree of quiet? And certainly quiet is a therapeutic resource and hastens recovery by inducing sleep at night and reducing nervous tension all day. You are rolled out on the balcony for air and change of scene. The air is tainted with coal and oil gasses, and the scene is a crawling horror of autos emitting their characteristic obscenities.

The society of the sick takes what is handed to it. We have no choice. We belong to "Les Misérables", and are grateful that time passes and the day of our release does draw nearer—provided, as the orderly remarked when I was going to the operating room, you have a return ticket.

However, the question which pressed in upon me more and more as I experienced the trained mercies of that place and the really tender, if relentless, offices of the doctors, was this:

In the event of war all these same highly skilled services and intricate equipment for comfort are devoted to cases of *manufactured sickness*.

People who would otherwise be well, in fact, the most healthy and vigorous part of the population of the nations involved, are, due to the egotisms, the antipathies, greeds and vindictiveness of statesmen and politicians, compelled to become cases for hospitals and doctors—and by the thousands daily.

Hospitals and nurses and doctors are provided in advance. Everything is arranged to receive the flood of *manufactured sick*. And presently here they come—by the train load, and the work begins, incessant, overwhelming, heartbreaking.

The amazing thing is this: there never has been a protest from the medical profession as such, from any association of doctors, against this manufacturing of sickness.

One wonders why. Do they like it, then? Do they rejoice in the added experience, in the enormous variety of wounds and diseases? Is it all a kind of medical and surgical orgy in which they feel peculiarly intoxicated with self forgetfulness and the practice of their art wholesale?

Would you not think that doctors would be among

the very first to resent these by-products of hostility forced on their attention?

But no there is no recorded instance which I have been able to discover of a protest against war against manufactured sickness by any medical association in America.

Can that be explained by doctors without incrimination and some sense of shame? And is it possible that we must remain content with the spectacle of the medical profession prostituted in this manner—following the bandwagon of the politician and the silk-hatted gentlemen of diplomacy into the big tent and there compelled to perform while the whip cracks?

For you may say all that can be said about the devotion and the exhilaration of self forgetfulness and about the experience gained and stored up for future use—this certainly is casting pearls before swine

For war makers are just that. They are not only pigs but they have the ugliest trait of the worst pigs—namely they devour their own progeny

It does seem strange, to a man in a hospital at any rate that doctors should make common cause with such people But they do

EDWARD YEOMANS

Westport Pt., Mass

#### SOME HINTS AIDING IN THE DIAGNOSIS OF ANTERIOR POLIOMYELITIS BEFORE THE PARALYTIC STAGE

The present epidemic of infantile paralysis has focused the attention of the entire medical profession upon this disease The anxiety of parents calls the average practitioner to see many cases that have symptoms which might possibly be those of this dangerous malady

While I do not make pretensions of being well informed on the subject, I have had occasion to delve into the literature in order to refresh my memory There should be an eagerness on the part of every physician to diagnose this disease before the paralytic sets in The latter is to a great extent acquainted with some symptoms and certainly the average parent can make a diagnosis when the child loses the use of some member I should like to present a brief outline of the disease in its preparalytic stage in order that my brother physicians may make a hasty résumé. I realize that busier men may not have a similar opportunity to review the description of the disease which is usually very lengthy I present only the symptoms of the preparalytic stage and a few hints to help in diagnosis.

The incubation period is from four to eight days A ten-day period of isolation should be imposed on all contacts How long the patient is infectious is unknown but modern practice is to insist on isolation for three weeks after nasal discharges have disappeared

The following are the points to be noted

1. Faucial reddening
2. Fever—(101-103)

3. Headache
4. Vomiting
5. Diarrhea.
6. Convulsions—especially in young children.
7. Tenderness of muscles and hyperaesthesia.
8. Irritability
9. Intolerance of handling
10. Kernig's sign.

After a glance at the above symptoms it will be apparent to the doctor that some of them, especially the first six are common to other childhood diseases. The latter four are peculiar to diseases involving the central nervous system. They are difficult to evaluate particularly in younger children who resent the handling of the examiner A good test for infants is to set them on a flat surface (a table for example) with legs extended before them. The patient who is infected will put his hands on the table to support his spinal column which is painful and is held rigid The child will also elevate the shoulders as though the back were sore very much like a person whose back is sunburned. This will also indicate a stiffness of the neck a valuable symptom, as this is difficult to ascertain in young children. One must be careful that the stiffness is not caused by cervical adenitis attending some simple pharyngeal infection

Kernig's sign will be found to be very often more or less developed This will serve to differentiate the disease and others that may simulate it. It is carried out with the child on its back the thigh is flexed on the abdomen and the leg is extended. A positive sign is present when there is resistance on the part of the hamstrings—when any extension of the knee-joint is difficult, and full extension is impossible.

If any or all of these symptoms are present to such an extent that the physician entertains a reasonable suspicion, lumbar puncture is necessary The physician should do this himself if he is equipped or remove the child to a place where it can be correctly carried out. Upon insertion of the needle increased pressure will usually be found if the disease is present. Cells that number more than ten or fifteen per cubic millimeter certainly point to a correct diagnosis. Polys may exceed 80 per cent. On repeated punctures they rapidly change to mononuclears Later there is a gradual decrease in cells and an increase in protein The sugar is little disturbed, a valuable point in differentiating tubercular meningitis which has a sharp decrease.

These few suggestions are offered in a hope that they may prove valuable to busy practitioners some of whom will undoubtedly be called to see some young sufferer They may be helpful in making a speedy diagnosis, thereby promptly bringing to the patient the best available treatment.

Sincerely yours,

FRED L. CAMPBELL, M D

665 Washington Street,  
Brighton Mass



# CORRECTION OF A REVIEW OF "TEN YEARS OF RURAL HEALTH WORK IN RUTHERFORD COUNTY, TENNESSEE"

The Commonwealth Fund  
41 East 57th Street  
New York City

August 13, 1935

Editor, *New England Journal of Medicine*,

I regret the necessity of calling to your attention certain errors of fact in the review of the booklet "Ten Years of Rural Health Work in Rutherford County, Tennessee", recently published by the Commonwealth Fund. This review appeared in the July 11, 1935 issue of the *Journal*.

It seems quite apparent that the reviewer was somewhat casual in his reading of the book. His first error is the location of the county, which he twice puts in Kentucky though the title clearly and correctly located it in Tennessee. Further on, the reviewer has taken a two paragraph summary of the situation prior to the demonstration, given on the bottom of page 4 and the top of page 5, which clearly dates the conditions as prior to 1924 and quotes from it implying that it describes the conditions "at the end of the demonstration".

Although the Commonwealth Fund welcomes comments and criticisms that are pertinent and based on facts, the misstatements of fact, and an evaluation of the publication far out of line with that of other reviewers, lead indubitably to the impression that the reviewer has been careless in his reading and made little effort to understand the objective of the book, or the facts presented in it, before writing his review.

In fairness to the many prominent public health workers who were engaged in carrying out this enterprise, as well as to the Commonwealth Fund who sponsored it, I shall be very glad, provided it be consistent with the policy of your *Journal*, if some correction of this unfortunate review may be published.

Sincerely yours,  
BARRY C SMITH.

## SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, AUGUST 26, 1935

Wednesday, August 28—

112 M. Clinico-Pathological Conference Children's Hospital

Saturday, August 31—

\*10-12 Staff rounds at the Peter Bent Brigham Hospital.

\*Open to the medical profession

†Open to Fellows of the Massachusetts Medical Society

August 29 - September 5—Latin American Congress of Physical Therapy, X-Ray and Radium. For information address Dr. Madge C. L. McGuinness, 1211 Madison Avenue, New York City.

September 5, 6, 7—American Congress of Physical Therapy will meet at the Hotel Kansas Citian, Kansas City, Missouri. Program and circular of information may be secured by addressing American Congress of Physical Therapy, 30 North Michigan Avenue, Chicago, Illinois.

September 17, 18, 19—Eleventh Clinical Congress of the Connecticut State Medical Society. For details address Dr. Creighton Barker, 129 Whitney Avenue, New Haven, Conn.

October 7-10—American Public Health Association will meet in Milwaukee, Wisconsin. For information address the American Public Health Association, 50 West 50th Street, New York City.

October 21 - November 2—1935 Graduate Fortnight of the New York Academy of Medicine. See page 898, issue of May 9.

October 28 - November 1—The Twenty-Fifth Clinical Congress of the American College of Surgeons. See page 1066, issue of May 30.

## BOOK REVIEWS

**Diseases of the Nervous System.** A textbook of Neurology and Psychiatry. Smith Ely Jelliffe and William A. White. Sixth Edition, 1935. 1175 pp. Philadelphia: Lea & Febiger.

The sixth edition of this important text includes all important contributions to neurology and psychiatry, of sufficient weight to warrant inclusion, which have appeared since the last edition. The book has been revised, rewritten and significant additions to the text are included. In order that the book should not be increased in bulk, the pages are correspondingly enlarged.

New methods of examinations of neurological and psychiatric patients are discussed at length. Sections dealing with the hypothalamic region in connection with metabolic studies are very complete. The surgery of the sympathetic nervous system and its wide application receive adequate mention. There is a wealth of new material dealing with interpretation of the activity of the symbolic systems.

Neurology and psychiatry as specialties are carefully related to general medicine by the authors and provide a basis for extensive integration of these fields. The book deals in the first section with The Physico-Chemical Systems, or the Neurology of Metabolism, in the second with the Sensorimotor Systems and in the third with the Psychological or Symbolic Systems. Among the topics which are outstanding for their careful consideration are the following: pachymeningitis interna hemorrhagica, syringomyelia, cerebellar syndromes and the treatment of neuroses and psychoses. The volume is worth having within easy reach whether the owner is specialist or general practitioner.

### A New Bibliography from Argentina

In 1933 there was formed a Committee of Bibliographical Information of the Medical Sciences of Buenos Aires. This Committee has undertaken to collect and publish as complete a bibliography as possible of the articles on medicine and the allied sciences published in Argentina. The first series consists of bibliographies dealing with Pediatrics and Puericulture, Biology and Physiology, Toxicology and Pharmacy and Chemistry. Some of the articles are abstracted while others are reported only by title.

# The New England Journal of Medicine

VOLUME 213

AUGUST 29 1935

NUMBER 9

## HERNIATION OR RUPTURE OF THE INTERVERTEBRAL DISC INTO THE SPINAL CANAL\*

### Report of Thirty Four Cases

BY WILLIAM JASON MIXTER, M.D.† AND JAMES B. AYER, M.D.†

IN the course of a good many years' experience with tumors of the spinal cord we had become familiar with the so-called enchondroma of the intervertebral disc. We had also become accustomed to the statement of the pathologist that he supposed the tumor must be an enchondroma, but that on section it looked like normal intervertebral disc. About three years ago Dr. Joseph Barr of the Orthopedic Department of the Massachusetts General Hospital impressed upon us the idea that these masses were identical with the nodules described by Schmorl.<sup>17</sup> It is interesting to note that Schmorl states quite positively that these nodules seldom if ever cause neurological symptoms. Investigation of the literature and our own cases resulted in a preliminary report by Mixter and Barr<sup>14</sup> of nine teen cases largely from the records of the Massachusetts General Hospital.

As far as we can determine rupture and extrusion of the intervertebral disc into the spinal canal was first described in 1911 independently by Goldthwait<sup>10</sup> in this country and by Middleton and Teacher<sup>18</sup> in England, but these contributions seem to have been forgotten. At any rate, the subject received scant attention for a good many years. In the meantime reports of enchondroma or echondroma of the intervertebral disc began to appear. Elsberg<sup>7</sup> in 1916 mentions the subject and states that Oppenheim had observed such a case. Olymer, Mixter and Mella<sup>3</sup> in 1921 note a similar case. Numerous other reports by Elsberg<sup>8</sup>, Stookey<sup>19</sup>, Bucy<sup>4</sup>, Petit Dutailis and Alajouanine<sup>16</sup>, Adson<sup>1</sup> and others came into the literature. Dandy<sup>5</sup> in 1929 reported two cases from which he had removed loose cartilaginous fragments protruding into the spinal canal. He considered them undoubtedly traumatic in origin. Elsberg<sup>9</sup> in 1931 again described these growths. The subject has been discussed more recently by Alpers, Grant and Yaskin<sup>2</sup>, who collected a large group of cases of chondroma from the literature up to 1933.

Peet and Echols<sup>15</sup> report two cases of herniation of the nucleus pulposus observed at operation. Maurice<sup>12</sup> in 1933, from a study of the literature, came to the conclusion, although he had observed no cases himself that many of the so-called enchondromata and Schmorl's nodules were identical. We had come to the same conclusion about the same time from clinical observations.

In our earlier cases, as in the references quoted above, the differential diagnosis lay between tumor and ruptured disc. We have been unable to find in the literature any group of cases in which the diagnosis was made in the absence of pronounced neurological signs and in which the differential diagnosis lay between low back strain of one sort or another and rupture of the intervertebral disc. The considerable number of such cases of this type which we are now able to report is the main reason for this communication.

In the eighteen months since the report of Mixter and Barr<sup>14</sup> we have observed fifteen additional cases. Our present paper is based on a study of the whole series of thirty four cases, proved at operation, twenty three of which were into the lumbosacral canal. Since 1912, in addition, there have been observed at the Massachusetts General Hospital six cases of true cartilaginous neoplasm of the spine. As these present an entirely different picture both clinically and pathologically from rupture of the intervertebral disc, they are omitted from this paper.

The disc specimens obtained at operation vary considerably as to the amount of annulus and nucleus present.\* Dr. Charles Kubik, neuropathologist at the Massachusetts General Hospital, has reviewed many of these specimens and feels that both nucleus and annulus are represented in most. At operation one is impressed with the fibrous character of the extruded fragment. We believe, therefore, that the term

\*The normal intervertebral disc is composed of two quite different cartilaginous structures. The annulus fibrosus is as its name implies a ring like structure of fibro-cartilage. Within this ring is a soft lenticular body the nucleus pulposus. This structure is 75 per cent water and contains cellular elements from the notochord in a rather gelatinous matrix in which elastic fibrils are found.

From the Neurological Department and the Neurosurgical Department of the Massachusetts General Hospital.

†Mixter, William Jason—Visiting Surgeon, Massachusetts General Hospital, Ayer, James B.—Professor of Neurology Harvard University Medical School. For record and addresses of author see "This Week's Issue" page 43.

herniation or rupture of the intervertebral disc is more descriptive than "prolapse of the nucleus pulposus" as coined by Schmorl (Fig 1)

#### HERNIATION OF DISC INTO LUMBOSACRAL CANAL

**Incidence** Of the twenty-three patients with this type of lesion, only four were women. At the time of operation the youngest was twenty years, the oldest sixty-four. The ages thirty to

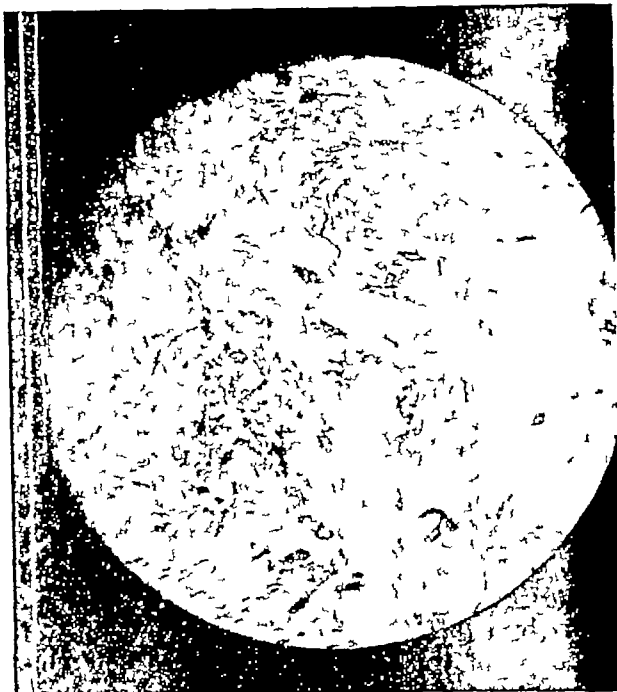


FIG. 1. Microphotograph from specimen obtained at operation. L. C. M. G. H. No. 325587. Material from annulus on the left and from nucleus on the right.

fifty furnished two-thirds of all the cases. No racial disposition was indicated.

**Etiology** A satisfactory history of antecedent trauma was obtained from fourteen patients and specifically denied by five. In only seven (one-third of all the cases) did it seem certain that an accident was followed immediately by the symptoms for which later the operation was performed.

It would be of interest to correlate as factors in causing rupture of a disc the physical development, body mechanics and nutritional state of the patients. This study, however, was not made. All we can say is that the work engaged in at the time of the rupture represented a wide variety of indoor and outdoor activity and that the individuals afflicted were not conspicuous for under- or over-development, nor were they otherwise, with one exception, chronic invalids.

As a typical example of the group under discussion the following case history is given:

**CASE 1** D. S. No. 342673 M. G. H., a man of slight build, forty-four years old, machinist in a cotton mill, complains of low back pain of two years' duration, radiating to the right but-

tock and down the posterior aspect of the right thigh and leg. There is no pain elsewhere and no difficulty with sphincters. The present symptoms are similar to pain experienced six years ago which came on suddenly when lifting a heavy bale of cloth, necessitating bed rest for five weeks. In the intervening four years he has been well and active.

He stands and walks with a list forward and to the right, bends body forward with caution and associated flexion of the right knee. There is tenderness on pressure over the right sacroiliac joint and increased pain in this region on straight leg raising which is greatly limited on this side. Although gluteus, hamstrings and calf appear a little softer and smaller on the right than on the left side, no appreciable weakness is observed, and sensory loss is limited to hypesthesia of skin over the external aspect of the lower right leg. The sole reflex abnormality is absence of the right Achilles jerk.

Combined lumbar puncture with needles at L1-2 and L5-S1 spaces shows no block, both fluids clear, colorless and in every respect normal except for elevation of protein, 59 mg and 67 mg respectively. (It is almost certain that both needles were above the tumor.)

X-ray after lipiodol injection into L1-2 space shows a concave defect in the lipiodol column outlining a rounded mass in the canal on the right side between the fifth lumbar vertebra and the sacrum.

At operation a piece of ruptured disc was found at the place indicated by lipiodol, and observed to press directly on the fifth lumbar root.

**Symptoms and Signs** As the site of the lesion in our cases varied so little, and the size of the herniated portion of the disc was found to be so uniform, it is not surprising that symptoms and signs should be similar. It is more in the course of the disease than in the nature of symptoms that we find individual differences.

**Sensory Symptoms and Signs** Pain was the first symptom in every case, and it was for relief of pain that all except two sought relief, in two only, disability was of prime importance. The pain was usually described as an ache in the low back, usually just to one side or the other, becoming paroxysmal on turning, stooping, coughing and sneezing, whereupon it would radiate outward over the buttock and down the back of the thigh, and at times the back of the leg also. Not infrequently the pain commenced in the mid-line and radiated down the back of both thighs, but unilateral distribution was the rule, even though symptoms had lasted many months. Pain in the perineum also was present in three patients. In only one was the pain referred to the anterior aspect of the thigh.

To minimize the pain, many patients assumed a slight stoop in walking and standing, and on examination the lumbar muscles were found in protective spasm. Tenderness even on gentle percussion over the low spine, lumbosacral ligaments and sacroiliac joint was commonly present, and yet rarely was the sciatic nerve tender on deep palpation. Notwithstanding, straight

leg raising in the supine position was greatly restricted on the affected side (and also to a less extent on the unaffected side)

In spite of very great pain, little objectively determined sensory loss was the rule, and only rarely was bilateral saddle anesthesia obtained

Numbness and paresthesiae frequently alternated with pain or were substituted for it.

**Motor Symptoms and Signs** While the patients usually complained of weakness of one leg it often seemed to the examiner that the weakness was more seeming than real due to protective spasm. Yet flaccid weakness and rarely paralysis were definitely observed in six patients, a unilateral foot-drop being a rare but striking finding. In the histories it is frequently noted that on some movement a stabbing pain in the back, perhaps radiating down one leg would be accompanied by an equally sudden transitory loss of power in that limb. **Atrophy**, always of slight degree, was associated with the weakness, and as expected was most conspicuous in gluteal, hamstring and calf muscles. As evidence of the slow progress of the disease in one patient it took seven years for the thigh and calf muscles to lose each four cm in circumference

Tremors, gross or fibrillary, were not observed

**Reflexes** The sole reflex abnormality noted in most cases was a loss of the Achilles jerk on the affected side, or of both in case of bilateral involvement. The associated plantar reflex was often not obtained, but was never extensor in type. Occasionally the knee jerk on the affected side was sluggish. The gluteal reflex was found diminished when this muscle was atrophied

Of greatest significance is the fact that in eight patients *no abnormality of the reflexes whatsoever could be demonstrated*

**Sphincters** Urinary and rectal incontinence were late manifestations in four cases always associated with bilateral involvement of the extremities.

In summarizing the clinical aspects of these twenty three cases, several points stand out and should be stressed

1 Pain is the first and with a few exceptions, remains the most important symptom throughout the course of illness. The pain is primarily in the low back with sciatic radiation mainly, and is increased by coughing, sneezing and bending

2. The symptoms and signs remain unilateral in more than half of the cases eight were on the left, and seven on the right side at the time of operation. Less frequently symptoms are bilateral from the onset or become bilateral during the course of the illness

3 No regular course of illness is indicated. In some cases the symptoms have progressed during two or three months with almost no interruption, with involvement of one lower extremity,

then the other, and finally sphincter loss. More frequently, however, symptoms have remained unilateral and have been intermittent over a period of many months or years, the patient enjoying relatively good health between attacks

**Spinal Fluid** Fluids were studied in twenty two of the twenty three cases. The significant fluid examinations in these cases have proved to be two only, an estimation of the protein content and the determination by manometry of subarachnoid block. The remainder of the examinations, cell count colloidal gold and Wassermann tests, have been routinely performed and found negative and of no diagnostic significance except to exclude syphilis and inflammatory disease

The technique of puncture has varied, at times a single needle below the lesion, on several occasions one needle above and one below but all too frequently because of the low site of the lesion we had to be satisfied with fluid obtained solely from above the site of the ruptured disc. Subarachnoid block nevertheless was determined by single or multiple puncture in eight cases. In no case was the block complete and often the latent period accompanying rise and fall in pressure in the manometer was indeed slight. In only three cases was the fluid from below the lesion xanthochromic

Whether obtained from above or below the lesion *every fluid showed an elevation of its protein contents*. For the most part the protein of the fluid was not excessive, even when from below the lesion although 1800 mg and 798 mg per 100 cc were obtained in two cases, the figures were usually less than 200 mg. From above the lesion the amounts were between 56 mg and 91 mg per 100 cc (40 mg high normal by the technique used)

**X Ray Examination** Films, even stereoscopic, failed to show direct evidence of a ruptured disc. Rarely was a lesion hinted at by a slight narrowing of the disc (five cases), or by localized spur formation or arthritis. In one case only was arthritis marked and it was partly on the supposition that arthritis might explain the symptoms that operation was withheld for seven years.

Our experience with x ray examination following injection of lipiodol places this procedure as of prime importance in diagnosis and localization of disc rupture. In our earlier use of lipiodol, the lesion was not clearly disclosed, with our present technique, elaborated particularly by Dr A. O. Hampton of the x ray department, we were frequently able to obtain results which were almost pathognomonic for herniation of the disc.

The technique is simple enough if two things are constantly kept in mind, i.e. that we are

trying to show a small mass which seldom causes compression of the whole cauda equina, and that the lesion always lies anterior to the dura. It is not our aim to show subarachnoid block, but to show a defect in the lipiodol shadow at the site of a protruded intervertebral disc. For this purpose the usual 15 cc or 2 cc of lipiodol, sufficient to demonstrate block, is not enough, and we now use 5 cc in order nearly to fill the lumbosacral canal. The injection is best made by puncture a little above the suspected lesion to prevent a breaking up of the oil into globules.

The patient in the *prone* position is then examined fluoroscopically on the tip table, films being taken when an excavation in the lipiodol shadow at the level of a disc becomes apparent. If the hernia is of the L 4-5 disc (as usual in this series), 5 cc of oil fills the canal above this point. Films taken with the patient sitting or standing and from various angles with the axis of the spine, usually localize the lesion (Figs 2, 3, 4 and 5).

Of the twenty-one patients of this group in whom lipiodol was employed, visualization of the hernia was satisfactory in sixteen. In the last ten cases of the series the demonstration has been so certain that a preoperative diagnosis of hernia of the disc has been made. In five patients who complained solely of unilateral pain and who showed no objective sensory, motor or reflex abnormality, an increased protein was found in the spinal fluid, and a characteristic notching of the lipiodol shadow correctly indicated a disc hernia.

**Differential Diagnosis** The majority of the cases of this series so closely resembled back strain, lumbosacral or sacro-iliac strain as to be indistinguishable from these conditions. When the symptoms were strictly unilateral, as they were in fifteen of the twenty-three cases, this diagnosis appeared quite satisfactory, indeed a very considerable number had been carried on as "sacro-iliac strain" for some time and would have been continued under this label if it had not been for the spinal fluid and lipiodol findings. Even the loss of an Achilles jerk, by far the commonest sign of nerve root involvement, was not considered conclusive, as it is maintained by some that this reflex may be lost in sacro-iliac affections.

It is unnecessary to recount numerous friendly discussions with our orthopedic confreres over these debatable cases, but the essence of the consultations briefly would come to this, that all would agree that the clinical picture presented was characteristic of sacro-iliac strain, or other orthopedic condition, and that we should operate for a herniated disc only if shown by lipiodol.

In the differential diagnosis, tumor also was considered. In no case did the clinical picture or x-ray findings suggest malignant disease of

the spine, and in no case was this diagnosis thought likely, yet benign neurofibroma or other intradural tumor would not have been a surprising finding in our earlier cases. We now feel that x-ray technique with lipiodol should usually differentiate these tumors from disc hernias, and in the last ten cases a preoperative diagnosis of ruptured disc has been found correct.

In two cases localized proliferation suggested old trauma and the intermittency of symptoms over a long period (in one case seven years) seemed consistent with root pressure of spinal origin, perhaps associated with intraspinal adhesions. In fact, the operation in one of these cases disclosed not only the disc hernia but a matting together of the cauda equina justifying our suspicions, in this case alone was evidence found suggestive of intraspinal trauma.

While a symptomatic diagnosis of sciatica was frequently made, in no case was the condition considered as sciatic neuritis.

#### RUPTURE OF DISC INTO CERVICAL CANAL

Age and sex incidence are similar to the previous group, the youngest being twenty-eight years, the eldest fifty-four years, all the patients except one were men. In one case only was there a causal history of trauma.

With one exception all the cases involved discs between the third and sixth cervical vertebrae, and with one exception the rupture was found primarily in the mid-line. As characteristic of this group Case 2 is presented in some detail.

**CASE 2** M A P, No 327775 M G H, an unemployed mill worker of forty-four years, a native of Madeira, entered the hospital March 10, 1933 because of increasing difficulty in walking of two and one-half months, which had progressed so that at the time of admission he was unable to walk alone. For two weeks prior to this complaint he had noticed a numb sensation in both feet which had spread upward to his shoulders, associated with paroxysmal pain between the shoulder blades, increased by coughing. With the onset of the difficulty in walking the pain subsided, but the numbness persisted, mostly on the right side. He had noticed a transitory difficulty in starting the urine.

He presented a spastic quadriplegia especially marked on the right with lively reflexes throughout, bilateral ankle clonus and Babinski signs. While there was coarse tremor of the right arm, no atrophy was apparent. There appeared to be general hypalgesia on both sides of the body, but only on the left side was temperature sense disturbed. No sensory level or zone of hyperesthesia was made out.

Combined cisternal lumbar puncture showed a definite but not complete subarachnoid block, with cistern protein 20 mg and lumbar protein 138 mg per 100 cc.

X-rays disclosed proliferative changes about the margins of the bodies of the lower cervical vertebrae consistent with hypertrophic arthritis. No other variations from the normal were noted. Lipiodol injected into the cisterna magna (ex-

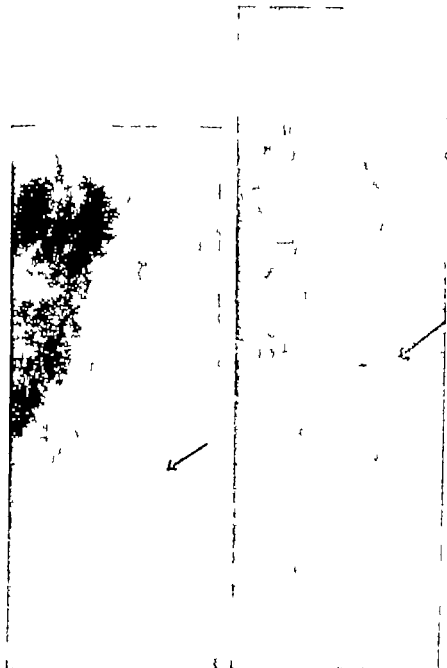
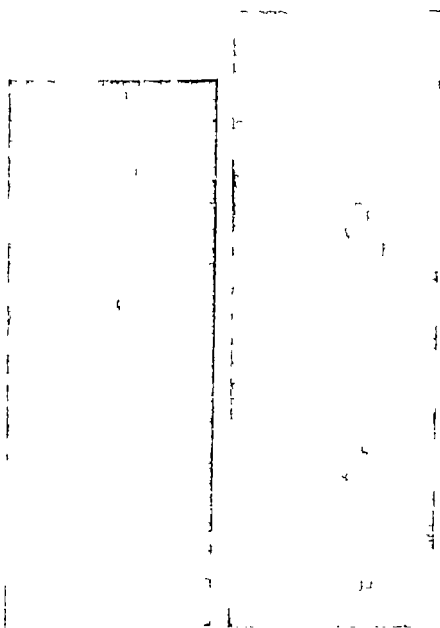


FIG. Spot plates taken during fluoroscopy. Anteroposterior and lateral C-M-D. H. No. 248220. Arrow points to defect.



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amination on the tip table) was temporarily arrested opposite the lower margin of the fifth cervical vertebra. The point of obstruction corresponded to the intervertebral disc.

At operation a disc tumor was in large part removed by means of an incision in the dura anteriorly. It was found by Dr C S Kubik to be very firm tissue measuring  $1.5 \times 0.5 \times 0.5$  cm., having the appearance of cartilage. The surface on all sides had a torn ragged appearance. Microscopically it consisted of fibrocartilage with a rather loose structure. There were only a few cartilage cells, these were evenly distributed through the fibrous matrix. The histological appearance corresponded very closely to that of nucleus pulposus.

**Symptoms and Signs** As would be expected, the clinical picture presented by the seven cases with mid line hernias was similar in many respects. Sometimes the earliest, and always the most important symptom to the patient, was motor disability of the lower extremities, bilateral stiffness, often with twitching of the legs and a sense of weakness, were the usual presenting symptoms. So insidious at times was the onset that in one man walking was noticed by his friends to be "peculiar" before he himself had observed anything wrong. At about the same time, or shortly before the appearance of stiffness of the legs, most patients experienced pain in the neck, frequently radiating to one or both shoulders, rarely down the spine, and made worse by coughing and sudden movements of the head. Numbness along the inner aspect of the arms and fingers was also commonly observed.

Increase in symptoms and signs usually is gradual, but there are seldom the long remissions noted in the lumbosacral group. Difficulty in walking generally demands attention in from two to four months, but in one case the progress of the disease was so slow that four years had elapsed before the gait was noticeably abnormal. A sense of numbness of the body, and occasionally difficulty in starting the urinary stream added to the discomfort of the patients.

For the most part these symptoms were bilaterally symmetrical from their onset, but in at least two cases a distinct inequality on the two sides was present.

The motor examination as expected showed typically spastic paraplegia without ataxia, with bilateral Babinski signs and ankle clonus. The upper extremities were normal or with alteration of reflexes only, sometimes increased, sometimes decreased, but never with gross disability or atrophy. The sensory findings were as a rule minimal and uncertain although a zone of hyperalgesia could usually be found at the level of the second ribs, even when no certain anesthesia was indicated below. In one case only was there a Brown Séquard syndrome.

We have grouped the above seven cases together because of similar symptomatology and

signs produced by disc hernias primary in the mid line. The eighth case of this cervical spine series, in whom the hernia protruded from O 4—5 disc well to the left side, produced such a different clinical picture that it will be considered separately.

**CASE 3** A. J. S., No 234269 M. G. H., a weaver forty four years old was admitted to the hospital December 29 1933 because of pain weakness and wasting of the left arm. Eighteen months before while cranking up the body of a dumptruck, he slipped and the crank hit his left arm just below the insertion of the deltoid muscle. Work was possible after a few days of pain at the site of the injury. A year after the accident he noticed numbness in the left arm and back and his arm from then on showed progressive weakness and wasting. Examination showed weakness and atrophy of the left deltoid in particular but a little weakness and atrophy of the biceps and triceps also although triceps and biceps reflexes were retained. There was an ill-defined hypesthesia to touch, pain and temperature sense in the upper arm. There was slight inequality of the pupils the right being greater than the left.

No abnormalities of the lower extremities could be made out. The spinal fluid showed no block, protein in the lumbar sac being 31 mg. X rays of the spine and left shoulder were negative. The condition was thought to be a traumatic brachial plexus injury.

The patient was readmitted to the hospital three months later because of increasing pain and weakness of the left arm. He now showed an increase since the previous examination in atrophy twitching of the deltoid muscle, hyperesthesia and tendon reflexes in this arm with a Hoffmann sign. The left knee-jerk was now livelier than the right, but without accompanying spasticity and with normal plantar response. Combined cistern lumbar puncture gave a questionable block with cistern protein 24 mg and lumbar protein 43 mg.

An intraspinal lesion seemed indicated and an exploratory laminectomy was done by Dr T J Putnam who found a mass, evidently arising from O 4—5 disc well out to the left side which compressed the spinal cord and over which the fifth cervical root passed. Unfortunately removal was found impossible without sacrificing the fifth root, so decompression alone was done.

**Spinal Fluid** Spinal fluid examinations of significance concern solely the dynamic tests for subarachnoid block and the protein content of the fluid. Block was demonstrated in seven of the eight cases, but was always partial, and sometimes very slight indeed even as judged by combined cisternal lumbar puncture which was used in five cases. In one case only block was not demonstrated. The protein content of the fluid below the block was slightly elevated as a rule, but in one case was actually below high normal. The protein figures varied from 32 mg to 186 mg per 100 cc. Xanthochromia was not observed.

**X-Ray** In no case did x ray examination show direct evidence of disc herniation. In one case a slight narrowing of the appropriate disc,



in two cases local spur formation and in two others scoliosis, suggested a lesion of some kind, but in none was the correct diagnosis possible from x-ray of the spine alone

Lipiodol injected into the cisterna magna was employed in six of the seven cases. There was definite lipiodol cap in four, and in one case in which no block had been demonstrated by fluid examination and no clinical level could be made out, it was the one dependable sign which led to operation. In one case, in which subarachnoid block was demonstrated by fluid examination, lipiodol passed down the canal without arrest, and in another case lipiodol seemed to be blocked at C 1, although the hernia was found at C 3-4.

In these cases the flow of lipiodol was followed fluoroscopically by examination of the patient on the tip table. The results are not uniformly satisfactory, yet in one case the evidence obtained was of paramount importance, and in three cases confirmatory evidence of block and localization was of such value as fully to justify the use of the oil.

#### DISCUSSION

Emphasis should be laid on the very considerable spasticity exhibited by these patients with little or no ataxia. This point has been stressed both by Elsberg<sup>9</sup> and by Stookey<sup>10</sup>, and is amply corroborated by a study of our cases. Their explanation seems reasonable, namely, that the posterior columns are at too great a distance from the compressing hernia to be affected, certainly they are not so readily exposed as are the pyramidal tracts. We have sought for evidence of early loss of pain sense as found by Stookey<sup>10</sup>, but fail to show that there is regularly such dissociation.

We believe that the diagnosis of hernia of the intervertebral disc in the cervical region can be only tentative and that true neoplasm is always a possibility in these cases.

In several cases a diagnosis of multiple sclerosis was considered until the demonstration of block made that diagnosis untenable.

In the single case in which root pain and atrophy were present, a disc lesion was not seriously considered until early signs of compression became manifest, which justified an "exploratory" laminectomy. A herniated disc was unexpectedly found.

Three patients had herniations of the disc at the thoracic level. We shall not at this time discuss them except to say that a diagnosis of ruptured disc was not made before operation. The symptomatology differed from cervical spine hernia mainly in one respect, in all three cases ataxia was prominent.

#### OPERATIVE TREATMENT

The technique of operation on patients with unilateral symptoms indicating a disc lesion at

the lumbar level, differs considerably from the method usually employed in exploration of the cauda equina for tumor. The reason for this is that the position of the lesion makes its demonstration difficult in some instances. If the pre-operative signs and symptoms are clear-cut, we have fairly exact knowledge of the level and of the side involved. In such a case the laminectomy may be limited to two or three vertebrae, but it should extend well out on the side of the lesion. It is our practice to preserve the spinous processes, undercutting them and leaving them attached to the muscles of one side. Two laminae on the side involved are removed, carrying the exposure well out and removing the articular facets to give wider exposure. It is sometimes necessary to remove part of one pedicle. The lesion can usually be felt before the dura is opened, but it is frequently small and may be hidden far out in the intervertebral foramen.

Sometimes the nodule can be exposed by retracting the dura and reaching it from the side. At other times it is easier to open the dura and then incise it again over the lesion. The extruded portion of the disc may be opposite the disc from which it has been torn or may be just above or below it. The lesion feels smooth and hard, and is frequently hemispherical in shape. If lateral, it usually presses against the nerve roots lying in their sheath. The mass lies in front of a dense fibrous membrane, the posterior spinal ligament. When this is incised the disc fragment usually, lying free, can be picked up with forceps. Occasionally the fragment is firmly attached to the edge of the disc. Search will almost always reveal an opening running down into the nucleus pulposus (Fig 6).

Elsberg<sup>8</sup> has described the technique of removal of these masses in the cervical and dorsal regions. We have followed his method closely. The dentate ligament is cut and the cord rotated, thus exposing the mass bulging through the anterior dura. Incision is made in the dura as he has described, and the fragment removed. It is our impression that the extruded fragment is more frequently connected with the disc than is the case in the lumbar region.

#### RESULTS

The first and perhaps the most striking result of operation in the lumbar cases is the immediate relief of pain in the leg. This relief has been complete and permanent in all but one of our cases. Some patients complain subsequently of lame back, but on the whole the operation has been most satisfactory. All of the patients have shown marked improvement in straight leg raising, many of them reaching eighty-five or ninety degrees of flexion. Tenderness of the lumbar spine is much less marked than before operation. Neurological signs, if present before operation, may or may not change.

Results in the patients with cervical lesions

have not been so satisfactory. Many continue to complain of the symptoms which they had before operation and remain spastic. On the whole, however, they too are improved.

In the whole series there has been one death attributable to the operation. In this case the wound was soiled with feces soon after operation, sepsis developed and the patient died of meningitis. Three others of the earlier group have since died, two probably as the result of urinary sepsis, while the cause of death in the third is unknown.

#### SUMMARY AND DISCUSSION

We realize that this subject opens up an interesting problem in industrial medicine. Injuries to the spine have long been a fruitful source of industrial accident compensation. It is unfortunate that we must further complicate this subject by adding another to the long list of possible injuries of the spine. We believe that this condition is rare as compared with back strain, fracture, sacro-iliac strain and the like, and that the diagnosis should not be made, even provisionally, without the proper evidence. We have stated that the examination of the spinal fluid and x-ray examination with lipiodol are of the greatest importance. We can say with equal emphasis that without increase of protein in the spinal fluid and without positive roentgenological evidence, even a tentative diagnosis of rupture of the intervertebral disc in the lumbar region should not be made. In the cervical region the differentiation of new growth and ruptured disc must at present remain obscure until proved at operation. This should go far toward preventing the loose application of this diagnosis to ill defined injuries of the spinal column.

##### 1. The Hernia

We believe that herniation of the intervertebral disc into the spinal canal is a definite pathological entity. The herniated mass producing symptoms and leading to operation has varied from  $\frac{1}{2}$  to 2 cm. in size. Irrespective of the size, we wish to emphasize that neither from gross nor microscopic appearance do they resemble true cartilaginous or other tumors. It follows that increase in symptoms must be due in large part to progressive protrusion of the disc and modification of tissues adjacent rather than to added growth as in neoplasm.

The physiological mechanism causing the disc rupture is still undetermined and we do not wish to commit ourselves on this point. We have purposely avoided a title to the paper which stresses the nucleus pulposus as the cause of the rupture or which indicates that the mass found at operation is a chondroma. It may in time develop that the weak point allowing such a rupture will be found to be the result of disease of the annulus fibrosus. The occurrence

of these hernias chiefly in persons advanced in years perhaps favors a preëxisting degenerative process.

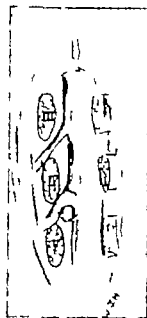


FIG. 7. Sketch from operation notes showing position of the lesion. C. S., M. G. H. No. 343385.

Trauma, as an immediate cause of rupture, appears to be quite certain in over one half of our lumbosacral group, and in this we are in agreement with Dandy, Alpers and others. In the cervicodorsal group, however, like Elsberg and Stookey, we failed to obtain a definite history of injury.

We are unable to establish any type of individual patient or any occupation in which disc hernias predominate, but the excess of males over females so afflicted is worthy of comment, and in this respect we are in general agreement with other writers.

##### 2. Symptomatology of the Lumbosacral Group

In general we have met with two groups of cases: those who present the clinical picture

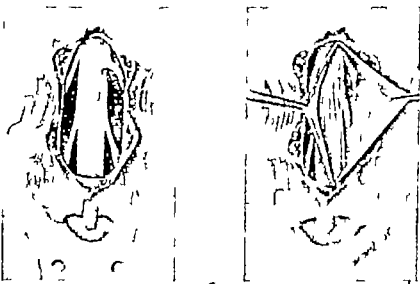


FIG. 8. Ruptured disc as seen at operation before and after opening the dura. J. M. C., M. G. H. No. 16381.

characteristic of sacro-iliac or low back strain, and those who present the picture of cauda equina tumor.

The first group is of the greatest interest in that these patients, suffering, intermittently

## THE SYNDROME OF ANEMIA, GLOSSITIS, AND DYSPHAGIA\*

## Report of Cases

BY W B HOOVER, M D †

THE syndrome of anemia, glossitis and dysphagia has been recognized only of recent years. A brief review of the literature will be given, and the cases seen in the Lahey Clinic in the past four years will be reported with a few comments.

<sup>1</sup>Plummer early noted the association of anemia and dysphagia in women. The latter was considered a hysterical manifestation. <sup>2</sup>In 1919, A B Kelly described the syndrome under the title of "Spasm at the Entrance of the Oesophagus." Spasm was stressed because of the fact that on the passage of the esophagoscope, the folds of the narrowed esophagus gave way without undue pressure, and the treatment consisted of dilatation. <sup>3</sup>Paterson described the condition at the same time in a paper entitled "A Clinical Type of Dysphagia." He particularly stressed the tongue devoid of papilla, changes in the mucosa and bands in various positions across the opening of the esophagus so that the opening was irregular, or an obliquely placed slit, and not always in the median line.

<sup>4</sup>In 1922, Porter P Vinson reported sixty-nine cases of "Hysterical Dysphagia." Since this report, the syndrome of anemia, glossitis, and dysphagia has frequently been referred to as the "Plummer Vinson Syndrome." Vinson noted splenomegaly in twelve of these sixty-nine cases. He did not find changes varying from the normal in the upper portion of the esophagus. His treatment consisted of dilatations, a liberal diet with iron and arsenic for anemia, and reassurance.

In 1926, Moersch and Conner also reported on sixty-five cases all in women. Glossitis was seen occasionally, the mucous membranes of the mouth were atrophic and dry, but webs or other membranous obstructions were not noted in the upper end of the esophagus. Splenomegaly was again recorded in twenty of the sixty-five cases. Achlorhydria was present in eight cases out of ten instances in which a gastric analysis was performed. Paresthesia of extremities was a feature in five cases. Their treatment was the same as that suggested by Vinson but they noted that in some cases the anemia preceded the dysphagia, an occurrence which was not in accord with Vinson's view that the anemia was due to an improper diet following dysphagia.

<sup>5</sup>A F Hurst in the same year reported a case in which it was impossible to pass the esophagoscope or mercury bougie, owing to "a tight spasm of the sphincter." This case had a

"streptococcal glossitis" and an anemia which preceded the dysphagia by two years. Improvement resulted following the administration of iron.

<sup>6</sup>Ryle reported another case in 1927, of esophageal spasm with severe anemia, and a recurrent ulceration of the tongue which the author thought to be a "streptococcal glossitis." The dysphagia was thought to be hysterical. The anemia responded to treatment with iron and arsenic, and the dysphagia was relieved by esophagoscopy.

<sup>7</sup>Jones and Owen also in 1928 reported on a series of cases. They recorded webs and membranes across the lumen of the esophagus, but also noted that the esophageal opening was lax without sphincter-like action occasionally. In 1929 <sup>8</sup>Cameron reported twenty-five cases of this syndrome. Hydrochloric acid was present in the gastric content of all eleven cases in which an analysis was made. Dysphagia was preceded by anemia in five of his cases and the reverse was true in fifteen of his cases, and the remaining five a definite statement could not be made of the sequence of symptoms. Cameron stressed the possibility of malignant change at the upper end of the esophagus in women with this syndrome.

From 1929 to the present time there has been a great interest in anemia and numerous articles have appeared, under the titles of "Simple Achlorhydric Anemia" or similar titles (see titles listed below) by the following authors: <sup>10</sup>Kaznelson, <sup>11</sup>Reimann and Weiner, <sup>12</sup>Altshuller, <sup>13</sup>Witts, <sup>14</sup>Waugh, <sup>15</sup>Mettier and Minot, <sup>16</sup>McCann and Dye, <sup>17</sup>Adamson and Smith, <sup>18</sup>Davies, <sup>19</sup>Mills, <sup>20</sup>Dameshek, <sup>21</sup>Hare, <sup>22</sup>Hurst, <sup>23</sup>Haden, all describe a type of anemia with achlorhydria. Some of these observers have noted enlargement of the spleen, a sore mouth, atrophic tongue, and dysphagia to be occasionally present among their cases.

Returning to the reports of cases in which dysphagia and glossitis are important factors <sup>24</sup>Evans, in 1930, advanced the view that the underlying cause of this syndrome was tertiary syphilis of the third or fourth generation, but in view of a review of the literature, it would seem that his arguments are not well grounded.

Witts in 1931 gave a short review of the literature and reported the finding of this syndrome in thirteen instances. He pointed out the close correspondence between this syndrome and achlorhydric anemia. His conclusions were that the disease was not the result of streptococcus infection, that the anemia was not produced by dysphagia, and that the symptoms were not

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the result of syphilis. His treatment consisted of a dilatation by the passage of bougies, and the anemia and glossitis usually improved following the administration of iron. He further noted that the administration of liver and dilute hydrochloric acid and the vitamin preparations did not seem to influence the anemia, glossitis or dysphagia.

Paterson confirmed his findings of 1919 and still held the view that the obstruction of the esophagus was due to spasm. He also stressed the frequency in which malignant growth developed in this syndrome. R. S. Johnson, in discussing Paterson's paper, pointed out that the dysphagia cleared up following bougies but that the change in hemoglobin concentration was very slow or did not take place at all unless liver extract and iron were given in large amounts. Achlorhydria was present in Johnson's cases.

Suzman in 1933 reports eight cases from the Massachusetts General Hospital. His paper is unique in that he is able to give the autopsy findings in one case. His comments on the findings in part are as follows: "From the gross findings, it is evident that a real obstruction brought about by raised folds of mucous membrane, was present.

"The mucosa and muscle of the tongue and esophagus showed definite histological abnormalities consisting chiefly of hyperkeratinization of the epithelium, with areas of desquamation and of degenerative, atrophic changes in the underlying muscle. Although there was a moderate degree of infiltration of the submucosa with lymphocytic like cells, on the whole, the condition did not appear to be inflammatory. The possibility that the hyperkeratinization of the epithelium may have been dependent on a deficiency of Vitamin A, is offset by the detection of significant amounts of this substance in the liver. The presence of areas of mucous membrane stimulating leukoplakia, and containing immature cells, exhibiting mitosis, is of interest in view of the tendency of malignant disease to develop."

One of Suzman's cases developed carcinoma in the pharynx and tongue but not of the upper end of the esophagus. This possibility of carcinomatous change has been emphasized by a number of observers. This is the only case of actual malignant change that I have found recorded in a patient with this syndrome. Suzman did not find changes in the intermuscular nerve plexus such as were suggested by Cameron, Hurst and Kelly to explain spasm as an etiologic factor in producing dysphagia. In view of the well marked gross and microscopic lesions found in the pharyngo-esophageal region in the specimen of his case "it seems unnecessary that hysteria be considered in the etiology of this disease." Recognizing the relation of simple achlorhydric anemia to this syndrome

Suzman states "The Dysphagia, it seems, is merely a complication or concomitant manifestation of this already well recognized form of anemia and there does not appear to be sufficient reason to regard this so-called 'Plummer Vinson Syndrome' as a separable clinical entity. From an etiological standpoint therefore, this syndrome may be considered simply one that may arise in idiopathic hypochromic anemia."

#### REPORT OF CASES AND COMMENTS

For the sake of brevity the accompanying table is given which illustrates quite graphically the principal points in the history, the physical examination, and the laboratory findings in seven teen cases presenting this syndrome comments and further notes will be given in the text.

It is to be noted that all of these patients are



FIGURE 1. An anterior posterior roentgenogram of the upper end of the esophagus showing the narrowed portion indicated by the arrows. Case No. 9 in the table.

women. The average age for the seventeen patients is forty six years the oldest being sixty three and the youngest thirty two. Very few patients with this syndrome are found among men. Vinson reported twelve men out of sixty nine cases the highest per cent reported by any observer.

All of these patients complained of dysphagia and this symptom caused them to seek relief. The dysphagia varied from a marked effort to get food to pass through the esophagus to partial starvation because of this symptom. All the patients had a fear of getting food caught in the throat and choking spells. Therefore, the food was well masticated or prepared with grinders or sieves. Eating at the table with other people became impossible because they could not eat so fast and choking spells would be very embarrassing. This often forced them to eat in solitude and one busy woman did not have the

time it required to get an adequate amount of food. Fluids were frequently used to wash the food down or liquid food was taken.

Eleven of these seventeen patients presented themselves to the Clinic with the belief that they had thyroid disease which caused the difficulty in swallowing and on examination six had adenomatous changes in the thyroid gland coincident with the syndrome of anemia, etc., but in no instance could the thyroid enlargement account for the difficulty in swallowing.

Weakness, fatigue, shortness of breath and "no pep" were common to practically all. Gastric distress was present in two cases. Prac-

ticallly all had other positive findings which gave symptoms.

Examination before the fluoroscope with the thick barium mixtures shows variation from slight hesitation to marked obstruction (see figure 2) at the upper portion of the esophagus.



FIGURE 2 Anterior-posterior roentgenogram of the upper portion of the esophagus. Case No. 13 in the table showing narrowing at the region of the web.



FIGURE 3 Lateral roentgenogram of the upper end of the esophagus. Case No. 13 in the table showing the niche made by the web in the barium at the upper end of the esophagus.

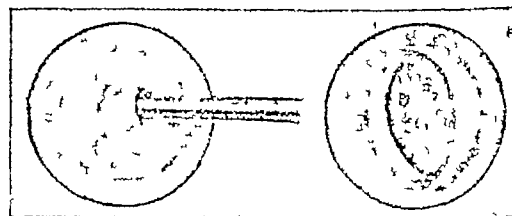


FIGURE 4a

FIGURE 4b

FIGURE 4 a) the esophageal appearance of the web. Case No. 13 showing the opening in the web through which an instrument was passed and brought against the under surface of the web. The web was so thin that it was transparent. b) shows the type of folds of partial web as seen in some cases, this one in Case No. 7 in the table. These webs are often attached to the posterior or lateral portion of the cricoid and pass backward around the upper end of the esophagus at the lowermost portion of the hypopharynx.

Examination with the esophagoscope and esophageal speculum shows the mucous membrane of the hypopharynx and esophagus similar to that of the pharynx. In two of the cases, no obstruction was encountered to the passage of the instrument. In four others a definite narrowing was present and pressure was necessary to pass the scope through the cricopharyngeal region and the upper inch of the esopha-

ticallly all had other positive findings which gave symptoms.

Anemia was known to be present by some of the patients and treatment had been given without results due to failure on the part of the patient to continue or because an inadequate amount of iron had been prescribed. None of the patients were apparently concerned by the presence of their anemia state.

Physical examination shows a patient of middle age or older with sallow skin appearing tired or fatigued and one is immediately impressed by the fact that the patient is below normal in general health and appearance.

The mucous membranes of the mouth and the conjunctivae are pale. The membranes of the pharynx are more dry than normal, slightly shiny and apparently thin. An actual acute

gus This produced some cracking and abrasion of the membranes. Of these resistant cases, one required the passage of graduated dilators to produce an adequate lumen in the esophagus. In seven cases a definite band or web was seen at the upper portion of the esophagus. One web was so complete that it narrowed the lumen of the esophagus to about four millimeters and was so thin that one could see an instrument through it when placed against the under surface. (See figure 4a.)

The passage of the esophagoscope not only aids in the diagnosis but the dilatation produced by its passage relieves the dysphagia in most cases. Gastric analysis was made in eleven instances and in eight there was absence of free hydrochloric acid, in two there was a small amount, in one a normal amount. In seven cases an attempt to pass a stomach tube for gastric analysis was unsuccessful before dilatation. In six of these cases the attempt was repeated after dilatation with success. One patient would not permit the passage of the tube and in four others it was not attempted.

The spleen was palpable in two cases on routine abdominal examination. No special effort was made to palpate the spleen in any of the cases. The blood examination showed a hemoglobin varying between 29 per cent and 70 per cent. The red blood cells varied between 2,910,000 and 4,990,000 and the highest white blood cell count was 12,000 and the lowest 1,450. Measurements of the cells were not made but in some smears variation in the size and shape of the red cells was noted. Achromia was marked in practically all the smears.

As to the relation of anemia to the dysphagia it is my impression that the atrophic process predisposed to web formation and fibrosis, yet it is to be remembered that we see many cases who have the anemia but do not develop dysphagia and further that others develop webs and fibrosis without anemia.

The treatment consists of two parts the mechanical and anti anemic. The dilatation can usually be carried out successfully at the time of the esophagoscopy examination but if this fails gradual dilatation can be carried out by passing dilators of gradually increasing size over the previously swallowed thread as suggested by Vinson in cases of esophageal stricture.

The dilatation which is so effective in relieving the dysphagia has very little effect on the anemia as was noted in case 10 in the table. This woman lived in a distant village. Her physician was instructed in carrying out her anti anemic regimen but since she swallowed readily, and that having been her chief complaint, she neglected this part of her treatment. When seen one year later after a vacation on the beach where her diet was ideal and living conditions were excellent her hemoglobin was only 55 per cent.

Dysphagia may recur as further webs or bands may be formed and atrophic process continue especially if the anti anemic treatment is neglected. Further dilatations will quickly relieve this symptom.

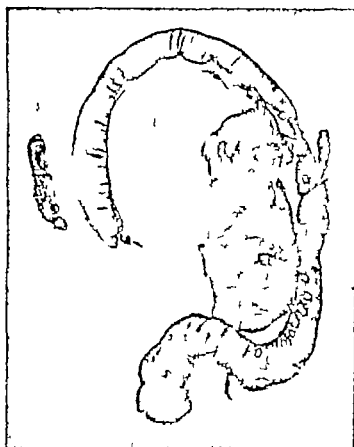


FIGURE 3. Microphotograph of a section made from the web in Case No. 13 which was removed from the esophagus with punch forceps. This web consists of two layers of mucous membrane with a small amount of fibrous tissue between them. The mucous membrane has separated partially from the fibrous tissue, especially in the lower portion.

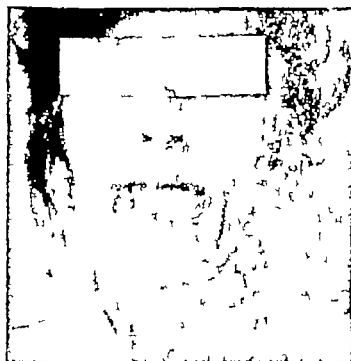


FIGURE 4. Photograph of Case No. 14 in the table, showing a smooth tongue and fissures at the corner of the mouth.

The anemia responds to the administration of iron salts in large doses. "Murphy states that the optimal dose is that which supplies 500 mg. of iron daily and he finds ferrous ammonium citrate and ferrous carbonate the most effective of the iron salts, the dosage of 3 Gm. per day of the former and 5.4 Gm. of the latter will yield this amount. This dosage has been found satisfactory in our cases.



The treatment with liver alone is disappointing. Some early cases were given liver without a rise in the hemoglobin percentage. Following the use of iron in combination with liver the percentage of hemoglobin increased.

Murphy has found that the combination of iron (ferrie ammonium citrate) in adequate dosage with the intramuscular injections of solutions of liver extract (Lederle) produced the most rapid "improvement in anemia of the hypochromatic type." Once the hemoglobin has reached normal it is necessary for the patient to continue a diet with a high iron content: fresh fruits, green vegetables, liver, etc., or even take an amount of iron in the form of an iron salt in sufficient dosage to prevent a decrease in the hemoglobin of the blood and maintain the iron metabolism of the body. There is a great tendency in these patients once the dysphagia is relieved to forget to take the iron and if the slightest abdominal distress occurs the patient gives the iron credit for the distress, the result being the discontinuation of iron medication.

Without careful follow-up the patient may not get a satisfactory increase in the hemoglobin or a relapse in the anemia may occur due to carelessness on the part of the patients. When difficulty in swallowing occurs it is so distressing that they seek further relief. In all the patients who have carried out instructions in medication there has been rapid increase in the percentage of hemoglobin. The anti-anemic treatment improves the appearance of the tongue as a rule. The fissures at the corners of the mouth rapidly improve without special attention being directed to them. In one instance the anti-anemic treatment relieved the dysphagia without the dilatations. This was in a young woman without severe dysphagia.

If there is obvious infection in the nose or mouth this should be cleared up.

Recently Hutter, Middleton, and Steenbock<sup>28</sup> have reviewed the recent writing on the atrophic tongue and with some experimental work and clinical investigation conclude that the smooth tongue most probably is due to a deficiency in diet or the inability of the patient to absorb Vitamin B. In view of this work I have given yeast to a few patients but cannot as yet make a definite report as to its efficiency.

#### SUMMARY

A brief review of the literature on the syndrome of anemia, glossitis and dysphagia is

given. The anemia is recognized as that reported as "Idiopathic Hypochromatic anemia" and so forth. The glossitis may more properly be described as an atrophic tongue and does not differ from that described in connection with other diseases. The dysphagia is often due to mechanical obstruction of the upper portion of the esophagus. Seventeen cases of this syndrome are reported. The treatment consists of mechanical dilatations and the prescription of iron salts in adequate dosage with or without liver. The need of careful follow-up is emphasized.

#### REFERENCES

1. Plummer cited by Vinson<sup>4</sup>
2. Kelly, A. B. Spasm at entrance to oesophagus. *J. Laryng. & Otol.* 34: 285 1919.
3. Paterson, D. R. Clinical type of dysphagia. *J. Laryng. & Otol.* 34: 289 1919.
4. Vinson, P. P. Hysterical dysphagia. *Minnesota Med.* 5: 107 1922.
5. Moersch, H. J. and Conner, H. M. Hysterical dysphagia. *Arch. Otolaryng.* 4: 112 1926.
6. Hurst, A. F. Plummer-Vinson syndrome (spasm of pharyngo-oesophageal sphincter with anemia and splenomegaly). *Guy's Hosp. Rep.* 76: 426 1926.
7. Ryle, J. A. Case of oesophageal spasm with severe anaemia (Plummer-Vinson syndrome). *Guy's Hosp. Rep.* 77: 33 1927.
8. Jones, A. M. and Owen, R. D. Dysphagia associated with anaemia. *Brit. M. J.* 1: 256 1928.
9. Cameron, M. Dysphagia and anaemia. *J. Laryng. & Otol.* 44: 168 1929.
10. Karmelsson, P., Reimann, F., and Welner, W. Achylische Chloranämie. *Klin. Wchnschr.* 8: 1071 1929.
11. Altschuller, G. Sur la pathogénie de l'anémie hypochrome chronique dite achylie à propos d'une observation personnelle. *Acta. med. Scandinav.* 70: 119 1929.
12. Witts, L. J. Simple achlorhydric anaemia. *Guy's Hosp. Rep.* 80: 253 1930.
13. Waugh, T. R. Hypochromic anemia with achlorhydria. *Arch. Int. Med.* 47: 71 1931.
14. Mettler, S. R. and Minot, G. R. Effect of iron on blood formation as influenced by changing acidity of gastrointestinal contents in certain cases of anemia. *Am. J. M. Sc.* 181: 25 1931.
15. McCann, W. S. and Dye, Jane. Chlorotic anemia with achlorhydria, splenomegaly and small corpuscular diameters. *Ann. Int. Med.* 4: 918 1930-31.
16. Adamson, J. D. and Smith, F. H. Chronic chlorosis. *Canad. M. A. J.* 24: 793 1931.
17. Davies, D. T. Studies on achlorhydria and anaemia. *Quart. J. Med.* 24: 447 1931.
18. Davies, D. T. Simple achlorhydric anaemia. *Lancet* 2: 355 1931.
19. Mills, E. S. Idiopathic hypochromemia. *Am. J. M. Sc.* 182: 554 1931.
20. Dameshek, W. Primary hypochromic anemia (erythronormoblastic anemia) new type of idiopathic anemia. *Am. J. M. Sc.* 182: 520 1931.
21. Hare, D. C. Simple achlorhydric anaemia treated by iron. *Brit. M. J.* 2: 888 1931.
22. Hurst, A. F. Achlorhydria and achylia gastrica and their connection with Addison's anaemia subacute combined degeneration syndrome and simple (non-Addisonian) achlorhydric anaemia. *Quart. J. Med.* 1: 167 1932.
23. Haden, R. L. Simple achlorhydric anemia. *J. A. M. A.* 99: 1398 1932.
24. Evans, G. Notes on nervous dysphagia, with special reference to its cause. *Practitioner* 125: 317 1930.
25. Paterson, D. R. Obstruction at upper end of oesophagus. *Proc. Roy. Soc. Med. (Sect. Laryng.)* 24: 1203 1931. *J. Laryng. & Otol.* 46: 532 1931.
26. Suzman, M. M. Syndrome of anemia, glossitis and dysphagia: report of eight cases with special reference to observations at autopsy in one instance. *Arch. Int. Med.* 51 (Jan.) 1933.
27. Murphy, William P. Treatment of secondary anemia with special reference to the use of liver extract intramuscularly. *Arch. Int. Med.* 51: 656 1933.
28. Hutter, Adolph M., Middleton, William S. and Steenbock, H. Vitamin B deficiency and the atrophic tongue. *J. A. M. A.* 101: 1205 1933.

## EPIDEMIC BENIGN MYALGIA OF THE NECK\*

BY BENEDICT F MASSELL, M.D.† AND PHILIP SOLOMON, M.D.†

THE purpose of the present paper is to report the high incidence in Boston during the past two months of a condition which appears to be an infectious myalgia of the neck. The attention of the writers has been forcibly attracted to this condition since each of us has suffered from it personally.

## PROCEDURE

Three hundred individuals, chosen at random were questioned as to the presence during the past two months of "stiff neck", or "sore neck" in themselves or their immediate acquaintances. A majority of the persons questioned were doctors, nurses, and hospital employees, but members of other walks in life were also included. Adults only were chosen, the age variation being roughly twenty to seventy years. When an individual was encountered who had had the symptoms in question, the following data were ascertained: date of onset (as well as could be remembered), time of day of onset, location, severity, and duration of the symptoms, interpretation of cause of the symptoms, incidence of such symptoms in the past, and the treatment employed.

## RESULTS

Of the 300 individuals questioned, fifty-two (17.3 per cent) had the symptoms in question within the past two months. The time of onset is shown in figure 1. It can be seen that an accurate recollection of the date of onset was rarely available after an elapse of two weeks or more. Answers such as "about two months ago", "last month" and "two weeks ago" were frequently obtained. It is probable that were the exact date of onset known in each case the distribution would be more even.

In addition to the fifty-two positive cases personally interviewed, the authors have knowledge of sixty-one other cases of "stiff neck" which have occurred in Boston within the past two months. Twelve of these came to the Out-Patient Department of the Boston City Hospital with pain and stiffness of the neck as their chief complaint. The remainder were relatives or friends of the group interviewed. It is probable that these cases represent only the more severe ones, many more may have been present among the acquaintances of the group inter-

viewed, but were not severe enough to warrant their talking about the trouble.

The description of a typical case follows.

The patient, a physician was awakened from a sound sleep at 5:00 A.M. on June 26 by a severe pain in the left side of his neck. The pain was neither dull nor sharp but somewhere between the two. It was definitely made worse by motion especially by rotating movements of the head. It seemed to be deep in the tissues of the neck near the occiput. Palpation elicited no single spot of localized tenderness but deep pressure was very painful over the whole left side of the neck, along the border of the trapezius muscle and especially just below the occiput. The patient was unable to lie comfortably in any position and could not fall asleep again. He interpreted his symptoms as possibly

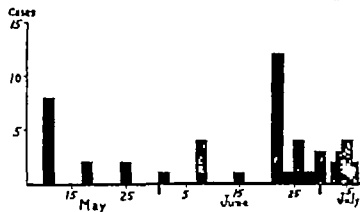


FIGURE 1 The date of onset of 5 cases of myalgia of the neck, May-July 1935

being due to a subluxation of a cervical vertebra which somehow occurred in his sleep. Several hours later he consulted a surgeon, who examined him carefully and thought that the condition was a myositis, chiefly of the trapezius and splenius muscles. The pain had diminished somewhat, but the tenderness was unchanged. There was no malaise, headache, fever or other symptoms. Baking and massage were recommended but the patient, with the typical lax attitude which physicians often take toward the treatment of their own illnesses, did nothing. The next day the pain had almost entirely disappeared but rotating movements of the head were still quite painful especially to the left. The third day the pain was gone but could be brought back by extreme rotatory movements of the head to the left. The condition has persisted at this stage to the present (July 6).

The case described above was perhaps more severe than the average, although many were severe enough to be incapacitating for the first twenty-four hours. In almost every case, the patients were in perfect health at the time of onset of the symptoms. The nearly complete absence of associated symptoms was remarkable. The patients were not ill, in only a few cases was headache present, appetite was not interfered with and sleep was prevented only in the rare case where the pain persisted and was sufficiently severe to make the assumption of a comfortable position impossible. In the great majority of the cases the symptoms were first

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noticed on awakening in the morning. In a few instances the symptoms were practically gone by noon, but in most cases they persisted for twenty-four to forty-eight hours, and then continued in a mild form for several days or weeks thereafter. Recurrences were not uncommon, but were never so severe as the original attack.

The location of the pain can best be explained by referring to figure 2. The pain was uni-

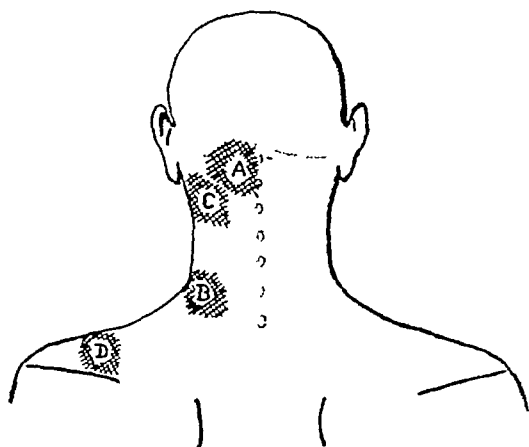


FIGURE 2 The common locations of the pain in myalgia of the neck. For explanation see text.

lateral in almost every case. The left side was somewhat more frequent than the right. The favorite site for the pain was at A, just below and to the side of the occiput, along the origin of the trapezius muscle at the superior nuchal line. The next most common site was at B, halfway down the neck along the border of the trapezius muscle. Other sites for the pain were at C, the insertion of the sternocleidomastoid muscle, and D, the lower border of the trapezius at the shoulder. In a few cases the patients thought they had a sore throat until they realized that the pain was not in the throat but deep in the muscles of the neck. One patient had very deep-seated pain accompanied for a short time by pain on swallowing. In the cases examined, nodules or extremely localized tenderness could not be felt. The pain often was more generalized in the side of the neck than is shown in figure 2. Movement of the involved muscle invariably caused severe pain, so that the patients were wont to walk about "stiff-necked", turning the whole body rather than the head in order to look to the side.

The interpretations which the patients gave for the cause of their symptoms were interesting. The majority said, "I thought I must have twisted my neck somehow in my sleep." Others thought they "must have been in a draught" the day before. A few thought that physical activity, such as swimming or tennis, was the cause. Two surgeons thought that a strained position during prolonged operating the day before might have been the cause. It is significant that no one of these patients has been subject to

"stiff neck" in the past, or has had this symptom commonly after activity similar to that which he thought might be the cause of the present condition.

The treatment used in the severe cases was heat and massage. Diathermy, infra-red baking, and a variety of liniments were occasionally employed. The heat in every instance seemed to give a measure of immediate relief. The massage, while extremely painful, was followed by a more lasting relief. It is doubtful how much good these measures were for the underlying condition. The cases without treatment ran approximately the same course as those with treatment. No complications occurred, and all cases recovered without residuals.

#### COMMENT

The high incidence of this condition (greater than one in six) demands attention in spite of the obvious benign character of the symptoms. It is possible, though it would seem unlikely, that at any time of the year one could elicit this same proportion of similar symptoms within the previous two months. If this were so, the fact would be even more interesting and more demanding of further research. It is possible that the explanations offered in the individual cases for the symptoms are indeed the correct ones. But the commonest of these, exposure to draughts on the previous day, has long been the layman's explanation for the onset of the common cold, the true etiology for which is now known to be infectious. A hypothetical twist of the neck during sleep seems hardly plausible enough to warrant serious consideration. Besides, several cases occurred during the day while no physical activity was going on. Physical exertion the previous day, swimming and tennis, admittedly popular at this time of the year, could be offered as an explanation in only a few cases, and in these it was unusual and surprising to the patients to find such acute symptoms as the result of physical activity which was not uncommon to them.

It seems to us quite possible that the etiology of the condition in question is on the basis of an infectious agent. While we are not in a position to offer proof for this hypothesis, there are several considerations which are in its favor. These are the apparent epidemic nature of the condition, the uniformity of the onset, symptomatology, and course, and the absence of other apparent causes. In two instances in this series, patients reported that their wives complained of symptoms similar to but milder than theirs on the day following the onset of their own symptoms. Aside from these instances, there seemed to be no other multiple cases in the same family.

Conditions similar to that described in this paper have been frequently discussed in the

literature under the name of "fibrositis", "myalgia", "myositis", or "muscular rheumatism".<sup>1</sup> Most of the authors have been interested chiefly in the chronic or recurrent form, and particularly in association with articular rheumatism. Very little attention has been given to the acute forms. Epidemics of acute pleurodynia or Bornholm disease have been reported<sup>2</sup>, but no reference can be found to epidemic myalgia of the neck. Except for brief discussions in the textbooks, the American physicians have almost entirely ignored the question of muscle pain.

"Stiff neck" has probably always been a common complaint, and the attitude of the public toward it has been one of annoyed tolerance and resignation, much the same as its attitude toward the common cold. But the total amount of pain and suffering occasioned in the community by these minor illnesses is enormous. Further research into the etiology of these conditions is obviously indicated.

#### SUMMARY

The high incidence in Boston during the past two months of a condition which appears to be

an infectious myalgia of the neck is reported. Of 300 individuals questioned, fifty-two, or 17.3 per cent, had the symptoms in question. The condition is described and attention is called to its apparent epidemic nature at present.

#### REFERENCES

- (a) Buckley C. W. Fibrositis lumbago and sciatica. Practitioner 1941 120 (Feb.) 1935.
- (b) McKewen P. W. Fibrositis and panniculitis. Brit. J. Phys. Med. 8: 107 (Nov.) 1933.
- (c) Clayton E. B. and Livingstone, J. L.: Fibrositis. Lancet. 1: 140 (June 23) 1930.
- (d) Murray G. R. Myofibrositis as a simulator of other maladies. Lancet 1: 115 (Jan. 19) 1929.
- (e) Gordon, R. G. Fibrositis. Edinburgh M. J. 32: 807 (Dec.) 1925.
- (f) McDonald, J. E. R. Fibrositis. Practitioner 115: 139 (Aug.) 1925.
- (g) Edgcomb W. Joint discussion on nature, prevention, and treatment of fibrositis. (Sect. Bacteriol. and Climatol., Epidemiol. and State Med. Med. Therap. and Pharm.) Proc. Roy. Soc. Med. 19: 2: 71 (Joint discussion group) (Nov.) 1925.
- (h) Morgan, M. T. Epidemic myositis in Great Britain. Bull. Office internat. d'hyg. pub. 26: 1463 1934.
- (i) Morgan, M. T. Epidemic myositis in Sweden. Bull. Office internat. d'hyg. pub. 26: 1033 1934.
- (j) Callaway J. L.: Epidemic pleurodynia. South M. J. 27: 1019 1934.
- (k) Sylvest, E. Myositis acuta epidemica (La maladie de Bornholm). Bull. Office internat. d'hyg. pub. 26: 1431 1932.
- (l) Richter A. H., and Levine, H. D. Epidemic pleurodynia. J. A. M. A. 102: 595 1934.
- (m) Crone, N. L. and Chapman E. M. Epidemic pleurodynia. New Eng. J. Med. 209: 1007 1933.
- (n) Pickles, W. N. "Bornholm disease: account of 10 cases." Brit. M. J. 2: 217 1933.

## COEXISTING INTRAUTERINE AND EXTRAUTERINE PREGNANCY

BY HENRY H. FAXON, M.D.\*

COEXISTING intrauterine and extrauterine pregnancy is an unusual although not extremely rare finding. The first reported instance of this condition was recorded by Duverney in 1708. His diagnosis was made at autopsy the mother having died in the third month of pregnancy as a result of rupture of the extrauterine sac.

A number of efforts have been made to correlate separately reported cases and three exhaustive reviews of articles dealing primarily with the group as a whole have been published by Novak (1926), Stein (1928) and Gemmell (1933). Although there are certain minor differences in these reports, due chiefly to each author's discrimination as to which published cases should be included in his series and to the time of publication, they agree essentially as to the findings derived from statistical evidence. As a matter of interest the following observations, based on the above reviews, are given by way of introduction.

There have been approximately 250 cases of coexisting intrauterine and extrauterine pregnancy reported. Ten per cent of these might well be excluded as representing instances of intrauterine pregnancy superimposed upon a tubal or intra-abdominal pregnancy that oc-

curred from one month to many years before. Thus, the finding of a lithopedion in conjunction with a normal gestation represents what has better been termed a "compound" than a "combined" pregnancy. In all save the ten per cent noted, impregnation of the tubal and of the uterine ova took place presumably within a short time of each other. In no instance has there been convincing evidence to show that ectopic conception occurred after intrauterine pregnancy was established.

In sixty per cent of the cases the mother was between the ages of twenty-five and thirty-five years, with slightly more than half of these cases falling in the latter five-year period.

Thirteen per cent of the cases occurred in nulliparas while fifty-four per cent of the women had previously borne one, two or three children. In six of the cases there was a history of previous multiple intrauterine pregnancies, but save for this finding no evidence was advanced to show any causal relationship between previous pregnancies and the occurrence of coexisting intrauterine and extrauterine pregnancy.

The symptoms complained of early in the course of the condition were usually attributable to the tubal pregnancy, while those in the latter months were more commonly the result of the intrauterine gestation. The condition was

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ed, it does not appear that the septum had undergone any morbid degeneration, which could be thought to give it a greater liability to rupture than any other part of the heart's muscular structure. But such degeneration was so remarkable in the case which had fallen under my own observation that I could not help desiring a more accurate examination of the preparation of St Bartholomew's, if after the lapse of seventeen years it were indeed possible. Mr Paget and Dr Ormond undertook it for me, with the aid of the microscope, and have obligingly communicated to me what they were able to make out. 'There was much oil swimming on the top of the jar. The texture of the heart was somewhat soft. On the parts about the rupture were many drops of oil, and hereabout the muscular tissue was evidently disorganized, for it appeared as irregular granular cords, without any transverse striae, which elsewhere were well marked. But there was no distinct fatty degeneration of the muscular fibres.'

"It appears then that in this, as in the other case, the septum had undergone a morbid change of structure, rendering it more liable to suffer rupture. But the change was not exactly of the same kind in the two cases."

The primary importance of the sclerosis of the coronary arteries was not fully appreciated, however. Dr Herrick, of Chicago, beginning about 1912<sup>2</sup>, took a leading part in pushing recognition of the disease in its entirety. The first diagnosis made in Boston before death, and proved at autopsy, was as late as 1916<sup>3</sup>. Dr Samuel Levine's monograph, published in 1929<sup>4</sup>, gives excellent descriptions of the disease, and outlines treatment.

The frequency of coronary occlusion has been somewhat of a surprise to me. It seemed worthwhile at the completion of five years of community practice in an outlying portion of Boston, to compare its occurrence with that of a few other diseases of major importance.

Twelve hundred and sixty-five patients have been treated in the five years. Thirty-nine of these have died while under my care, the primary causes of death being as follows:

Coronary occlusion	9
Malignant neoplasm	7
Chronic myocarditis	5
Lobar pneumonia	5
Arteriosclerosis, generalized	4
Cerebral hemorrhage	3
Bronchopneumonia	3
Chronic nephritis	1
Cystitis and pyelitis	1
Intestinal obstruction (old adhesive bands)	1

There have been seven autopsies in this group of thirty-nine deaths.

Coronary occlusion has been the greatest single cause of death in this series, constituting nearly a fourth of the total. If the cases in which the patient had died suddenly, before I saw them, and which had not previously been under my care, were to be included, the proportion would be somewhat higher. For in a large share of such instances, the story as given by onlookers is apt to be typical of coronary occlusion.

Among patients who live, as well as among those who die, coronary occlusion is common. The number of patients encountered having as their chief disease one of an arbitrarily chosen group of fifteen major conditions is listed below. These are all patients who were alive while under my care, so are in addition to the group listed above.

Chronic myocarditis and hypertensive heart disease	32
Diabetes	24
Coronary occlusion	15
Rheumatic valvular heart disease	11
Peptic ulcer	11
Tuberculosis	11
Syphilis	11
Malignant neoplasm	10
Cerebral hemorrhage	8
Acute nephritis	7
Pernicious anemia	6
Lobar pneumonia	5
Acute rheumatic fever and chorea	4
Hyperthyroidism	4
Chronic nephritis	3

Coronary occlusion ranks third in frequency in this list. The two groups containing larger numbers, viz (1) chronic myocarditis and hypertensive heart disease, and (2) diabetes, include many individuals who in future years will have cardiac infarction.

Of the total of twenty-four cases of coronary occlusion, nine died of the disease while under my care, two died of the disease while under the care of others, and one died later of malignant neoplasm. The remaining twelve are in fair or good health. Five of the eleven deaths from the disease occurred within the first two weeks following the initial occlusion.

The history alone will give an accurate diagnosis more often than not. In most cases it is a history primarily of crushing pain in the front of the chest. There are variations. One woman complained of sudden and terrific pain in the upper dorsal spine. The first day she consistently denied even the slightest pain or heaviness in the front of her chest. But on the second she said that the front of her chest felt a little freer than it had the day before. Vomiting is not uncommon as a prominent complaint, the "acute indigestion" which we still hear mentioned by laymen, and even by physicians.

When seen within a few minutes or a few hours of onset, as the community practitioner is apt to see these patients, the only physical sign

of value may be the drawn or pained appearance of the face. The temperature, pulse and blood pressure are frequently at their usual levels. But a careful history, carefully appraised, may in fifteen minutes make a reliable diagnosis. The appearance during subsequent hours or days of slight fever, leucocytosis, faster heart rate, drop in blood pressure, precordial friction rub, congestive failure—or even sudden death—will usually confirm the original diagnosis. In only an occasional instance does an electrocardiographic tracing contribute any more toward a sound diagnosis than the history and the ordinary bedside findings. In a few cases in which symptoms, and even the signs are strongly suggestive of an acute abdominal condition, an electrocardiographic tracing may be of paramount importance.

Since in most cases the diagnosis can be made at the bedside, perhaps with the aid of leukocyte counts at the physician's office, hospital

ization is seldom necessary for diagnosis. And it is seldom essential for treatment. Usually it is to be preferred that the patient be kept at home, and not moved. Other members of the family, or a nurse, can give closer attention to the patient than would be given in a hospital, unless special nurses are provided.

## SUMMARY

1 Coronary occlusion is a common disease in community practice

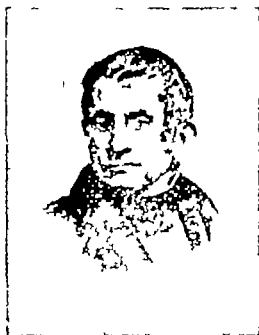
2 Diagnosis and treatment can in most cases be carried out satisfactorily in the home, relieving the burden on hospitals

## REFERENCES

1. Latham, P. M.: Lectures on Subjects Connected with Clinical Medicine Comprising Diseases of the Heart. 2: 174 1848
2. Herrick, J. D.: Clinical features of sudden obstruction of the coronary arteries. J. A. M. A. 59: 115 191
3. Levine, S. A., and Trautner, C. L.: Infarction of the heart simulating acute surgical abdominal conditions. Am. J. M. Sc. 155: 57 1918
4. Levine, S. A.: Coronary Thrombosis: Its Variations. Clinical Features. Medicine Monographs Volume XVI, 1919

## JACOB BIGELOW, M.D., LL.D.\*

BY CHESTER D. STELLHORN, M.D.†



JACOB BIGELOW

## Generous soul

Whose high ambition marks a loftier goal  
Whose settled eye awaits a distant scene  
Heedless of narrower fields that intervene  
His sure resolve and firm unbending soul  
Nor luring hopes, nor threatening fears control  
Fixed in the high but rough ascent to fame  
With ardent step and undivided aim  
Nor bars nor years his progress can abate  
Firm to excel and patient to be great.

ON May 27, 1835 at the annual meeting of the Massachusetts Medical Society, Jacob Bigelow delivered a discourse on "The Self Limited Diseases." The clarity, simplicity and timeliness, together with the quaint and gentle humor of the paper, perhaps explains the profound effect

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which it exerted. Dr. Oliver Wendell Holmes wrote "This remarkable essay had more influence on medical practice in America than any other similar brief treatise." It was directed against the universally exaggerated faith in drugs and the heroic therapy of the day. In popular opinion Homeopathy has the credit for bringing about that radical change in therapeutics. Bigelow's paper, however, was actually responsible for the reform.

The author, Jacob Bigelow, was of old New England ancestry. His people came to this country in 1640 and settled in Watertown, Massachusetts. He was born in 1787, graduated from Harvard in 1806, attended medical lectures there in 1808 and graduated from the Medical College of the University of Pennsylvania in 1810. There he studied under the eminent Benjamin Rush who was wont to say to his students, "We can have no reliance on nature gentlemen. We must turn her out of doors in our practice and substitute for her efficient art." These were not the ideas of Bigelow as we shall see.

He began to practice in Boston by an association with the elder James Jackson. Years later, when he was asked how, without our modern medical schools, hospitals and clinics he obtained his professional training and knowledge, he replied, "Oh from my patients." To bring himself before the public he began to write and won the Boylston prize for four successive years.

Botany was his great hobby. In 1812 he gave a public course of lectures on botany to the citizens of Boston. His "Florula Bostoniensis" published in 1814 was very popular. In 1815 he was made a lecturer on Materia Medica at Harvard and in 1817 he was made Professor. Under

the title of "American Medical Botany" Bigelow published an elaborate series of volumes during the years from 1817 to 1820. This brought him European recognition. The preface to this work contains the germ of many of the ideas which he later elaborated. "Much harm has been done in medicine by the partial representations of those, who, having a point to prove, have suppressed their unsuccessful experiments and brought into view none but favorable facts." Photography and lithography were then unknown and Bigelow invented for his purpose an original method of printing in colors directly from copper plates. The illustrations, some sixty plates and over 6,000 engravings, were all made by Bigelow. Their exquisite workmanship, accuracy and artistic arrangement would grace with distinction a modern herbal. The volumes have become quite scarce and are much sought by collectors.

He became an excellent craftsman in many lines. It is said that he went to every shop, cellar and garret in Boston where the mechanics would allow him and would answer his questions. "He knew what was done and how done by smith, glassblower, clock maker, type caster, printer, moulder and engraver." These forays yielded the material for his early lectures on the application of science to the useful arts. They also lent direction to his tastes and views and led to his participation as a founder of the Massachusetts Institute of Technology.

Bigelow lived to be ninety-two and his long life was crowded with many achievements of the highest order. He was the first Rumford Professor of the Application of Science to the Useful Arts. He assisted in the editing of the first edition of the United States Pharmacopoeia, following this with "Bigelow's Sequel," a commentary on current remedies. During the great cholera epidemic of 1832 the death rate in Boston was the lowest of any of the large cities on the Atlantic seaboard, due to the wise adoption of the rigid sanitary precautions urged by Bigelow. He was a visiting physician at the Massachusetts General Hospital and had a large consulting practice. From 1842 to 1847 he was president of the Massachusetts Medical Society, having served previously as treasurer from 1823 to 1828.

Three other achievements were outstanding. In 1825 the dead of the cities were still being buried in churchyards or in vaults. The matter became a serious one, the churchyards were full and the danger to public health was great. Bigelow wrote a series of papers during the years from 1825 to 1832, urging his plan for a forest garden cemetery outside of the city. A storm of opposition and ridicule met this proposal. Bigelow met this criticism, supplemented his statements and where necessary, defended them. Here as in other battles, he carried his own cause. In spite of continuing dissent, the Mount Auburn Cemetery was dedicated for public use

in 1832. In a very true sense Bigelow was the founder of this first modern cemetery. "He laid out the grounds, thinned the trees, surveyed roads, paths and hedges, he supervised the ornamentation. He designed its classic gateway and approach. He became the first of our landscape architects."

Bigelow was also an educational reformer. In 1865 he delivered an address on the "Limits of Education" at the opening of the great hall of the Institute of Technology. His object was to break rather than extend the limits. He believed that education should be extended from ancient and classic lore to the recognition that scientific studies, modern languages and learning also constitute education. He placed the culinary art beside music and painting. He asked, "Why should not a refined and cultivated anesthesia be so varied in its applications and degrees as to exempt mankind from their griefs and grievances by an artistic application?" All this is commonplace today but caused widespread discussion at home and abroad at the time. Just how much we are indebted to Bigelow for our modern college curriculum is very difficult to determine. Doubtless, he was but one of many who argued for this reform.

His most important paper was that entitled "Self Limitation of Diseases." The medical profession needed this confession of past error and the acknowledgment that it might still be wrong and be experimenting in the dark. "Medical books," he says, "are prompt to point out the cure of diseases. Medical journals are filled with the crude productions of aspirants to the cure of diseases. Medical schools find it incumbent on them to teach the cure of diseases. The young student goes forth into the world, believing that if he does not cure disease, it is his own fault. Yet when a score or two of years have passed over his head he will come at length to the conviction that some diseases are controlled by nature alone. He will often pause at the end of a long and anxious attendance and ask himself how far the result of the case is different from what it would have been under less officious treatment than that which he pursued, how many in the accumulated array of remedies which have supplanted each other in the patient's chamber, have actually been instrumental in doing him any good. He will also ask himself whether in the course of his life he has not had occasion to change his opinion, perhaps more than once in the management of the disease in question and whether he does not, even now, feel the want of additional light."

He anticipated and answered the questions, "Is there then no need for a physician?" "Shall he then in any case stand by and do nothing, prescribe nothing?" The preventing of the doing of some things, he says emphatically, is often the highest form of service. There is also abundant use for the physician "in the discriminating study of a case, in careful interpretation of na-

ture, in coöperating with it, in soothing and palliating appliances, and in averting incidental aggravations of disease. Besides this, science has really accomplished something." Homeopathy he likened to this side of medical practice which without interfering, awaits expectant on its unassisted course. This is the real reliance of Homeopathy though not its avowed one. Bigelow was tolerant of the doctrines of Hahnemann. "A certain portion of mankind," he says are so constituted that they require to be ridden by others and if you should succeed in unhorsing a particular impostor, it is only to prepare the saddle for a fresh and more unflinching equestrian."

So rapidly was the change effected that today there are only traditions of the old methods of heroic treatment and blind submission to dogmatic therapy. One would like to conjecture as to the effect of these opinions upon the mind of Henry J. Bigelow, the son of Jacob and wonder whether they were the force which impelled him to embrace the surgical side of the healing art.

In old age Bigelow amused himself by writing "Chenodia," a Mother Goose rendered in Greek and Latin. With his wife and friends he took a

sightseeing trip to California. He had a whole some interest in political events for he had been the friend of John Adams, Thomas Jefferson, Daniel Webster, Lincoln and Grant. His son became a famous surgeon in Boston. He who had been the Nestor of his day became a distinguished, approachable, old man oracle. He remained modest and unassuming. Blind and bedridden for the last five years of his life he was unforgotten to the very end. He died Jan 10, 1879.

The poem quoted at the beginning of this biography is the Phi Beta Kappa poem, written by Jacob Bigelow and delivered at Cambridge in 1811. It is truly a self portrait.

#### REFERENCES

1. Bigelow Jacob. American Medical Botany. Boston: Cummings and Hilliard, 1817-1820.
2. Bigelow Jacob. Self Limited Diseases, delivered before the Society May 27 1825. Medical Miscellanies.
3. Bigelow Jacob. Medical Inquiries: Classical, Professional and Miscellaneous. Boston: Little, Brown and Company 1847.
4. Burrage Walter L. A History of the Massachusetts Medical Society. With brief biographies of the founders and chief officers 1781-1902. Norwood, Mass.: The Pilgrim Press. P. 116-118.
5. Eliot George E. Memoir of Jacob Bigelow M.D. LL.D. Cambridge: John Wilson and Son, 1880.
6. Mumford J. G. Jacob Bigelow—A Sketch. Bull. Johns Hopkins Hosp. 13: 1 1903.
7. Unsigned Memoir. Boston M. & S. J. 100: 97 1879.

## VERMONT STATE MEDICAL SOCIETY

### IRRADIATION TREATMENT OF TUMORS\*

#### Late European Developments

BY C. F. BALL, M.D.†

SINCE I grew up with the therapeutic development of x rays and radium, I naturally had a keen interest in the Fourth International Congress of Radiology, and a special interest since a prominent part of the program of that Congress was to be a résumé of therapeutic techniques as used by the important clinics of the world. When I was invited to accompany the American Delegation to Switzerland I felt particularly honored. I found the Congress to be all that I had expected, and more. One of our American delegates stated that "undoubtedly it was the largest gathering of the leading Radiologists ever assembled in the world."

The American Delegation was royally entertained by the British radiologists for a week in England, at London, Cambridge, and Teddington. The British delegation then joined the American group on the trip to Eindhoven, Holland and up the Rhine through Germany to Zurich. This trip by busses from the Hook of Holland took several days, with stops at most of the important radiological clinics. The German radiologists, like the British, demonstrated their equipment and freely gave detailed data as to their various techniques. Therefore my re-

mains in so far as the Congress is concerned, will reflect not only what was presented in therapeutics at Zurich and St. Moritz, but also what was learned en route. To me, each was of equal value.

Irradiation techniques fall into two general groups: Regulative and Destructive. The former are applicable principally to benign processes or lesions encountered in medicine. The destructive techniques are more specifically applicable to malignant neoplasms or malignant functional processes encountered in surgery.

Perhaps the most important single statement made relative to the general subject of irradiation therapy was made by Professor Schanz, President of the Congress, in his introductory address. When speaking of the relation of surgery and radiology, he said: "It is clear that Surgery and Radiology have their indications, strict indications, and these indications should not be forgotten in favor of a personal preference. *Even more harmful can be a separation of deep X Ray therapy and Radium therapy.*" Irradiation should never be thought of in terms of either agent alone. X rays are frequently ineffective of themselves, but when combined with proper radium dosage the two become admirably efficient. The same is true of the uses of radium, except in unusual amounts.

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W M Levitt<sup>9</sup> at St Bartholomew's Hospital, London, developed a modified Coutard technic

"(1) To provide an intensity of radiation on the esophagus comparable with that obtained by the technic in use for the treatment of similar growths in the throat

"(2) To provide a daily dose to the esophageal growth which should equal as nearly as possible that obtained by a similar growth in the throat treated by the usual technique

"(3) In addition, it was considered important that a sufficient span of esophagus above and below the growth should be included in the irradiation because of the known tendency of the disease to spread up and down the esophagus "

General consensus in Cancer of the Breast is that *all malignancies of the breast should be preoperatively irradiated*. Transirradiation of the breast mass should be employed as much as possible, thus avoiding the thorax to a considerable extent. There are axillary nodes and some supraclavicular nodes that often can be more successfully attacked with radium than with the x-rays. X-rays are more applicable to the larger areas of the chest. In a few weeks after the treatments, operative removal may be used in suitable cases, such cases being those where complete regression of the secondary glands occur. Then a Halstead operation is indicated. Otherwise there seemed to be a general feeling that it is best not to explore an axilla with persistent nodes, following irradiation, since such surgery would definitely aggravate an otherwise partially or completely arrested activity. Breast statistics are at best bad, by any or all methods of therapy. Early diagnosis and early treatment have not seemed to be too effective!

Primary carcinomatosis of the lungs or bronchial primary carcinomata are dealt with rather more conservatively as to individual indications, but such modified treatments are made to extend over longer periods of time.

It is now felt that longer and smaller dosages per treatment, continued over longer periods of time, effect more mitotic cell divisions and so ultimately kill off more cancer cells than the big single dosage therapy of a few years ago. Perhaps more accurately it helps to build up a defense mechanism which of itself limits the diseased process. There are many experimental data to substantiate this latter position but I cannot go into it further at this time.

Adenocarcinomata of the intestinal tract are not successfully treated as a general rule. Now and then there is a favorable case, which goes to indicate that a therapeutic trial should be made. It should be followed up if the tissue is radiosensitive, abandoned if resistant. A few treatments only are needed to determine which is which. Some clinics irradiate through the open wound direct to the tumor mass. In this particular class of cases close association with

early surgery is imperative. *Only as abdomens are explored on a reasonable suspicion of probable malignancy can this form of disease be helped*

Some slight progress seems to have been obtained in the protracted type of irradiation therapy in cancer of the rectum and prostate. Most of these cases are seen too late.

Preoperative irradiation is advisable in all tumors of the kidneys, since irradiation does not seem to damage the renal epithelium of a glomerulus or of the tubules. It does, however, reduce the size of the tumor by its effects upon the embryonal and sarcomatous forms of tissue found in many of the kidney tumors. After their reduction in size and cellular inhibition, they are then more safely removed surgically. The irradiation does not increase the surgical difficulties of the nephrectomy. This applies to the three types, hypernephromata, adenocarcinomata, as well as the mixed tumors of the kidneys. Not all respond favorably since some have a large amount of fully developed radio-resistant epithelium. If the tumor does not subside with a good course of irradiation promptly, stop treatment and do a nephrectomy at once. Irradiation will often make an otherwise hazardous operation safe.

Irradiation has raised the curability of cancer of the cervix from less than 15 per cent by the older surgical procedures, with a 50-50 operative mortality, to about 50 per cent curability and this without any appreciable mortality. Moran<sup>7</sup> in his paper "Some Opinions Based on Cancer Work in Australia", states the following concerning cancer of the cervix: "Two facts stand out. One is that such menopausal bleeding is not often an early sign unless it be the slight 'show' which follows the marital act. Secondly, a lack of faith in the capacity of medical men to effect a cure leads the sufferer to postpone consultation, for she prefers to live in ignorance rather than to be definitely informed that she has what she believes to be an incurable disease. The attitude of many practicing doctors who do not appreciate the notable advance made in the treatment of uterine carcinoma is chiefly responsible for this, their lack of optimism filters through to the lay population." "What parallelism exists between the increased incidence of uterine cancer and the increased use of chemical and mechanical contraceptives, it is difficult to say, but the subject invites careful enquiry." Statistics shown from Stockholm indicated that present technique was about as effective as the clinical appearance of the disease allowed, 70 per cent cures in grade 1 cancer of the cervix, about 50 per cent in grade 2, and only about 20 per cent in grade 3 and practically none in grade 4 cases. No alteration in technique had seemed to improve their figures in the past five years. Grades 1 and 2 are the most hopeful. Physicians

should remember that grade 1 is practically non clinical, found only on routine biopsy, and grade 2 is only suspicious or very early clinically, grade 3 is readily recognized clinically and too late for good results, grade 4 is grossly apparent and almost hopeless.

Up to recently, cancer of the fundus was thought best removed surgically. Several authors at this Congress gave statistics that indicated that irradiation was frequently as effective as surgery, without the usual surgical mortality risk.

Chorionepitheliomata and some of the teratomata are radiosensitive. The required extent of irradiation therapy in these tumors may be determined by the Aschheim Zondek Test.

Epitheliomata of the penis and vulva come under skin lesions already referred to, but are far more difficult to treat than similar lesions on exposed surfaces because the associated glands have to be treated the same as metastatic cervical glands, with heavily filtered protracted irradiation.

Metastatic bony lesions in some instances respond to irradiation therapy. Primary bone tumors are usually very resistant and a therapeutic test should be made in all cases. The problem of bone tumors is difficult from any angle. Osteoporosis of endocrine origin is benefited by irradiation to bone lesions and endocrine glands involved, usually the parathyroids.

#### SUMMARY

The international scope of the Congress of Radiology was fully expressed by the large number of different countries represented on the program.

The experimental, physical, and clinical papers were thoroughly international in character and all in general accord. Particularly was this true relative to the clinical application of irradiation therapy. Many techniques were quite thoroughly standardized at least in principle, if not always in exact physical relations. There was a very definite trend in the use of radium away from interstitial (needling) irradiation to surface applications, more highly filtered and at greater distance from the surface, and applied for longer periods of time. Continued absorption of irradiation energy from either source by malignant tissue over longer periods of time seems more effective than the shorter and more intensive methods of a few years ago. In general the x ray beam is being more highly filtered and given at a more moderate milliamperage, over many more total hours of application than formerly. Work with the ultra high x ray voltages is still experimental. Efforts are being made to perfect apparatus that is capable of measuring both of these irradiation beams in a common unit of energy of absorption.

As a result of these changes, better and better statistics of the curability of cancer are be-

ing recorded by the various countries, with each in closer accord one with the other.

Modern irradiation methods add a definite hope to many a cancer sufferer. The general practitioner should reflect this hope in his attitude to his patient.

#### REFERENCES

- Schinz, Hans R. Translation, Introductory Address by R. Stewart Harrison. IV International Radiologenkongress Zurich 1934. St. 1, 1934.
- Moller, H. J.: Radiation Genetics. IV International Radiologenkongress H. R. V.
- Arthur, W. E. Strucor analysis. Ibid. H. R. VII.
- Pfahler, G. E. The treatment of cancer of the mouth by surface and interstitial irradiation. Ibid. H. R. IV D.
- Contard, Henri: De la roentgentherapie des cancers du pharynx. Ibid. H. R. IV B.
- Levitt, W. M.: British Empire Cancer Campaign. Eleventh Annual Report. P. 35.
- Moran, H. M. Some opinions based on cancer work in Australia. IV International Radiologenkongress. St. 6 1934.

#### MISCELLANY

#### VERMONT DEPARTMENT OF PUBLIC HEALTH

JULY 1935

During the month of July the incidence of communicable diseases, as reported to this Department is as follows: chicken pox 36 diphtheria 1, German measles 236 measles 187 mumps 39 scarlet fever 16 undulant fever 1, typhoid fever 1, whooping cough 125 and tuberculosis 15.

The Laboratory of Hygiene reports a total of 138 examinations made in July. The results are as follows:

Examinations for diphtheria bacilli	78
Widal reaction of typhoid fever	51
" " undulant fever	71
" " gonococci in pus	146
tubercle bacilli	159
syphilis	513
of water chemical and bacteriological	209
" water bacteriological	234
milk market	208
milk, submitted for chemical only	0
milk, submitted for microscopical only	0
" foods	10
" drugs	0
" for courts autopsies	2
" " courts miscellaneous	23
" of animal heads for evidence of rabies	1
" for presence of malaria	2
" miscellaneous	61
Autopsies to complete death returns	1

Thirty seven cases of gonorrhea and eleven cases of syphilis were reported to the Division of Communicable Diseases. This Division mailed 633 Wassermann outfits and 842 slides for gonorrhea.

The Sanitary Engineer visited several towns inspecting sewage systems water supplies and camps. The Sanitary Engineer also made a survey of one of the lakes in the state.

The State Advisory Nurse of the Division of Public Health Nursing has devoted most of her time during the month of July to concluding the work of the VERA, having received word that the work of public health nursing was closed

#### RECENT DEATH

**BLODGETT** — JOHN H BLODGETT, M D, of Bellows Falls, Vermont, died suddenly August 2, 1935. He had been in poor health for a long period. He was born in Grafton, December 31, 1867, the son of Henry and Jane (Ayers) Blodgett. His premedical education was acquired in the public schools of Grafton and Chester, and in the Vermont Academy. He matriculated in the University of Vermont and after receiving the degree of Bachelor of Philosophy in 1895 entered the medical school and his M D degree was conferred in 1897. His internship of two

years was served at the Boston City Hospital. He first settled in Saxtons River in 1899 and in 1908 he moved to Bellows Falls, where he built up a large practice. Dr Blodgett served as representative and senator from his county, and was chairman of the State Tuberculosis Commission for a time. He formerly served on the State Board of Registration of Nurses. In addition to membership in the Windham County and State Medical Societies, he was a Fellow of the American Medical Association. He served on the Staff of the Rockingham Hospital and was also a trustee and member of the executive board of this institution. Another medical activity was that of attending physician to the Kurn Hattin Homes. He was a Mason, a deacon of the United Church and affiliated with the Delta Mu college fraternity.

Dr Blodgett is survived by his widow, Mrs Mary L (Abercrombie) Blodgett, formerly of Boston.

### HOW GRIEVANCES ARE DEALT WITH UNDER THE ENGLISH HEALTH INSURANCE SCHEME

BY G F MC CLEARY M D ‡

**T**HERE are 16,071,000 men and women in England and Wales insured under the national health insurance scheme, and there are 16,500 insurance doctors. The insured persons, having paid their contributions to the cost of the scheme, are entitled to receive proper medical treatment, the insurance doctors by virtue of their agreements with the local Insurance Committees are under obligation to give it\*, and the Insurance Committees and the Ministry of Health are responsible for ensuring that the doctors' obligations are fulfilled. Where medical services are provided on so enormous a scale, it is inevitable that cases will occasionally arise in which an insured patient considers, rightly or wrongly, that he has not received proper treatment from his insurance doctor, and it is necessary that a procedure should be devised by which such grievances shall be dealt with equitably, expeditiously, and economically.

In some European countries the doctors' obligation to give proper and necessary medical services is enforced by the insurance authorities' selecting the insurance doctors and making them responsible to superior officers for the quality of their work. Failure to do good work may result in the termination of the doctor's appointment. Under the English health insurance scheme there is no selection of doctors by the

insurance authorities. Any doctor†, however careless, intemperate and incompetent he may be, has the right to join the local panel of insurance doctors, and he has no superior officer to supervise his work. Some safeguard has been provided by giving the persons insured under the scheme the right, which private patients have, to choose, and change, their doctors, a doctor who acquires a reputation for bad work will sooner or later see his list of patients grow smaller and the lists of his competitors larger by the transfer of patients from his list to theirs. But meanwhile some patients may have been seriously damaged, and from the first it was recognized that additional means would have to be provided to secure that insured patients should receive proper treatment. For the great majority of insurance doctors such means are not needed, their professional conscience is sufficiently developed to keep them up to the mark. But among over 16,000 doctors it would be unsafe to assume that all may be relied upon to give unfailing attention, and it was generally agreed that it would be necessary to adopt some method for enabling insured patients to bring forward their grievances for adjudication. At the inception of the scheme there were doctors who considered that grievances should be heard in law courts, but by most this was regarded as undesirable. Legal proceedings are expensive, a doctor who has successfully contested an unfounded complaint may be unable to obtain costs from the complainant, and the publicity of a legal action does no good to a doctor's practice. It was therefore agreed to

\*An insurance doctor's obligation in this respect is expressed in his agreement with the Insurance Committee in the following terms: "The treatment which a practitioner is required to give to his patients comprises all proper and necessary medical services other than those involving the application of special skill and experience of a degree or kind which general practitioners as a class cannot reasonably be expected to possess. Treatment in respect of a confinement is however expressly excluded."

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†Except a doctor who has been removed from the panel by the Minister of Health. Removal is a rare event.

set up in each area a special committee to deal with grievances.

#### THE GRIEVANCE COMMITTEE

Each Insurance Committee appoints a Medical Service Sub-Committee specially constituted to hear complaints against insurance doctors. The Sub Committee consists of an equal number not less than three or more than five, of local medical practitioners and of representatives of insured persons, with a neutral chairman. The Sub Committee's function is to investigate the complaint, find the facts and report them to the Insurance Committee, who on the facts so found (which, if no appeal is made, must be accepted as conclusive) decide what action should be taken. Either party may appeal against the decision to the Minister of Health.

The procedure for dealing with grievances will be more readily apprehended if we take an imaginary case and follow it through its various stages. It is similar to cases that have actually occurred.

#### THE CASE OF JAMES THOMPSON

James Thompson, who is twenty six years of age, is an insured person and is employed in an iron foundry at a weekly wage of \$15. Two years ago he chose Dr Smith as his insurance doctor and was on his list when the case began. It began when Mr Thompson awoke about two o'clock one morning with severe abdominal pain which Mrs Thompson vainly attempted to relieve with hot applications. Mr Thompson was reluctant to send for Dr Smith, who lived about half a mile away, but after enduring the pain for an hour he felt so ill that he asked his brother a boy of fifteen who lived in the same house, to go to Dr Smith and ask him to call as soon as possible. The boy arrived at Dr Smith's house at 3 15 A.M., rang the night bell and in answer to the doctor's inquiry through the speaking tube said that his brother had been awakened with a "terrible pain in his stomach," and that he felt very ill indeed and wanted the doctor to come round at once. He added that he had brought his brother's medical card with him to show that he was one of the doctor's insured patients. On being asked whether the patient had been sick or had diarrhoea he said he did not know, but he was sure that his brother was "terribly ill". The doctor came downstairs, and made up a bottle of medicine, which he gave to the boy, saying that the patient should take a dose at once and another every two hours if still in pain and that he would call after break fast. Mr Thompson was greatly disappointed at not seeing the doctor, but he took the medicine, which, since it contained a substantial quantity of opium, relieved the pain considerably. About 11-45 A.M. the doctor called, found that

Mr Thompson was suffering from acute appendicitis and advised immediate removal to the local hospital, where an operation was at once performed by a surgeon on the hospital staff, the case being urgent.

Mr Thompson made but a slow recovery, which he attributed to the failure of Dr Smith to visit him when requested and the consequent delay before the operation could be performed. On leaving the hospital he removed his name from Dr Smith's list to that of another doctor, and lodged a complaint against Dr Smith with the Insurance Committee. A copy of the complaint was sent to Dr Smith and the case referred to the Medical Service Sub Committee.

The Sub Committee may dispense with a hearing if they deem the complaint frivolous, in this case they decided that a hearing was necessary, and Dr Smith and Mr Thompson were asked to attend their next meeting. At this meeting which like all meetings of the Sub Committee, was held in private, neither party being allowed to be represented by a lawyer or other paid advocate, Mr Thompson, who had received a copy of Dr Smith's answer to his complaint, gave his account of his illness and his brother told what happened when he called on Dr Smith. The facts so stated were not disputed by Dr Smith, except that according to his recollection he was called at 4 30 A.M. and not at 3 15 A.M. He said that the messenger's account of the patient's symptoms led him to think that the case was one of ordinary colic, that it was a most inclement night and that he had a bad cold and was tired out by a hard day's work. When asked why if he felt unable to go out he did not arrange for a deputy to take the call he said that the idea did not occur to him. He did not think his short delay in visiting the patient had materially affected the progress of the case. He was closely questioned by the doctors on the Sub Committee, who seemed less impressed than their lay colleagues by the reasons he gave for his failure to visit the patient when requested.

After hearing the evidence the Sub-Committee prepared a report to the Insurance Committee, in which they found the facts as stated above, inferred from them that Dr Smith had failed to render proper service to his patient, and recommended that a sum of twenty pounds (\$100) should be withheld from his remuneration. The Insurance Committee adopted the report without discussion and sent a copy to the Minister of Health.

#### DR. SMITH'S APPEAL

Dr Smith exercised his right to appeal to the Minister of Health against the decision of the Insurance Committee on the report of their

\*The Sub-Committee's findings of fact must be accepted by the Insurance Committee as conclusive.

Medical Service Sub-Committee. He thought the decision was unwarranted by the facts of the case. In accordance with the regulations governing these cases, the Minister appointed an appeal tribunal consisting of three members: a medical officer and a legal officer of the Ministry of Health, and a medical practitioner selected from a panel of insurance doctors nominated by the British Medical Association. At the appeal both Dr. Smith and the Insurance Committee were represented by competent lawyers, and the witnesses, who gave evidence on oath, were subjected to searching cross-examination. The case concluded, the tribunal drew up a report to the Minister in which they stated that they saw no reason to dissent from the decision of the Insurance Committee.

The Regulations provide that in any case in which an insurance doctor has been found by the Insurance Committee (or by the appeal tribunal in a case in which an appeal has been made) to have been negligent in his treatment of the patient, the Minister shall, before arriving at a decision on the case, refer it to an Advisory Committee, consisting of the Chief Medical Officer of the Ministry of Health, two other medical officers of the Ministry, and three doctors selected from the panel of insurance doctors nominated by the British Medical Association to which reference has already been made, and shall consider their report on the case. Our imaginary case, which we have now traced to its final stage, would be so referred, and from what has happened in similar cases that have actually occurred it is unlikely that the decision of the Medical Service Sub-Committee would be modified.

#### THE WITHHOLDING OF REMUNERATION

It will be noted that in this case the Insurance Committee, adopting the report of their Medical Service Sub-Committee, recommended, with the concurrence of the appeal tribunal, that a sum of twenty pounds should be withheld from Dr. Smith's remuneration. In a case in which money is withheld, the Minister deducts the sum from the moneys paid by him to the Insurance Committee for providing medical services, and the Committee deducts that sum from the next payment made to the doctor. During 1933, remuneration was withheld from eight insurance doctors who had been negligent in the treatment of their insured patients.

#### REMOVAL FROM THE PANEL

The most severe action that can be taken against an insurance doctor under the disciplinary procedure of the health insurance scheme

is removal from the Medical List, or "panel" as it is colloquially termed. This action may be taken by the Minister of Health if he is satisfied that the doctor's continuance on the panel would be "prejudicial to the efficiency of the medical service of the insured." A case of removal usually originates in a representation made by an Insurance Committee to the Minister of Health that the continuance of a certain doctor on the panel would be prejudicial to the medical service, and on receiving such a representation the Minister must appoint an Inquiry Committee consisting of a lawyer (barrister or solicitor) in actual practice and two doctors. The Committee hear the allegations made against the doctor and his reply, the witnesses give evidence on oath, and the parties are legally represented. The Committee do not decide the question of removing the doctor from the panel; their business is to report to the Minister, stating the facts that appear to them to be established by the evidence and the inferences of fact which, in their opinion, may properly be drawn from the facts so established. The decision to remove or not to remove a doctor from the panel rests with the Minister, but before deciding he must refer the Inquiry Committee's report to the Advisory Committee mentioned above and must take their recommendations into consideration.

Very few doctors have been removed from the panel. In 1933 there was no case in which the question of removal was raised.

Complaints against insurance pharmacists are dealt with by a similar procedure, the complaints being heard by committees on which pharmacists are represented. There is, however, no advisory committee to deal with cases in which pharmacists are concerned.

It will be noted that in the procedure of the English health insurance scheme for the settlement of grievances the medical profession takes a highly important part. At every stage in the proceedings the medical aspects of the case are adequately brought to the consideration of the authorities responsible for decisions, and the medical members of the various tribunals are nearly all insurance practitioners familiar with the conditions of insurance practice. The procedure was not devised by the Government and imposed on the doctors; it is the result of many conferences between the Government and the accredited representatives of the medical profession. It has been modified from time to time, chiefly by increasing the disciplinary responsibilities of the profession, and after twenty-two years' experience it is generally regarded as an equitable, effective, and satisfactory method of dealing with grievances.

## PARALYTIC TREATMENT OTHER THAN RESPIRATORY

## The Important Rules in the After Care of Poliomyelitis

BY ARTHUR T. LEGG, M.D.\*

THE after-care of poliomyelitis cases should start as soon as the paralysis or weakness takes place

## (a) To prevent deformity (contractures)

- 1 By posterior wire splints for the legs to hold them in the normal position
- 2 By a corset to hold the trunk in normal position
- 3 By a platform splint to hold the arm in abduction to prevent any strain on a weakened deltoid
- (a') The elbow may be flexed or extended, depending on the power in the biceps or triceps
- (a'') A hand splint to prevent deformity of the hand

## (b) To relieve sensitiveness

- 1 By hot packs, two or three a day
- 2 By complete rest.

No massage or manipulation should be allowed during the sensitive stage.

A complete muscle examination should be made as soon as the sensitiveness is over

Muscle training should now be started to strengthen the weakened muscles by carrying out their function voluntarily. This should be increased gradually.

Muscle training should be carried out only by a worker with a thorough knowledge of functional anatomy. The muscle training should be preceded by baking and massage to increase the circulation in the part.

Ultraviolet light therapy may perhaps be of value in improving the general condition of the patient but it should be understood that it does not constitute treatment of the paralysis.

It is better to obtain a voluntary contraction of a weakened muscle than a response to electrical stimulation. A muscle which shows a definite motor response to electrical stimulation can in most cases produce voluntary motion if placed in a suitable position. The dangers of stimulation are not only from overfatigue of the muscle without reeducation of the nerve

pathways but also from the fact that stimulation, strong enough to produce a response from muscles too weak to respond well voluntarily, is likely to spread to other and stronger muscles. In any case, electrical stimulation should never be used as a substitute for muscle training, or by any person who is not familiar with the exact location of the muscles and the degree of paralysis existing in the various groups.

Overfatigue of the weakened muscles should be carefully guarded against.

Patients should never be allowed to stand in a deformed position.

When the patient with weakened legs or trunk is standing, splints should be applied to hold the feet and knees in their normal position and a corset or jacket to hold the trunk in its normal position in order to prevent deformity.

Patients should not be encouraged to walk soon after the onset or to use mechanical exercisers.

Swimming does not take the place of localized muscle training.

Treatment in water has no more specific value than table treatment, but it is a pleasant way of doing exercises. The buoyancy of the water allows weak muscles to perform their function more easily than is possible otherwise.

The respirator has a place in the after treatment of poliomyelitis with those patients whose muscles of respiration have been weakened. In the early stages it can be used to rest the muscles of respiration, and later it can be used to increase chest expansion.

Frequent muscle examinations should be made of poliomyelitis cases, in order to record the gain or loss of power of the different muscles and the exercises should be changed accordingly.

While the most rapid regain in muscle power will take place during the first year, muscles will continue to gain power indefinitely if muscle training is continued.

All cases should be followed carefully for years to note any imbalance of muscle power which will produce deformity.

Reprinted from "A Digest Prepared for Use in Connection with the Exhibit on Poliomyelitis Scientific Exhibit, American Medical Association, New Orleans Session 1932."

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## MEDICAL PROGRESS

PROGRESS IN THE SURGERY OF THE AUTONOMIC  
NERVOUS SYSTEM IN 1933 AND 1934\*

BY JAMES C WHITE, M D †

THIS review of progress in the field of the autonomic nervous system covers the years 1933 and 1934. Neurology is necessarily a complex subject and that part of it which deals with visceral innervation cannot be simplified beyond a certain point. An attempt has been made, however, to describe the work in as simple terms as are consistent with scientific accuracy. All angles of the subject have been considered relevant, provided they have a definite clinical bearing. For this reason the recent contributions of the physiologists are reviewed in some detail, as they have contributed so much to an intelligent understanding of these problems. The most recent fields opened to the neurosurgeon are the carotid sinus syndrome and the control of hypertension. The application of sympathetic neurosurgery to these conditions is therefore summarized at some length, as are its effects on the peripheral circulation and the ever-important rôle of the viscerosensory nerves in intractable pain.

## I PHYSIOLOGY

*Chemical Mediation of Autonomic Nerve Impulses*

As far back as 1921 Otto Loewi discovered, on stimulating the vagus nerve of a frog that a chemical substance appeared in the heart's blood which, when perfused through the heart of a second frog, duplicated the cardiac inhibiting effects of vagus stimulation. The full development of this epochal experiment has been worked out in the last two years and has shown that stimulation of smooth muscle is carried out not by direct nervous discharge, but by a chemical mediator secreted at the nerve endings. An excellent review of the growth of this fundamental concept in neurophysiology has been written by Cannon<sup>1</sup>, who has himself been one of the leading contributors to the development of this field. From the anatomical point of view, Stohr states that only one smooth muscle cell in a hundred is supplied with a nerve ending. The knowledge that a chemical mediator is set free in the occasional cells having nerve endings obviates the necessity for an individual neurone to each contractile fibre. These mediators have been named "parasympathin" and "sympathin". Parasympathin has been found to resemble acetylcholine and, as it is rapidly destroyed by blood or tissue esterase, its physiological effects are limited to a localized area. During nerve stimulation this substance has been found in the blood

from the heart, the sweat<sup>2</sup> and salivary glands<sup>3</sup>, and the gastric veins<sup>4</sup>. Dale has aptly designated these nerve endings as cholinergic, and Feldberg and his co-workers in Dale's laboratory have discovered the surprising fact that parasympathin is secreted not only at the synapse between the sympathetic pre- and post-ganglionic neurones in the paravertebral ganglia<sup>5, 6</sup>, but also in the adrenal medullas<sup>7</sup>.

The adrenergic substance, "sympathin," which was discovered by Cannon and his co-workers<sup>1</sup>, is liberated at all the sympathetic nerve endings on smooth muscle. This hormone, which resembles adrenalin in many ways, has never been isolated. Cannon and Rosenbluth<sup>8</sup> have shown that it exists in two forms. Sympathin E, which is given off by smooth muscle when excited to contract by sympathetic impulses, is carried by the bloodstream and is capable of causing contraction in distant smooth muscle organs. Sympathin I, on the other hand, affects smooth muscle organs which relax. In character with the generalized diffuse discharge of the sympathetic nervous system, and in contrast to parasympathin, sympathin is widely distributed by the blood stream. Like adrenalin, sympathin causes contraction of smooth muscle even after complete denervation. This has been shown by Freeman, Smithwick, and White<sup>9</sup> to be of real clinical importance, since even after sympathectomy, denervated organs such as the arteries are exceedingly susceptible to these chemical mediators (see below).

*Autonomic Centres in the Brain*

With the advance in our knowledge of neurophysiology the governing centers of the involuntary nervous system have been followed steadily upwards from the medulla oblongata through the diencephalon and have at last reached the cerebral cortex in the premotor region. Much of this work has been carried out in Dr. Fulton's laboratory at Yale, where an intensive investigation has been made on this portion of the brain. He and his colleagues have shown that stimulation of the premotor area in monkeys and chimpanzees gives rise to vigorous peristaltic movements of the gut and that bilateral extirpation causes morbid hunger and even at times obstructive intussusceptions<sup>10, 11, 12</sup>. Considerable disagreement still exists concerning the control of body temperature by the cerebral cortex. Kennard<sup>13</sup> claims that ablation of the premotor area in the monkey causes a failure of reflex vasodilation on the opposite side of the body, whereas Pinkston, Bard and Rioch<sup>14</sup> have observed chronic vasodilation after removal of the neonallum. After removing a cor-

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responding area in a case of brain tumor, Zolinger and Schnitker<sup>15</sup> were unable to detect any change in skin temperature of the extremities.

Investigation of the autonomic centres in the hypothalamus has been carried on by Ranson, Kabat, and Magoun<sup>16</sup>. They have contributed additional evidence that the area behind the optic chiasm contains important sympathetic centres, and that stimulation of the preoptic region causes a slowing of the heart and a fall in blood pressure, as well as contraction of the bladder (i.e., a parasympathetic discharge). Davis<sup>17</sup> has emphasized the importance of that portion of the hypothalamus above the stalk of the pituitary (the tuber cinereum) in the control of carbohydrate metabolism.

### *The Cerebral Circulation*

The problem of the vasomotor control of the circulation through the brain has been extensively investigated by Cobb and his co-workers during the past six years. Accurate measurement of the calibre of the pial vessels has been made possible by Forbes's brain window technique. A summary of this work has been published by Cobb<sup>18</sup>. Anatomists have long taught that the cerebral arteries do not anastomose, i.e., that they are all "end arteries". It has also been held that these arteries have no vasomotor mechanism. Recent investigations in the department of neuropathology at the Harvard Medical School have shown that both of these concepts must be revised. The pial, as well as the dural arteries show well marked constriction when the cervical sympathetic chain is stimulated or on direct application of adrenalin. The vasodilator pathway of the cerebral vessels has been found to leave the brain stem in the facial nerve, to traverse the geniculate ganglion, and thence to follow the cerebral vessels. Drugs such as alcohol, histamine, amyl nitrite and acetylcholine increase cerebral circulation, but the most effective stimulant is the inhalation of a mixture of 10 per cent carbon dioxide in 90 per cent oxygen. Clinically it is now realized that vascular spasm plays an extremely important role in syncope, migraine, and epileptic convulsions.

### *The Vasodilator Nerves*

Rosenbluth and Cannon<sup>19</sup> have pointed out that active vasodilator reflexes persist in totally sympathetomized animals. These investigators suggest that the vasodilator system is probably constituted and distributed as follows: A, autonomic dilators, (1) sympathetic, distributed primarily to skeletal muscle, (2) parasympathetic, distributed to special localized regions (e.g., chorda tympani nervi erigentes), B, dorsal root dilators, distributed primarily to skin and viscera, as described long ago by Bayliss. Bishop, Heinbecker, and O'Leary<sup>20</sup> have investigated this last group with the cathode ray oscillograph and by means of differential blocking of the sensory and motor fibres with narcotic drugs and by pressure. They conclude that there is a special type of non myelinated neurone in the dorsal roots and in purely sensory nerves, such as the saphenous, with cells of origin in the dorsal root ganglia. These resemble autonomic neurones and are the only fibres in the sensory root which on stimulation produce a vasodilator response. This work eliminates the somewhat clumsy explanation of "antidromic conduction" of vascular impulses by the posterior roots.

*Carotid Sinus Mechanism*

### *Carotid Sinus Mechanism*

C Heymans and his collaborators<sup>21</sup> in Ghent have made an exhaustive study of the hitherto unappreciated rôle of the carotid sinus in the regulation of blood pressure and of a large number of important visceral mechanisms. They have shown that there is a special sensory innervation situated at the bifurcation of the common carotid arteries. Impulses set up in a group of sensory end organs in the arterial wall are conducted to the brain stem by the glossopharyngeal and vagus nerves, thence they are distributed over the entire autonomic system. By this reflex mechanism a local rise or fall of blood pressure in the carotid sinus gives rise to a generalized vasodilator or vasoconstrictor response. Resection of the carotid sinus nerves in the dog results in a persistent tachycardia and a hypertension of 200 to 300 mm. After total sympathectomy this is abolished<sup>22</sup>. Certain carotid sinus reflexes, however, are only abolished by cutting the spinal cord in the upper thoracic region. The sinus is also sensitive to changes in carbon dioxide and oxygen tension, to variations in hydrogen ion concentration, and to numerous drugs.

### *The Reaction of the Sympathetic Nervous System in Shock*

In relation to the homeostatic activity of the sympathetic nervous system it has long been appreciated that after severe accidents and operations, as well as in acute illness, this division of the nervous system does its utmost to preserve the constancy of the "milieu intérieur". Freeman<sup>23</sup>, however has shown that after prolonged hyperactivity even this most foolproof of automatic regulating devices may go wrong and lead to the destruction of the organism which it is commonly supposed to preserve. Thus in severe traumatic shock or dehydration<sup>24</sup>, medullary adrenal activity causes such an intense degree of vasoconstriction that the tissues may become asphyxiated and the vital blood volume reduced to a fatal level by leakage of the plasma through the anoxic capillary walls. The stranded red blood corpuscles increase viscosity and the effective blood volume is further reduced by peripheral stagnation.



## II OPERATIVE METHODS

*Recent Modifications in the Technique of Cervicothoracic Ganglionectomy*

The posterior longitudinal incision devised by Adson for reaching the inferior cervical and first two thoracic ganglia by resecting the central ends of the first or second ribs often results in separation or delayed healing of the wound. This is due to the necessity for continuous and forceful retraction of the tissues and also to the difficulty in suturing the incision at the edge of the spinous processes. Adson<sup>25</sup> has recognized the shortcomings of this incision and has modified it to the extent of cutting off the tips of the spinous processes. When this is done the fascia and muscle can be sutured as in a laminectomy incision. In every other respect the exposure of the ribs is unchanged.

White, Smithwick, Allen and Mixer<sup>26</sup> have advocated an oblique muscle splitting incision. This is carried from the prominent spine of the seventh cervical vertebra to the angle of the scapula. The trapezius muscle is split in the plane of its fibres and the space between the superior rhomboid and the levator anguli scapulae entered. On separating the thin fibres of the serratus posterior superior muscle, the first and second ribs are found to lie directly in the long axis of the incision. By this route less bleeding is encountered, a minimum of retraction is necessary, and an excellent exposure is obtained. This incision is particularly applicable to a unilateral approach, if a bilateral ganglionectomy is indicated, these writers feel that it is best carried out in two stages a week to ten days apart.

Gask and Ross<sup>27</sup>, who prefer the anterior cervical approach, have found that it is possible to resect the chain to the second thoracic ganglion, provided the scalenus anticus muscle is transected. With this valuable modification the resection of an adequate number of ganglia is no longer a difficult procedure.

Reichert<sup>28</sup> has advocated the injection of alcohol instead of the resection of the lumbar ganglia in certain cases of intermittent claudication or threatened gangrene. He feels that it is less dangerous than operation for the elderly arteriosclerotic, and that it is better for economic reasons in many cases with thromboangitis obliterans. He reports that twenty-four out of twenty-nine of the arteriosclerotics were improved, some markedly. There was an increase in walking ability from double the former distance up to two miles. The results in the cases with Buerger's disease are less impressive.

Craig<sup>29</sup> has developed a practical posterior infradiaphragmatic approach to the splanchnic nerves. Although this has given disappointing results in hypertension, it should be of definite value in the control of pain from the upper abdominal viscera.

## III EFFECTS OF SYMPATHECTOMY ON THE CIRCULATION

Coller and Maddock<sup>30, 31</sup> have brought out the importance of the regulation of blood flow through the skin of the arms and legs in the control of body temperature. In the first place these areas, which on account of their irregular shape make up an extraordinarily large proportion of the total surface (i.e., 65 per cent), have a much greater function in the dissipation of body heat than does the skin of the head and trunk. Interrupting the normal heat regulating process by sympathetic ganglionectomy results in a considerable increase in blood flow to the extremities.

In a recent and most interesting review of their ideas on Raynaud's disease, Lewis and Pickering<sup>32</sup> point out that this eponym should be abandoned, as it has come to include a number of entirely unrelated conditions. Such a grouping cannot fail to obstruct inquiry into the causation of the various maladies which are included under it. They have subdivided these into a practical and more exact classification.

- "1 Intermittent spasm of digital arteries, without complications
- "2 Intermittent spasm of digital arteries with local nutritional changes
- "3 Intermittent spasm of digital arteries with generalized scleroderma
- "4 Raynaud's phenomenon arising out of local injury, including the use of vibrating tools
- "5 Bilateral gangrene of digits in the young, and with infection, this condition is regarded as probably the result of thrombotic closure of vessels
- "6 Bilateral gangrene with haemoglobinuria from cold, a condition having probably a unique pathogeny
- "7 Bilateral gangrene of digits in the elderly, in which closure is shown to be thrombotic, but preceded by disease of the small arteries
- "8 Thromboangitis obliterans associated with Raynaud's phenomenon
- "9 Cervical rib or crutch pressure causing Raynaud's phenomenon or gangrene, so it is thought, by thrombotic and embolic processes."

Lewis and Pickering insist that gangrene cannot take place from uncomplicated vasospasm, and that in all these conditions except the first there is definite pathology in the arteries.

Surgeons who treat this group of diseases are at present considerably less enthusiastic about the results of sympathetic ganglionectomy in restoring a satisfactory circulation to the arm than to the leg. Thus Sheehan<sup>33</sup> states that "cervico-dorsal ganglionectomy for Raynaud's disease, although resulting in a definite improvement in the condition of the upper limb, rarely gives a complete recovery. This incomplete result, in

marked contrast to that of the lower extremity, has been noted by many surgeons." To account for this discrepancy, it should be pointed out that the leg cases usually fall in Lewis's first group. The toes very rarely go on to spontaneous gangrene and therefore the condition is more probably one of pure vasospasm. In addition, it is a simpler technical procedure to ensure cutting all the vasoconstrictor fibres to the lower extremity. However, even in the early uncomplicated forms of the disease and after complete sympathetic paralysis of the upper extremities, recurrent vasospasm is not a rare occurrence. Fitting in with an observation which has been reviewed above that denervated smooth muscle remains sensitive to adrenalin, Smithwick, Freeman and White<sup>14</sup> have found that the completely denervated arm becomes intensely sensitive to the circulating hormone of the adrenal medulla. This sensitivity is much more marked in the arm than in the leg and probably is the cause of the fundamental difference between the results of the two operations. It is a most striking phenomenon in the rabbit's ear, but disappears and permits constant vaso-dilation if the adrenal glands are inactivated<sup>15</sup>.

In searching for the etiology of vasospastic disease, Craig and Kernohan<sup>16</sup> have examined the ganglia from 208 cases. In comparing their histological observations on sympathetic ganglia removed at operation with those from postmortem subjects without arterial disease, nothing was found to explain the various vascular disturbances. All the changes which have been commented on by other writers were found to be within normal limits and most of them explained on the basis of advancing age.

During the past two years ganglionectomy has been enthusiastically advocated for the treatment of the cold, cyanotic legs after poliomyelitis (Telford and Stopford<sup>17</sup>), for the vasospastic group of patients with thromboangitis obliterans (Adson<sup>18</sup>, Dier<sup>19</sup>), and for extreme degrees of hyperhidrosis (Leriche and Arnault<sup>20</sup>).

One of the latest developments in the field of sympathetic neurosurgery is the treatment of hypertension. Exclusive of the periodic crises of hypertension caused by chromaffin cell tumors arising from the adrenal medulla, the only type which has responded to operations on the sympathetic nervous system is the essential form which occurs among comparatively young individuals, is progressive in spite of medical treatment, and carries a uniformly unfavorable prognosis. This has been designated as the malignant type. According to Hines and Brown<sup>21</sup>, patients with this variety of the disease show an unusual rise in blood pressure on exposure to cold.

A number of operations have been recommended to reduce hypertension, either by eliminating vasoconstrictor tone from large areas of the body or by reducing adrenal secretion. With

the latter end in view, De Courcy<sup>22</sup> has recommended subtotal bilateral adrenalectomy. Although he has reported apparently good results in a series of eight cases, the observations date over too short a period to be at all convincing. The risks of the procedure and its lack of sound physiological background make it necessary to postpone final judgment as to its value. In the attempt to reduce vasoconstrictor tone, the first operative procedures consisted in sympathetic denervation of the upper and lower extremities. This did not affect a sufficient portion of the arteriolar bed to modify the systemic blood pressure. Craig and Brown<sup>23</sup> later advocated resection of the splanchnic nerves as they enter the abdominal cavity between the crura of the diaphragm, but the results were still unsatisfactory in the more advanced cases. The most logical procedure, but at the same time the most radical, is the section of the lower six thoracic and upper two lumbar anterior spinal roots as proposed by Adson and Brown<sup>24</sup>. This operation not only eliminates all vasoconstrictor impulses to the lower half of the body, but denervates the adrenal glands and reduces intra-abdominal pressure as well. While its early results as reported from the Mayo Clinic and also by Page and Heuer<sup>25</sup> are distinctly encouraging, this radical type of operation should still be regarded as in the experimental stage, only time and a large number of cases can tell whether this new form of neurosurgery can achieve another victory over a disease which has heretofore resisted all other forms of treatment.

While underactivity of the carotid sinus causes hypertension in the dog, failure of this control mechanism does not seem to be a cause of this condition in man. Weiss and Baker<sup>26</sup> have described the interesting syndrome which is due to an hyperactive sinus. Studies have been conducted on fifteen such cases. The patients complained of dizziness and fainting attacks occurring whenever the region of the carotid bifurcation was pressed upon. In four cases these symptoms were induced merely by a sharp turning of the head, in the others they could be elicited by digital pressure. Evidence is presented that these symptoms and signs are due to stimulation of the sinus and the intercarotid nerves, not to direct vagal irritation. Three main types of cardiovascular response were observed: (a) marked asystole or slowing of the heart rate, (b) marked fall in blood pressure, (c) changes in cerebral circulation without essential slowing of the heart or fall in blood pressure. The first response is evidently due to a vagal reflex and is abolished by atropine. If the intercarotid nerves are infiltrated with novocaine, all the reflex phenomena are obliterated. In one case reported in this paper, and in a considerable number since, section of the carotid sinus nerves has successfully relieved the symptoms.

## IV VISCERAL PAIN

The neurophysiology of visceral pain has been greatly clarified by Heinbecker, Bishop and O'Leary's<sup>46</sup> demonstration that the sympathetic trunks are traversed by myelinated neurons whose histological appearance and electrical conduction properties are exactly similar to those of the peripheral sensory nerves. These neurones run through the paravertebral chain of ganglia to the posterior spinal roots, where their nerve cells are situated. The viscerosensory fibres should therefore not be considered as a part of the sympathetic nervous system, but as belonging to the somatic cerebrospinal nerves. B Cannon<sup>47</sup> has implanted shielded electrodes on the larger autonomic nerves of the cat and studied these animals after complete recovery. He has found the cervical and lower lumbar sympathetic chains, as well as the vagus below its recurrent laryngeal branch, to be devoid of pain sensation. On the other hand, the upper lumbar chains and the splanchnic nerves have a high degree of sensory acuity.

The Moores<sup>48</sup> have made a careful analysis of arterial pain. They have concluded that there is a large group of afferent neurones subserving painful sensation which end in close association with the smaller arterial branchings. These can be stimulated under experimental conditions by the intraarterial injection of irritants, such as sodium iodide and lactic acid. Under natural conditions it is probable that they function by virtue of sensitiveness to a chemical stimulus. The most common cause of arterial pain is ischemia, and under these circumstances lactic acid is probably the actual stimulating agent. Moore and Singleton<sup>49</sup> have shown that in the case of the viscera, arterial pain is definitely conducted along sensory neurones in the splanchnic and other sympathetic trunks. Further evidence that afferent fibres run in these channels has been added by Sheehan<sup>50</sup>, who has shown by experimental work that the myelinated neurones of the Pacinian bodies in the mesentery travel along the splanchnic nerves. In the extremities, however, arterial pain is not affected by sympathectomy, but is abolished by section of the peripheral nerves.

*Migraine*

Sympathectomy appears to be of definite, if inconstant, value in the relief of migraine. Adson<sup>51</sup> reports the cure of a case after superior cervical ganglionectomy, ligation and section of the external carotid artery, and interruption of the sympathetic connections of the internal carotid by stripping the common carotid artery. Penfield<sup>52</sup> states that superior cervical sympathectomy and stripping the carotid artery gave only partial benefit in two cases of severe long-standing migraine. He then cut the ophthalmic fibres of the Gasserian root and obtained lasting complete relief. He believes that "unilateral migraine can be cured by radical neurectomy."

*Atypical Neuralgias of the Head*

This peculiar type of facial pain is only partly relieved by root section of the Gasserian ganglion. Reichert<sup>53</sup> reports five such cases, three of which were relieved of their residual neuralgia by alcohol injection of the upper thoracic sympathetic chain. But sympathectomy cannot be counted on to relieve these conditions, as is shown by the fact that one of Reichert's two failures has been only partially benefited by an additional superior cervical ganglionectomy plus the stripping of her carotid sheath.

*Amputation Stump Neuralgias*

Hamant and Bodart<sup>54</sup> and also Reschke<sup>55</sup> report four cases of severe amputation stump neuralgias. In these cases vasoconstriction was a common manifestation. Previous resections of neuromata and in one case periarterial sympathectomy had failed. These patients were relieved by resection of the regional ganglia or their rami, and have been free of pain from six months to three years.

*Angina Pectoris*

White, Garrey, and Atkins<sup>56</sup> have been able to determine the exact pathways of cardiac pain by producing it experimentally in dogs. Sutton and Lueth's method of temporarily constricting the descending branch of the left coronary artery was used. The pain was entirely interrupted by bilateral resection of the upper four thoracic sympathetic ganglia or the upper five pairs of posterior thoracic spinal roots. Resection of the lower cervical sympathetic trunks and stellate ganglia, as in the old Jonnesco operation, section of the intercostal nerves distal to the sympathetic rami, or bilateral vagotomy failed to abolish the pain. These experiments explain the frequent failures of the various modifications of cervical sympathectomy which have been recommended for the relief of angina pectoris. No cervical operation can produce a complete sensory denervation of the heart, because it leaves intact important direct connections between that organ and the upper thoracic ganglia. These thoracic ganglia should be attacked, because after their destruction the cervical sympathetic pathways are interrupted as well, since all the cardiac nerves enter the spinal cord over the upper thoracic white rami communicantes.\* White<sup>58</sup> has shown that these experimental findings are well corroborated by clinical results in four patients in whom the upper thoracic ganglia were resected, cardiac pain on the homolateral side has been abolished. This is equally true after section of the upper five posterior thoracic roots (5 cases on record) and following successful alcohol in-

\*Heinbecker<sup>57</sup> believes that there are also direct anatomical connections between the heart and the central nervous system over the cervical segments as well as over the fifth and tenth cranial nerves. That these pathways are of any clinical significance seems doubtful as we have had numerous experiences with cardio aortic pain referred to the head and neck, all of which have been successfully relieved by thoracic paravertebral injection.

jection of the corresponding sympathetic ramus and ganglia. The latter is undoubtedly the safest surgical procedure, but occasional failures (20 per cent) are due to its technical difficulty. Both White and Levy<sup>59</sup> report complete relief from anigral attacks on the injected side in 50 per cent of cases and a very satisfactory amelioration in another 30 per cent (54 cases).

#### *Abdominal Pain*

Alvarez<sup>60</sup> has written an excellent discussion of this subject both from the clinical and the physiological viewpoints. In this he points out that the main sensory pathways from the upper abdominal viscera lie along the splanchnic nerves, although the sensory neurones do not, strictly speaking, belong to the sympathetic system and are no different from those in the rest of the body. In distinction from the abdominal organs, the root of the mesentery, like the rest of the parietal peritoneum, is supplied by branches of the spinal nerves. Pain from traction on the mesenteries or inflammation of the parietal peritoneum is therefore transmitted over the intercostal and lumbar nerves. Alvarez admits that there is no good explanation for the pain of peptic ulcer. Gall bladder and common duct pain has been stimulated by Zollinger<sup>61</sup> during the course of operation by distention of these structures with a balloon. This gave rise to deep epigastric discomfort, more severe than, but similar to the attacks of indigestion in gall bladder disease. This was not relieved by infiltrating the anterior abdominal wall with novocaine. It was found impossible to produce referred pain in the back, and localized right upper quadrant pain was noted only when the gall bladder pressed on the parietal peritoneum. Scrimger<sup>62</sup>, who previously reported cases of obscure abdominal pain relieved by resection of the segmental sympathetic ramus and ganglia, has contributed two additional cases.

#### *Pain from the Pelvic Viscera*

The pathway of uterine pain has been shown to enter the spinal cord over its eleventh and twelfth thoracic segments (Cleland<sup>63</sup>). Surgically it is most accessible in the presacral region at the bifurcation of the aorta. Dobrzaniecki and Serafin<sup>64</sup> have published superb illustrations of dissections of this region. Adson and Masson<sup>65</sup> have given a very clear description of the technique for resecting the superior hypogastric plexus. Statistical evidence presented by the latter, as well as by Herrmann<sup>66</sup> and Wetherell<sup>67</sup>, proves the effectiveness of this safe and non-mutilating operation in the control of functional dysmenorrhea, as well as in the type of pelvic pain which is often associated with sclerocystic degeneration of the ovaries or occasionally follows operations for chronic pelvic inflammation. Greenhill and Schmitz<sup>68</sup> have also emphasized the effectiveness of presacral

neurectomy in controlling the intractable pain of carcinoma of the uterus and cervix. This operation permits the surgeon to inspect the carcinomatous involvement and is so much safer than chordotomy that it should always be tried first<sup>69</sup>, provided the malignant infiltration has not invaded the lumbosacral plexus. These surgeons have reported a remarkable series of thirteen cases, all of which experienced instant and complete relief of their suffering.

Unfortunately bladder pain is not so effectively relieved by resection of the superior hypogastric plexus. The reason for this is that part of its afferent connections run over the pelvic parasympathetic rami to the second, third, and fourth sacral segments. Certain types of intractable cystitis can, however, be relieved by presacral neurectomy. Douglass<sup>70</sup> reports that in chronic interstitial and tuberculous cystitis he has been able to secure a worthwhile improvement by this operation. He believes that in the first condition cases which manifest excessive spasm of the bladder neck will respond most favorably. Learmonth and Braasch<sup>71</sup> have advocated a similar procedure, but to date the reported results of this operation have not been very impressive.

#### V VISCERAL MOTOR FUNCTION

##### *Cardiospasm*

By cutting the thoracic vagi in cats, Knight<sup>72</sup> has been able to produce experimental achalasia of the cardiac sphincter with dilation of the esophagus. Removal of the sympathetic fibres along the course of the celiac axis and the left gastric artery prevents the development of this condition. Clinical corroboration of this experimental observation has been put forward by Craig, Moersch, and Vinson<sup>73</sup>, who report the cure of a case of cardiospasm associated with precordial pain radiating to the neck and arm. Paravertebral novocaine injection of the upper thoracic ganglia on the left side temporarily relieved the patient's pain and enabled her to swallow without difficulty. Bilateral cervicothoracic ganglionectomy has given her permanent relief.

##### *Megacolon*

The anatomy of the nerve supply of the colon and rectum has been carefully studied by Telford and Stopford<sup>74</sup>. Their findings emphasize the fact that the sympathetic fibres which inhibit bowel tone and constrict the internal anal sphincter, can be interrupted either by resection of the lumbar ganglia by section of their rami, or by dissecting out the plexuses around the inferior mesenteric artery and in the presacral region. This last operation is followed by loss of ejaculation and the failure of spermatozoa to pass down the tubules in the epididymis (Simeone<sup>75</sup>) and is therefore contraindicated in

Subarachnoid injections of alcohol, as advocated by Dottolotti, constitute an alternative method which is rapidly establishing its efficacy and safety.

male patients Very favorable reports of the clinical application of these procedures, which were originally advocated by Wade and Royle and by Rankin and Learmonth, have been reported at a joint meeting of the New York Surgical Society and the Philadelphia Academy of Surgery<sup>76</sup>

### *Paralysis of the Bladder*

In an attempt to localize the bladder pathways in the spinal cord, Barrington<sup>77</sup> has found that bladder function is uniformly crippled by lesions in the dorsal half of the lateral columns of the spinal cord Animal experimentation on the physiology of micturition by Langworthy, Reeves, and Tauber<sup>78</sup> has shown that the sympathetic nerves are in no way essential to normal urination, but actually inhibit this act Furthermore, their resection improves the function of the automatic bladder Essentially this parallels the observations made by Learmonth on the human being The results of the clinical application of this knowledge have been summed up by Learmonth and Braasch<sup>79</sup> In four cases of "cord bladder", resection of the superior hypogastric plexus brought about marked improvement in two, reduction in residual urine but a continuance of infection in the third, and failure in the fourth case Another case of neuromuscular imbalance, causing achalasia of the sphincter mechanism, was completely relieved. Other cases are reported, but in these sympathectomy is combined with sphincterotomy or exploration of the cauda equina The authors are satisfied of the occasional value of this operation in their practice As time passes, no doubt indications will be more strictly defined This may mean either restriction of its field or its expansion to include other conditions

## VI TUMORS

An unusually thorough analysis of the tumors which develop from the cells that wander out from the neural crest during embryonic life has been made by Lewis and Geschickter<sup>70</sup> This is based on 103 case records of these tumors in the Johns Hopkins Hospital The undifferentiated cell may give rise to a neuroblastoma and, as differentiation proceeds, the more adult types of paraganglioma and ganglioneuroma may develop The occurrence of all these types of tissue in the same tumor indicates a common origin

The neuroblastomas occur mainly in infants and children and have the same embryologic origin as the medulla of the suprarenal gland They are highly malignant and metastasize to the lymph nodes, liver, lung, and bones The most common symptoms are fever, abdominal mass, and anemia

The paragangliomas are the most common tumors of the sympathetic system and are encountered in the medulla of the suprarenal

gland, the carotid body, the submucosa of the appendix and small intestine, and the ganglia along the sympathetic chains They commonly occur in adults and are usually solitary and benign, but may be multiple and at times malignant Hypertension, urinary symptoms, and gastrointestinal disturbances are the most common symptoms

Ganglioneuromas usually occur in young adults and are, as a rule, benign and solitary They may occur anywhere in the central or peripheral, as well as in the sympathetic, nervous system In the latter system they are most commonly seen along the paravertebral chain of ganglia Those in the cervical region and thorax may interfere with respiration, those in the abdomen cause digestive symptoms

In contrast to the cortical tumors of the adrenal which give rise to the suprarenal genital syndrome, the sympathetic syndrome is caused by neoplasms (paragangliomas) of the chromaffin cells These have been reviewed by Collier, Field, and Durant<sup>80</sup> and by Belt and Powell<sup>81</sup> The symptomatology of these tumors is quite characteristic and consists of periodic outbursts of sympathoadrenal activity, caused by an increased medulladrenal secretion The typical clinical features are paroxysmal hypertension, glycosuria, tachycardia, and vasoconstriction These are followed by flushing, nausea, vertigo, dyspnea, and susceptibility to shock or pulmonary edema When surgical removal has been successful, the patients have remained completely relieved

### REFERENCES

1. Cannon W B Chemical mediators of autonomic nerve impulses *Science* 78: 43 1933
2. Dale H H and Feldberg W Chemical transmission of secretory impulses to sweat glands of cat *J Physiol* 82: 121 1934
3. Cattell M Wolff H G and Clark D Liberation of adrenergic and cholinergic substances in submaxillary gland *Am J Physiol* 109: 375 1934
4. Dale H H and Feldberg W Chemical transmitter of vagus effects to stomach *J Physiol* 81: 320 1934
5. Feldberg W and Gaddum J H Chemical transmitter at synapses in sympathetic ganglion *J Physiol* 81: 305 1934
6. Feldberg W and Vartiainen A Further observations on physiology and pharmacology of sympathetic ganglion. *J Physiol* 83: 103 1934
7. Feldberg W Minz B and Tsudzimura H Mechanism of nervous discharge of adrenaline *J Physiol* 81: 236, 1934
8. Cannon W B and Rosenblueth A Studies on conditions of activity in endocrine organs sympathin E and sympathin I *Am J Physiol* 104: 557 1933
9. Freeman N E Smithwick R H and White J C Adrenal secretion in man reactions of blood vessels of human extremity sensitized by sympathectomy to adrenaline and to adrenal secretion *Am J Physiol* 107: 529 1934
10. Fulton J F Kennard M A and Watts J W Autonomic representation in the cerebral cortex. *Am J Physiol* 109: 37 1934
11. Watts J W and Fulton J F Intussusception—relation of cerebral cortex to intestinal motility in monkey *New Eng J Med* 210: 882 1934
12. Sheehan D Effect of cortical stimulation on gastric movements in monkey *J Physiol* 83: 177 1934
13. Kennard M A Vasmotor representation in cerebral cortex. *Science* 79: 348 1934
14. Pinkston J O Bard P and Riech D Responses to changes in environmental temperature after removal of portions of forebrain *Am J Physiol* 109: 515 1934
15. Zollinger R and Schnitker M T Skin temperature reactions following removal of left cerebral hemisphere *Science* 79: 546 1934
16. Ranson S W Kabat H and Magoun H W Autonomic responses to electrical stimulation of hypothalamus pre optic region and septum *Arch Neurol & Psychiat* 33: 467 1935

- 17 Davis, L. Relation of hypophysis, hypothalamus and autonomic nervous system to carbohydrate metabolism. *Ann. Surg.* 100: 454 1934
- 18 Cobb, S. Cerebral circulation. *Ann. Int. Med.* 7: 9 1933
- 19 Rosenblueth, A. and Cannon, W. B.: Further study of vasodilators in sympathetomized animals. *Am. J. Physiol.* 108: 459 1934
- 20 Bishop, G. H. Heinbecker, P. and O'Leary, J. L. The function of the non myelinated fibres of the dorsal roots. *Am. J. Physiol.* 106: 647 1933
- 21 Heymans, C., Bouckaert, J. J., et Regniers, P. Le sinus carotidien et la zone homologue cardio-aortique. *Paris 2. Journ. de Chir.* 1933
- 22 Daen, M., Drouin, L., et Heymans, C. Réflexes aortiques d'origine sino-carotidienne et actions pharmacologiques chez le chat et chez le chien sympathetomisés. *Arch. Internat. de Pharmacol. et de Thérap.* 46: 179 1934
- 23 Freeman, N. E. Decreases in blood volume after prolonged hyperactivity of sympathetic nervous system. *Am. J. Physiol.* 103: 155 1933
- 24 Freeman, N. E., Morrison, R. S. and Sawyer, M. E. M. Effect of dehydration on adrenal secretion and its relation to shock. *Am. J. Physiol.* 104: 68 1933
- 25 Adson, A. W. Changes in technique of cervicothoracic ganglionectomy and trunk resection. *Am. Jour. Surg.* 33: 37 1934
- 26 White, J. C. Smithwick, R. H., Allen, A. W. and Mixer, W. J.: New muscle splitting incision for resection of upper thoracic sympathetic ganglia. *Surg. Gynec. Obst.* 59: 651 1933
- 27 Oak, G. E., and Ross, J. P. The Surgery of the Sympathetic Nervous System. Baltimore: William W. and Company 1934
- 28 Rebertus, F. L. Pre-ganglionic arteriolelerotic and thromboangiitis lechemia—Control of pain therein. *California & West. Med.* 40: 81 1934
- 29 Craig, W. M. Surgical approach to and resection of splanchnic nerves for relief of hypertension and abdominal pain. *Am. J. Surg.* 48: 148 1934
- 30 Maddock, W. G. and Collier, F. A. The role of the extremities in the dissipation of body heat. *Am. J. Physiol.* 106: 589 1933
- 31 Collier, F. A., and Maddock, W. G.: Function of peripheral vasoconstriction. *Ann. Surg.* 100: 523 1934
- 32 Lewis, T., and Pickering, G. W. Observations upon males dies in which blood supply to digits ceases intermittently or permanently and upon bilateral gangrene of digits observations relevant to so-called Tyanand's Disease. *Clin. Sci.* 1: 277 1934
- 33 Shuman, D. On innervation of blood vessels of upper extremity, some anatomical considerations. *Brit. J. Surg.* 20: 412 1933
- 34 Smithwick, R. H.; Freeman, N. E. and White, J. C. Effect of epinephrine on sympathetomized human cat emity. *Arch. Surg.* 59: 759 1931
- 35 Craig, W. M. and Kerehnan, J. W.: Surgical removal and histological studies of sympathetic ganglia in Raynaud's disease, thrombo-angiitis obliterans, chronic infective arthritis and scleroderma. *Surg. Gynec. Obst.* 59: 747 1933
- 36 Telford, E. D. and Stoford, J. S. B. Some experiences of sympathectomy in anterior poliomyelitis. *Brit. Med. J.* 3: 770 1933
- 37 Adson, A. W. Results of sympathectomy in treatment of peripheral vascular diseases, Hirschsprung's disease, and cord bladder. *Ann. Int. Med.* 8: 1044 1933
- 38 Dix, J.: La thromboangiitis obliterans. Buenos Aires "El Ateneo" 1934
- 39 Leriche, R., et Arnulf, G. Effets des diverses sympathectomies sur la sudation. *Bull. et mém. Soc. nat. de chir.* 60: 454 1934
- 40 Hines, E. A., Jr., and Brown, G. R. Standard test for measuring the variability of blood pressure its significance as index of prehypertensive state. *Ann. Int. Med.* 7: 209 1933
- 41 DeGourcy, L. Subtotal bilateral adrenalectomy for hyperadrenism (essential hypertension). *Ann. Surg.* 100: 319 1934
- 42 Craig, W. M. and Brown, G. R. Unilateral and bilateral resection of major and minor splanchnic nerves, its effects in cases of essential hypertension. *Arch. Int. Med.* 54: 575 1934
- 43 Adson, A. W., and Brown, G. R. Malignant hypertension. *J. A. M. A.* 102: 1115 1934
- 44 Palfrey, L. H., and Hise, G. Surgical treatment of essential hypertension. *J. Clin. Investigation.* 14: 22 1935
- 45 Weiss, S. and Baker, J. P.: Carotid sinus reflex in health and disease. *Medicine.* 18: 97 1933
- 46 Heinbecker, P.; Bishop, G. H. and O'Leary, J. Pain and touch chords in peripheral nerves. *Arch. Neurol. & Psy. Chiat.* 33: 773 1933
- 47 Cannon, B. Method of stimulating autonomic nerves in the unanesthetized cat with observations on motor and sensory effects. *Am. J. Physiol.* 108: 366 1933
- 48 Moore, R. M. and Moore, R. L.: Studies on pain sensibility of arteries some observations on pain-sensibility of arteries. *Am. J. Physiol.* 104: 19 1933
- 49 Moore, R. M. and Hingston, A. O. Jr.: Studies on pain sensibility of arteries peripheral paths of afferent neurons from arteries of extremities and of abdominal viscera. *Am. J. Physiol.* 104: 67 1933
- 50 Sheehan, D. Afferent nerve supply of mesentery and its significance in causation of abdominal pain. *J. Anat.* 67: 233 1933
- 51 Adson, A. W. Right frontotemporal migraine relieved by surgical methods. *Proc. Staff Meet. Mayo Clin.* 9: 673 1934
- 52 Penfold, W. Operative treatment of migraine and observations on mechanism of vascular pain. *Tr. Am. Acad. Ophth.* 37: 60 1931
- 53 Reichert, P. L.: Neuralgias of head and face. *Am. J. M. Sc.* 167: 26 1934
- 54 Hamant, et Bodart. La ramification lombaire dans les douleurs du couloir. *Rev. de chir.* 84: 393 1933
- 55 Raschke, K. Sympathikusresektion bei Stumpfschmerz. *Zentralbl. f. Chir.* 60: 130 1933
- 56 White, J. C.; Garvey, W. E., and Atkins, J. A.: Cardiac innervation. *Arch. Surg.* 59: 768 1933
- 57 Heinbecker, P.: Anatomical and physiological criteria for surgical relief of cardiac pain. *J. Thoracic Surg.* 2: 517 1933
- 58 White, J. C. Experimental and clinical studies in surgical treatment of angina pectoris. *Ann. Int. Med.* 7: 9 1933
- 59 Levy, R. L. Management of patient with anginal pain. *New Eng. J. Med.* 311: 22, 1934
- 60 Alvarez, W. C. Abdominal pain. Sensitive region in abdomen and ways in which they may be stimulated to produce pain. *J. A. M. A.* 100: 1251 1934
- 61 Zollinger, H.: Observations following distension of gallbladder and common duct in man. *Proc. Soc. Exper. Biol. & Med.* 30: 1260 1933
- 62 Scrimger, F. A. C. Further experience in relief of pain by section of rami communicantes and ganglionated sympathetic cord. *Ann. Surg.* 99: 254 1934
- 63 Cleland, J. G. P. Paravertebral anaesthesia in obstetrics. *Surg. Gynec. & Obst.* 57: 51 1933
- 64 Dobrzanek, W. and Serafin, K. Anatomical study upon superior hypogastric plexus or pre-sacral nerve from surgical standpoint. *Ann. Surg.* 100: 30 1934
- 65 Adson, A. W. and Mason, J. C. Dysmenorrhea relieved by resection of presacral sympathetic nerves. *J. A. M. A.* 103: 936 1934
- 66 Herrmann, L. G. Resection of hypogastric plexus for the relief of pelvic pain. *J. M. A.* 102: 23 1934
- 67 Wether, E. Relief of pelvic pain by sympathetic neurectomy. *J. A. M. A.* 101: 1255 1933
- 68 Greenhill, J. P., and Schmitt, H. E. Sympathectomy for intractable pain of inoperable cancer of cervix. 101: 6 1933
- 69 Douglas, H. L. Excision of superior hypogastric plexus in treatment of intractable interstitial cystitis. *Am. J. Surg.* 55: 249 1934
- 70 Leamonthe, J. R. and Braasch, W. F.: Clinical and surgical aspects of nerve lesions involving lower part of urinary tract. *Zschr. f. urol. Chir.* 36: 193 1933
- 71 Braasch, W. F. Spastic irritability of the bladder controlled by pre-sacral neurectomy. *Proc. Staff Meet. Mayo Clin.* 9: 253 1934
- 72 Knight, G. C. Relation of extrinsic nerves to functional activity of the oesophagus. *Brit. J. Surg.* 23: 155 1934
- 73 Craig, W. M., Moersch, H. J., and Vinson, P. P.: Treatment of intractable cardiospasm by bilateral cervicothoracic sympathetic ganglionectomy. *Proc. Staff Meet. Mayo Clin.* 9: 749 1934
- 74 Telford, E. D. and Stoford, J. S. B.: Autonomic nerve supply of distal colic anatomical and clinical study. *Brit. M. J.* 3: 572 1933
- 75 Simcoe, F. A. Neuromuscular mechanism in ductus epididymidis and its impairment by sympathetic denervation. *Am. J. Physiol.* 103: 58 1933
- 76 Donovan, E. J., Peterson, E. W.; Shaw, T. A., and Both, F. M. Lumbar sympathetic neurectomy for Hirschsprung's disease. *Ann. Surg.* 98: 309, 1933
- 77 Barrington, J. F. J.: Localization of paths subserving micturition in spinal cord of cat. *Brain.* 56: 13 1933
- 78 Langworthy, O. L., Reeves, D. L., and Trauber, E. C. Autonomic control of urinary bladder. *Brain.* 57: 66 1934
- 79 Lewis, D. and Geschickter, C. F.: Tumors of sympathetic nervous system. *Arch. Surg.* 58: 16 1934
- 80 Collier, F. A., Field, H. Jr., and Durant, T. M.: Chromaffin cell tumor causing paroxysmal hypertension, relieved by operation. *Arch. Surg.* 58: 1136 1934
- 81 Bell, A. J., and Fowler, T. O.: Clinical manifestations of chromaffin cell tumors arising from suprarenal medulla. *Surg. Gynec. Obst.* 59: 9 1934

## CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C CABOT, M D

TRACY B MALLORY, M D, *Editor*

### CASE 21351

#### PRESENTATION OF CASE

A forty-two year old Armenian salesman entered complaining of precordial pain

Five years before entry the patient developed severe occipital headache which remained almost constant for two years, increasing in severity during the day and often keeping him awake at night. Two years before entry he was seen in the Out-Patient Department where he was told that he had hypertension and advised to reduce his weight. His blood pressure at that time was 208/160. He had slight pitting edema of the ankles and hemorrhages were seen in the right retinal vessels. The urine had a specific gravity of 1.017. His headaches improved a great deal when he was on a restricted food intake. The latter, however, caused insomnia and he resumed his former voracious eating habits with the result that the headaches recurred and increased in severity. Three and a half years before admission he developed nocturia, at first two or three times a night but gradually increasing until at the time of admission he urinated every half hour during the night and every two hours during the day. There were no other urinary symptoms. Three weeks before entry he developed an upper respiratory infection associated with backache, coryza and cough. Two days later his headaches became very severe and that evening he was seized with a dull precordial pain which had persisted and was worse when he was reclining. On the evening before admission the pain was most severe. During the past three weeks he had developed marked shortness of breath, especially upon exertion. There was no edema.

His family and marital histories are non-contributory.

He had frequent colds and sore throats but there was no history of rheumatic fever or nephritis.

Physical examination showed an obese man, acutely ill and complaining of extreme headache. His breath was uremic. His respirations were labored. His pupils were regular and reacted to light and accommodation. The fundi

were slightly hyperemic and showed small hemorrhages. His chest was clear. His heart was slightly enlarged to the left, the left border of dullness being 10 centimeters from the mid-sternal line, the right 2 centimeters. No murmurs were heard. The blood pressure was 220/140. There was left costovertebral tenderness. The abdomen was obese. The liver edge was felt two fingerbreadths below the costal margin. There was no edema.

The temperature was 99.9°, the pulse 105. The respirations were 30.

Examination of the urine showed a specific gravity of 1.008 to 1.012, a large trace of albumin and a sediment which contained only an occasional red blood cell and granular cast. The blood showed a red cell count of 3,750,000, with a hemoglobin of 70 per cent. The white cell count was 10,800, 83 per cent polymorphonuclears. The stools were negative. A Hinton test was negative. The nonprotein nitrogen of the blood was 82 milligrams. A phenolsulphonephthalein test gave only 5 per cent excretion at the end of one hour. A urine concentration test showed a constant specific gravity of 1.010. The serum calcium of the blood was 8.56 milligrams and the phosphorus 6.12. A lumbar puncture gave an initial pressure of 400 which rose to 450 after combined jugular compression and which fell to 150 after removing 20 cubic centimeters. Otherwise it was not remarkable.

He was put on digitalis on the third day. He rapidly failed, became comatose, developed muscular twitchings and died on the tenth day.

#### DIFFERENTIAL DIAGNOSIS

DR. WALTER BAUER. It is perfectly obvious after reading the history that we are dealing with a man who had had hypertension for at least two years. We also appreciate that he had impairment of renal function. Knowing that this man was forty-two years of age and that one of his last complaints was precordial pain, one might guess that he died from chronic glomerulonephritis with an associated terminal pericarditis. It is always worthwhile to discuss this type of case because it gives us an opportunity to determine whether we can or cannot distinguish nephrosclerosis from chronic glomerulonephritis. For a long time I had thought that it was always an easy task. However, if one regularly inquires of Dr. Mallory as to his final interpretation in each individual case, one wonders if it is as easy as it would appear. When clinical deductions are based on percentage figures obtained from the analysis of a large group of cases, the differential diagnosis does not seem difficult, but in dealing with one lone case percentage figures of this sort are often of little value in arriving at the correct diagnosis. In fact, such figures may mislead one.

In going over this history I am not certain that I can make a correct diagnosis. This man first came under observation two years ago complaining of headache. At that time he was obese and had hypertension. His urine had a specific gravity of 1.017. We cannot attach too much significance to this one urine examination. When first examined, he did have retinal hemorrhages, in other words, albuminuric retinitis. If we interpret these findings as indicative of an existing nephrosclerosis, even though he had been diagnosed previously as having a benign hypertension, it is apparent that at the time of his first Out-Patient Department visit it was no longer of the benign type because an albuminuric retinitis, high diastolic pressure, etc., characterize the malignant type of hypertension. From these findings one would ordinarily say he had only a few months to live that the prognosis was serious and the outlook hopeless.

The average length of life is eighteen months. It is interesting that he should have complained of severe occipital headache for almost two years. If he really had severe headaches of two years' duration, one wonders whether he did not have hypertension prior to the time of the first entry to the Out Patient Department. If not one might suspect that it was functional in origin. We have all seen people with hypertension of years' duration who have never complained of headache. In this particular case the headache disappeared when he went on a weight reduction diet. We do not know whether the pressure was affected. I should doubt seriously if the hypertension was influenced by dietary measures.

"Three and a half years before admission he developed nocturia." That again antedates our first knowledge of the hypertension by eighteen months. Therefore, if the nocturia is related to his final illness, it must be interpreted as meaning some impairment of kidney function eighteen months prior to the discovery of the existence of the hypertension. This symptom of nocturia became so marked that prior to the hospital entry he had nocturia every half hour during the night and every two hours during the day. This I should say was unusually frequent. Therefore, one wonders whether the recent upper respiratory infection was responsible for an associated pyelitis. This seems unlikely because he never complained of fever and had no urinary findings to substantiate such a suspicion. The recent upper respiratory infection might have caused further damage to already damaged kidneys. Nocturia of this grade explained solely on renal impairment is unusual but I suppose it can occur.

Two days before entry the headaches became very severe and he developed a dull precordial pain. There is very little more said about this pain except that it was always more marked

when he was reclining. It evidently was not sufficiently severe to require opiates. If one were to interpret the findings as those of chronic glomerulonephritis, one might suspect that the patient had a terminal pericarditis such as we not infrequently encounter in terminal Bright's disease. From what information we have at hand I do not believe that it represented coronary heart pain.

It does state in the past history that he had frequent colds and sore throats. These infections could represent the cause of chronic glomerulonephritis, if that is what he had.

Physical examination showed him to be an obese man. I presume that in this day and age when one is confronted with an obese individual with hypertension he must always consider the possible existence of Cushing's syndrome. The existence of definite renal impairment is against such a diagnosis. However, we must appreciate the fact that some of our colleagues in New Haven have examined the pituitary glands in cases of nephritis and hypertension. I believe they have found that there are more basophilic cells in the pituitary glands of such cases than in those of normal individuals. What that proves, I do not know. I do not believe it can be interpreted to be of any etiological significance in either nephrosclerosis or glomerulonephritis. There is no further information here that would enable one to suspect the existence of a basophilic adenoma.

The man who made the physical examination evidently did not hear any pericardial friction rub. That does not rule pericarditis in or out. There is a note stating that costovertebral tenderness was present. Such a finding would be in keeping with a diagnosis of pyelitis. If present, it would help explain the frequent nocturia. However the urine examinations did not support such a diagnosis. It is surprising that the history contains no further information concerning his shortness of breath. He did have a little pitting edema on one occasion. The respirations were increased. His liver was enlarged. The lungs were reported as negative. Therefore, we cannot say that he had evidence of cardiac failure due to hypertensive heart disease. The urine examinations revealed a specific gravity of 1.009 to 1.012. The urine concentration test showed failure to concentrate above 1.010. Therefore, one must admit the existence of renal impairment if the kidneys were unable to concentrate above 1.012. The red blood cell count was 3,750,000 with a hemoglobin of 70 per cent (Tallqvist). The red blood cell count is as a rule of some significance and of help in differentiating these two types of renal lesions. We expect people with a terminal glomerulonephritis to have a more severe anemia. We look upon the anemia as of some prognostic significance. However, we do know



that occasionally a patient may enter with terminal uremia of chronic glomerulonephritis and yet have a normal red blood cell count. However, they are in the minority, in the end stages of either nephrosclerosis or chronic glomerulonephritis. You always expect to find a more severe anemia in a nephritic than in a person with nephrosclerosis. The reduction in red blood cell count and hemoglobin here could perfectly well fit with either type of case. His nonprotein nitrogen was only 82 milligrams per 100 cubic centimeters. The finding of a nonprotein nitrogen of only 82 milligrams per 100 cubic centimeters in an individual who is unable to concentrate his urine or excrete more than 5 per cent of the phenolsulphonaphthalein dye would favor a diagnosis of nephrosclerosis. We have here further evidence of impairment of kidney function as shown by a serum phosphorus of 6 milligrams per 100 cubic centimeters and a serum calcium of 8.5 milligrams per 100 cubic centimeters. This speaks for a terminal acidosis which we might see in either type of case. The lumbar puncture was negative except for increased pressure. This is of no diagnostic help. The question is of what did this man die? What is primary here? Did he have a terminal nephritis with a secondary hypertension or are we dealing with an individual who had a primary nephrosclerosis with secondary kidney impairment. Going on percentage figures, I should say that the history in this case was more in keeping with a diagnosis of nephrosclerosis than chronic glomerulonephritis. This man had no symptoms except headaches. With chronic glomerulonephritis one would expect the patient to complain of other symptoms such as weight loss, weakness, anorexia, indigestion, etc. In other words, patients with chronic Bright's disease usually have definite constitutional symptoms. This man had none. From the history alone I should be inclined to favor a diagnosis of nephrosclerosis rather than a diagnosis of chronic glomerulonephritis. I do think that the existence of nocturia for eighteen months prior to his first Out-Patient Department visit, two years before his final entry, can be used as an argument that he had some renal impairment at that time. It might be used also as an argument that he had a latent glomerulonephritis. However, I still believe that he should have had more in the way of other symptoms. I do not think that, from the laboratory side we obtain much information that enables us to make the correct diagnosis. I think the red blood cell count favors nephrosclerosis and perhaps the nonprotein nitrogen of only 82 milligrams per 100 cubic centimeters might also be used as evidence in favor of it. Therefore, I shall hazard the guess that this man had a malignant hypertension, nephrosclerosis and hypertensive heart disease

but I will not be surprised if Dr Mallory tells me the opposite. I suppose one might wonder if there is any other complicating factor here. The headache was so severe and so persistent that one must consider the possibility of some other factor. However, it seems strange that he did not have any more symptoms or signs to direct us to the cause of such a complicating factor. I think it would be safer to assume that we are dealing with an individual with one of these two conditions and not a complicating factor in addition.

DR FULLER ALBRIGHT. The service came to the same conclusion as Dr Bauer.

DR MYLES P. BAKER. I remember seeing this man in the Out-Patient Department and we had the same impression as Dr Bauer, save that we considered a cerebral accident or cardiac failure a more likely eventuality. I do remember that the severe headaches were largely relieved, though the diastolic pressure was not lowered, by a little encouragement and a few suggestions that we felt at that time would not materially alter the prognosis.

#### CLINICAL DIAGNOSES

Hypertension, malignant  
Uremia.

#### DR WALTER BAUER'S DIAGNOSES

Malignant hypertension  
Nephrosclerosis  
Hypertensive heart disease

#### ANATOMIC DIAGNOSES

Nephrosclerosis, malignant type  
Cardiac hypertrophy, hypertensive type  
Arteriosclerosis, aortic and coronary, moderate  
Passive congestion—liver, spleen and kidneys  
Pulmonary edema.  
Obesity

#### PATHOLOGIC DISCUSSION

DR TRACY B. MALLORY. The autopsy on this man showed a pair of kidneys weighing 280 grams, which is only a slight degree of contraction. The capsules stripped with some difficulty and left a granular surface which was quite red in character. The granules were both fine and coarse in type. In other words the gross picture was entirely consistent with a malignant vascular nephritis. The microscopic examination entirely bears that out. There are few totally destroyed glomeruli, but the great majority show extensive hyalinization, occasionally with fresh fibrin thrombi in the capillary loops, but without proliferation of endothelial or epithelial cells. The afferent arteries of the glomeruli are extensively and uniformly involved, often with characteristic necrotizing lesions. The larger vessels show a marked

fibrous intimal thickening sometimes described as endarteritis. Also, the vessels in the other organs of the body show somewhat similar changes, very marked, as one would expect, in the spleen, but present also in the capsule of the adrenal, in the pancreas, and barely discernible in the liver. So that everything from beginning to end is entirely consistent with a malignant nephrosclerosis. I think there is little possibility of doubt in regard to the diagnosis.

The only other findings at the autopsy of significance were a considerably hypertrophied heart, as one would expect, and a moderately severe grade of coronary sclerosis. However there was no occlusion of the coronary as yet no myocardial scars and no terminal pericarditis. The lungs showed a quite severe pulmonary edema, probably an acute attack of very short duration a rather characteristic terminal event in any type of nephritis.

DR. BAUER. I should like to ask a few questions. (1) Do you think you see an occasional case in whom you find evidence of the existence of both nephrosclerosis and chronic glomerulonephritis?

DR. MALLORY. I think one fairly often sees at autopsy a pair of extensively atrophied kidneys which microscopically show no progressive changes except in the vessels although both the clinical picture and the other autopsy findings suggest that the underlying difficulty is an old destruction of a large proportion of kidney substance by glomerulonephritis. Confirmatory evidence of the plausibility of such a hypothesis has appeared this last year in the interesting studies of Alan Moritz of Cleveland who was able to show that functionless glomeruli do not persist indefinitely as hyalinized scars as had generally been supposed in the past, but the majority disappear so completely that no scar is left at all. He showed this very prettily by glomerular counts and by special staining methods which demonstrated glomeruli in every stage of destruction.

DR. BAUER. They completely disappear.

DR. MALLORY. Yes, so that one cannot expect to find the traces of a glomerular lesion that occurred twenty years ago. The only evidence may be the tremendous reduction in the number of glomeruli.

DR. BAUER. What evidence exists to favor the view that malignant hypertension is caused by infection? How does the pathologist interpret the so-called hypertension crises?

DR. MALLORY. In answer to the first question I have a strong personal conviction that malignant hypertension is simply a very severe form of benign hypertension rather than a different disease and I doubt if it is dependent upon infection. I have to admit that occasionally pictures indistinguishable from malignant hypertension can be produced by infectious diseases such as periarteritis nodosa for instance,

but that is an entirely different syndrome that happens to involve the same structures and produce the same picture.

DR. BAUER. Certain German investigators cite cases in which streptococcus throat infections were thought to have caused the hypertension.

DR. MALLORY. Fahr in particular supports strongly the theory of an infectious origin, but I think the opinion of pathologists and clinicians the world over is very steadily shifting away from that point of view. I cannot answer the other question.

DR. BAUER. It seems to me that the theories offered in the average textbook as to the cause of the so-called hypertension crises are not based on sound physiological reasoning. We always wonder if they do not represent a true vascular episode in which the patient did not present any localized signs.

DR. CHARLES S. KUBIE. I should think our findings here would tend to confirm that view, that where cerebral symptoms appear an organic lesion has developed in the brain. Even the fact that in large numbers of these cases the symptoms are transitory, even very quickly so, does not rule out actual occlusion. I think we have material which proves that.

## CASE 21852

### PRESENTATION OF CASE

A thirty-four year old American painter entered complaining of swelling of the neck and groins.

About four months before entry the patient noticed a single nodular swelling about the size of a golf ball in the left groin. At the same time there developed also two small rather hard nodules under the angle of the jaw on both sides. He consulted his physician who prescribed injections of Iodex, which he used for one month without any decrease in the size or character of the glands. At the end of this period they began to increase in size rather rapidly. The ones in the neck extended to include a chain of glands on each side. The single nodule in the groin increased in size and others appeared in the right groin. He visited his physician again and this time was given potassium iodide. One month before entry he was placed on Fowler's solution 5 drops three times a day, which he took until the time of admission. There was no pain. Ten weeks before entry he began to raise phlegm which was often blood tinged and gave him a feeling of discomfort. Shortly after the onset of the glandular swelling he noticed that he was unable to hear very well. There was always a pumping noise in his head. There was some bleeding from his gums, but there was no history of change in voice, cough or hemoptysis. About three weeks

before entry he developed shortness of breath, became rather weak and tired easily.

The family and marital histories are non-contributory.

He had been a painter during the past fourteen years. He had had the usual childhood diseases. Seventeen years before entry he had influenza.

Physical examination showed a well-developed and fairly well-nourished man with marked enlargement of his neck. The glands were discrete, firm, non-tender and varied in size from 2 to 8 centimeters in diameter. There was no redness or heat of the overlying skin. The axillary, epitrochlear and inguinal glands were all enlarged up to 8 centimeters in diameter. The heart and lungs were not remarkable. The firm edge of the spleen could easily be felt upon deep inspiration. Several purpuric spots were seen on the skin near the axillae.

The temperature was 98°, the pulse 88. The respirations were 20.

Examination of the urine was negative. The blood showed a red cell count of 3,120,000, with a hemoglobin of 55 per cent. The white cell count was 4,600. The smear showed 4 per cent polymorphonuclears, 19 large lymphocytes and 62 small lymphocytes. The stools were negative. A Hinton test was negative. The basal metabolism rate was plus 37, the icteric index 20, the serum protein 6.8 per cent.

X-ray examination of the chest was negative. There were no mediastinal masses.

On the third day his temperature started to rise, reaching 106°. The white blood cell count at this time was 6,600. A smear showed 3 per cent polymorphonuclears, 21 large lymphocytes and 76 small lymphocytes. Another white cell count made the following day was 950. The smear showed cells only of the lymphoblastic type.

He rapidly failed and died five days after entry, his temperature having remained around 106° for the last three days.

#### DIFFERENTIAL DIAGNOSIS

DR. F. DENNETTE ADAMS. The history of fairly rapid development of nodules in the neck and groin is suggestive of some form of malignant disease, most likely lymphoblastoma of the leukemic, Hodgkin's or lymphosarcomatous type. Cancer or other tumor in the head, neck, chest or abdomen could produce metastases in the glands of the neck, possibly in the groin, but it would be unusual to have such a disease sufficiently far advanced to produce generalized adenopathy and yet manifest no local symptoms. The size and duration are against mononucleosis and other acute infections with adenopathy. Tuberculosis is possible but very improbable because of general distribution and the rapidity of growth, other

types of granulomata are equally unlikely. Bleeding from the gums is typical of the leukemias and lymphoblastomas, the blood-tinged sputum is also common. It could be caused by collection in the throat of blood which oozed from the gums overnight, by congestion or by invasion by tumor tissue farther down. Deafness, due presumably to cellular infiltration of vestibule, middle ear or auditory nerve, is not uncommon in leukemia. The pumping noise one can assume is an associated symptom. Weakness, fatigue and dyspnea would be expected in a patient with what is obviously a severe and progressive disease.

Inunction of Iodex, of course, is a useless procedure in a case of this kind. I am astonished at the frequency with which such therapeutic methods are advocated. One sees them recommended for all sorts of swellings, including tumors of the breast, and as a result valuable time is frequently lost and harm actually done. In this instance, happily, since no form of therapy would have been of permanent value, there was no actual loss. Potassium iodide was worth a trial, arsenic has its place in the treatment of leukemia. One is always on the lookout for lead poisoning in a painter. There is nothing to suggest it in this case.

History will not supply the diagnosis, laboratory tests are essential, but on the basis of history alone one would be most suspicious of lymphoblastoma or leukemia.

The type of glandular swelling described in the physical examination almost excludes tuberculosis and other granulomata but supplies no added leads.

In leukemia one would expect to find at least some enlargement of the liver and greater enlargement of the spleen, although this is not always the case. Purpuric spots, like the bleeding gums, are consistent with lymphoblastoma of the leukemic type, rare with the Hodgkin's type.

The key to the diagnosis is the blood report—the lymphocytic formula, even in the absence of a higher total leukocyte count, throws the case into the group of the lymphatic leukemias. One would be justified in assuming, I think, that earlier there was a higher total leukocyte count, and that the present figure represents depression produced by arsenic therapy or the depression so frequently seen in the terminal stages, though it is possible that the low count may have persisted throughout the disease. The red cell count and hemoglobin are consistent. The high metabolic rate is an important characteristic of the disease. It is impossible to account positively for the high icteric index. It could be due to liver damage by the arsenic, or to partial biliary obstruction by leukemic infiltration.

The rapid downward progress with high fever, marked drop in the leukocyte count, and fatal termination is typical of leukemia, par-

icularly of the acute type. To be sure, the duration is longer than usual for the acute case which is more apt to last only a few weeks and is short for the chronic case, but there are all gradations. One can speculate as to the influence of arsenic on the leukocyte count although there are no other definite indications of arsenic poisoning (the dosage of fifteen drops of Fowler's solution daily for a month is not excessive), and also as to the possibility of terminal infection. There is no definite evidence in the record.

It seems to me that the only diagnosis which will fit the picture is lymphatic leukemia.

A PHYSICIAN: You do not think the question of lead plays any part in this?

DR. ADAMS: No.

A PHYSICIAN: Do you think the diagnosis is consistent with the white count of 950?

DR. ADAMS: Yes. The white count may drop in the terminal stages.

A PHYSICIAN: How do you account for the high temperature?

DR. ADAMS: Also a common terminal event.

A PHYSICIAN: Is there any other condition in which you get a lymphocyte ratio so high?

DR. ADAMS: Pertussis often shows a lymphocytic formula but rarely as high as this although the total count would probably be higher. Mononucleosis might give a similar blood picture.

A PHYSICIAN: Do you see it very often in pertussis?

DR. ADAMS: One hears about it but I do not happen to see it as I rarely see children. Do you, Dr. Mallory?

DR. MALLORY: No.

A PHYSICIAN: How do you account for the metabolism?

DR. ADAMS: The metabolism is always high in myeloid leukemia. I do not know why. This finding is so consistent that it is used as a diagnostic factor in such cases. It may be but is not necessarily high in lymphatic leukemia.

A PHYSICIAN: Do you feel that the white cell count had been this low throughout?

DR. ADAMS: I believe it was probably high earlier in the disease but would prefer Dr. Mallory's opinion.

DR. MALLORY: It could have been higher before or it could have been this low or lower throughout.

A PHYSICIAN: Do you ordinarily get such a count with leukemia?

DR. MALLORY: Not ordinarily, but I have seen cases start high and fall below normal and also cases which start at a low level and later rise to 40,000 or more.

#### CLINICAL DIAGNOSES

Lymphatic leukemia.  
Bronchopneumonia

#### DR. F. DENNETTE ADAMS' DIAGNOSIS

Lymphocytic leukemia acute

#### ANATOMIC DIAGNOSES

Lymphoblastoma, aleukemic leukemic type  
Aplastic anemia, terminal  
Bronchopneumonia

#### PATHOLOGIC DISCUSSION

DR. MALLORY: The autopsy showed generalized lymph node enlargement, a normal sized liver without any sign of leukemic infiltration and a spleen that was only moderately enlarged, 550 grams which is small for leukemia. There was a terminal pulmonary infection which was peculiar looking histologically because there was a reaction of fibrin and red cells but no leukocytes whatever. In other words, it looks like the pneumonic reaction in agranulocytosis and I think that fits his terminal condition. As I remember it, there was no differential to go with that final white cell count, but there were probably no polymorphonuclears at all.

In true leukemia you expect to find the bone marrow completely flooded with leukemic cells—so many that all other elements are displaced and you have to hunt hard for islands where the red cells, megakaryocytes and normal white cells are being formed. Instead this patient has a completely aplastic marrow in which we could not find either normal hematopoiesis or leukemic infiltration. If you gave me the sections of the bone marrow and told me nothing about the history I would call it aplastic anemia, but it is quite obvious that is not the whole diagnosis.

Microscopic sections of the lymph nodes showed a perfectly typical lymphoma and the spleen showed an infiltration consistent with leukemia. The diagnosis of aplastic anemia could not explain the lymph nodes and could not explain the spleen. A diagnosis of lymphoma in leukemic form does not explain the bone marrow. We have to make two diagnoses. There is no question that it is some form of lymphoma of which there is postmortem evidence only in the lymph nodes and spleen. It was most probably leukemic and at one time the bone marrow was involved. Then something happened—probably pretty suddenly—and knocked out all those cells in the bone marrow and produced a final picture that looks like complete aplasia of the bone marrow. The question as to what that factor was comes up. We have had one other proved leukemia in whom we did a sternal puncture two weeks before his death and found a typical leukemic infiltration with big unclassified cells. Two weeks later he died and showed a completely aplastic marrow. In the interval he developed an acute streptococcus infection for which he received no medication.

I do not know whether it was part of the leukemia per se or secondary to the streptococcus infection. In this man there is evidence of a terminal infection but apparently of only short duration—just the last day or two of his life. I do not believe that infection could have knocked out the bone marrow so completely in such a short length of time. He had received Fowler's solution for a long time which is reported sometimes to knock out the bone marrow badly. That is another possibility. He had not received any x-ray treatment.

A PHYSICIAN Is it not said that x-rays will stimulate polymorphonuclear production?

DR MALLORY I have heard that claimed. I do not feel very confident about it. I think they might sometimes but I should be more afraid of their depressing them.

DR ADAMS Considering the extent of his

bone marrow destruction one would expect the red cell count to have been lower. I suppose it might have been so recorded had further observations been made before death.

DR MALLORY He was in the hospital only five days and a good deal of the destruction of the bone marrow must have occurred in that five day period. There was only a single red cell count.

DR ADAMS Did you account for the head symptoms?

DR MALLORY We did not have permission to examine the head. However, Dr Soma Weiss of the City Hospital recently has looked up all the leukemias at the City Hospital and here at the Massachusetts General Hospital. He has found evidence of much more frequent central nervous system involvement than is generally supposed.

# The New England Journal of Medicine

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## THERE WERE GIANTS IN THOSE DAYS

In the Educational Symposium which appeared recently in the *Journal* the history of the Massachusetts Board of Registration in Medicine was reviewed briefly, after noting some of the outstanding points in the history of the movement which led to the enactment of the statute of 1894, by which the Board was created.

We are removed from those days only forty years, according to the calendar, but from the spirit of the Victorian age, then passing off the stage by seeming aeons of difference. It is difficult for us to realize the emotional excitement of the medical controversies of the nineteenth century, and the sectarian bitterness with which some of the antagonists arrayed themselves for battle. The questions which presented opportunities for the generation of so much heat we have forgotten and when they are recalled to us

we wonder if we could ever get so excited about anything.

For thirty five years, there had been no statute controlling the practice of medicine in Massachusetts except the criminal law, and since the other states, except one, had some sort of medical practice act, for years there had been seeping into Massachusetts many of the outcasts from other states. The situation has a familiar parallel to-day.

It is impossible for us who have not lived through it to realize the strength and the character of the opposition to the medical practice act of 1894, which had to be overcome, and to the credit of the leaders of the medical profession of those days, was overcome. The names of the men who took an active part are well known to us. What we forget is the clearness of vision, and the earnestness of purpose and the dogged determination to overcome, which characterized them, of whose labors we reap the harvest.

Note the contemporary characterization of the opposition "Medical blacklegs of all kinds, deceitful clairvoyants long haired spiritualists, necromancers, wizards, witches, seers, magnetic healers, pain charmers, big Indian and Negro doctors, abortionists, harpies who excite the fears and prey on the indiscretions of the young of both sexes, who treat venereal diseases with the utmost secrecy and dispatch, who have good facilities for providing comfortable board for females suffering from any irregularity or obstruction, who sell pills which they are particular to caution patients when pregnant against using."

There has been some progress in forty years. The opposition to progress has changed its face. To meet and overcome this opposition, there is needed to-day the same clear thinking, the same determination, the same valor, which the giants of that day possessed, and of which the tradition has become our inheritance.

## THE INFANTILE PARALYSIS SITUATION IN MASSACHUSETTS

THE incidence of infantile paralysis in Massachusetts is considerably larger than was expected earlier in the year. Up to August 21, the State Department of Public Health had reports of 345 cases and the expectation is warranted that by the time this statement appears there will have been reported over four hundred cases.

The important centers of the outbreak of this disease are Boston, Fall River, the North Shore and the Merrimac Valley. The western part of the State has been comparatively free from invasion thus far.

By advice of the State Department of Public Health and permission of the Editor of the

*Journal of the American Medical Association* an article written by Dr Arthur T Legg, which was published with others in connection with the exhibit on Poliomyelitis at the New Orleans Session of 1932, appears on page 415 of this issue

This will give approved information relating to the aftercare of patients with this disease and correct the attitude held by some. In many cases, delay in treating these patients has made a reasonable degree of recovery impossible. Expert opinion and correct physiotherapy often determine the future condition of these patients. The dictum that manipulation and massage are to be avoided during the sensitive stage should be followed. The family physician can, with advantage to his patient and himself, secure early expert advice in every doubtful case.

### SCHOOL DAYS

It may be a small kindness, from the point of view of the school child, to issue a reminder in August that school days will soon be upon us. For the older person, however, who must bear some of the responsibility for this educational venture, whether parent, teacher or physician, there are certain preparations which must be borne in mind and the earlier they are looked to the better. Some two million children in the land of the free and the home of the brave will be initiated into the mysteries of academic life this fall. Before entering the public schools of many of our states they must be vaccinated. All of them should be, whether it is required or not, whether it is public or private school in which they are to be matriculated.

A lesser number, unfortunately, will have been immunized against diphtheria. Here the advice of the family physician or pediatrician will carry weight, and advice on this important subject should be given voluntarily. In other ways how well is the child physically equipped to embark upon his scholastic career? Wise parents will have ascertained beforehand if their children's hearing is unimpaired, their vision normal and their respiratory tracts unhampered by obstructing adenoids or diseased tonsils.

It is the first important step that the child is taking, away from the affectionate security of his home, he is going into the outside world at last, not as a tourist but for a purpose and he should be prepared to meet that purpose without handicap.

The teacher, the school nurse and the school physician have also their responsibilities to shoulder. Physical or mental defects in the child, hitherto unnoticed, must be recognized, and the proper machinery set in motion to correct them if they are remediable. It must be borne in mind that many children, for the first time in their lives, will be exposed to a barrage

of infectious diseases, and their first year in school will be the year when they are most susceptible to these contacts. Such exposures should be reduced to a minimum by teacher and nurse, who will remember that the common cold is an acute infection, often dangerous and highly communicable, even if it is they themselves who are harboring it!

### 'THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

MIXTER, WILLIAM JASON B S, M D Harvard University Medical School 1906 F A C S Visiting Surgeon, Massachusetts General Hospital Address 319 Longwood Avenue, Boston Associated with him is

AYER, JAMES B A B, M D Harvard University Medical School 1907 Chief of Neurological Service, Massachusetts General Hospital Professor of Neurology, Harvard University Medical School Address 319 Longwood Avenue, Boston. Their subject is "Herniation or Rupture of the Intervertebral Disc Into the Spinal Canal Report of Thirty-Four Cases" Page 385

HOOVER, W B M D Washington University School of Medicine, St. Louis, Missouri 1922 Laryngologist, New England Deaconess Hospital Associate Otorhinolaryngologist, New England Baptist Hospital Otorhinolaryngologist, Lahey Clinic His subject is "The Syndrome of Anemia, Glossitis, and Dysphagia" Page 394 Address 605 Commonwealth Avenue, Boston

MASSELL, BENEDICT F M D Harvard University Medical School 1931 Resident Physician, House of the Good Samaritan Address 25 Binney Street, Boston Associated with him is

SOLOMON, PHILIP M D Harvard University Medical School 1930 Assistant in Neurology, Harvard University Medical School Junior Visiting Neurologist, Boston City Hospital Address Boston City Hospital, Boston Their subject is "Epidemic Benign Myalgia of the Neck" Page 399

FAXON, HENRY H A B, M D Harvard University Medical School 1925 F A C S Staff Assistant Surgeon, Massachusetts General Hospital His subject is "Coexisting Intrauterine and Extrauterine Pregnancy" Page 401 Address 264 Beacon Street, Boston

HALBERSLEBEN, DAVID A B, M D Harvard University Medical School 1928 Junior Associate in Medicine, Peter Bent Brigham Hospital, Boston Visiting Physician, Channing Home, Brookline His subject is "Coronary Occlusion

in Community Practice." Page 403 Address  
3 Conway Street, Roslindale

STELLHORN, CHESTER E. A.B., M.D. University of Michigan 1929 Formerly, Intern at Providence Hospital, Detroit, Research Fellow in Pathology, Detroit College of Medicine and Surgery, Pathologist, Women's Hospital, Detroit, and Resident, Orthopedic Surgery, Long Island College Hospital, Brooklyn Now, Resident Surgeon, Cumberland Hospital, Brooklyn. His subject is "Jacob Bigelow, M.D., LL.D." Page 405 Address Cumberland Hospital, 39 Auburn Place, Brooklyn, New York.

BALL, C. F. M.D. American Medical Missionary College 1902 F.A.C.S. Surgeon, Rutland Hospital His subject is "Irradiation Treatment of Tumors Late European Developments" Page 407 Address 56½ Merchants Row, Rutland, Vermont.

McCLEARY, G. F. M.D. (Cantab.), D.P.H. Formerly, Deputy Senior Medical Officer, Ministry of Health, and Principal Medical Officer, National Health Insurance Commission (England) Now, Medical Officer of Health, Battersea, Hampstead, Bedfordshire Examiner in Public Health, University of Liverpool His subject is "How Grievances Are Dealt with Under the English Health Insurance Scheme." Page 412 Address Milbank Memorial Fund, 40 Wall Street, New York City

LEGG, ARTHUR T. M.D. Harvard University Medical School 1900 F.A.C.S. Assistant Professor of Orthopedic Surgery, Harvard University Medical School. Associate Surgeon Children's Hospital Consulting Orthopedic Surgeon, Lowell General and St. Joseph's Hospitals, Lowell, also at Chelsea Memorial Hospital, Chelsea. His subject is "Paralytic Treatment Other Than Respiratory The Important Rules in the After Care of Poliomyelitis" Page 415 Address 319 Longwood Avenue, Boston

WHITE, JAMES C. A.B., M.D. Harvard University Medical School 1923 F.A.C.S. Assistant Professor of Surgery, Harvard University Medical School Associate Surgeon, Massachusetts General Hospital His subject is "Progress in the Surgery of the Autonomic Nervous System in 1933 and 1934." Page 416 Address: Massachusetts General Hospital, Boston

## MISCELLANY

### A NATIONAL HEALTH SURVEY

The President of the United States has approved an allotment of \$3,450,000 for the employment of 3500 workers on relief rolls to operate in nineteen states to get health histories of families. The work

will be directed by the United States Public Health Service.

Special attention will be devoted to heart diseases and to illnesses due to certain occupations or income groups. The underlying purpose is to acquire information not otherwise available in hospital records and reports of other institutions for the use of research scientists and doctors

### DR. FRANCIS R. MAHONY BECOMES A MEMBER OF THE MASSACHUSETTS BOARD OF REGISTRATION IN MEDICINE

In order to meet the provision in the law that no Medical Society may have majority representation on the Massachusetts Board of Registration in Medicine Dr. Francis R. Mahony has resigned from the Massachusetts Medical Society. He was nominated by Governor Curley to fill the position made vacant by the retirement of Dr. Hovey of Springfield.

This action by Dr. Mahony calls for appropriate recognition by the Society of the sacrifice of this membership. He is now the second doctor who has given up membership in the Society in order to serve the State in this important capacity.

### A PLAN TO MEET THE MEDICAL NEEDS OF LOW INCOME GROUPS

A Committee on Medical Economics of the North Side Branch of the Chicago Medical Society has studied the problem relating to meeting the medical needs of low income groups. Its first conclusion is that "The responsibility of providing that care for the indigent sick should rest with all tax payers." The rest of the report is devoted to a plan for dealing with the group whose incomes are between \$750 and \$1,000. The attendance of many patients at the advertising clinics is deplored because such organizations have entrenched themselves in a field which should have been controlled by organized medicine. The suggested remedy is set forth as follows: "Why should the medical profession be expected to donate services and at the same time pay in taxes its share of the cost of sickness among the indigent? Remuneration for this medical service should be added to the other expenses connected with sickness among these people and the total should be carried equitably by all tax payers."

The purpose of this plan is commendable and the experiment, if put into operation, will be watched with interest. Success will depend on the devotion and ideals of the doctors participating in the plan and the efficiency of the social service adjunct. Much of the trouble with such schemes is likely to be lack of general cooperation or dissensions among those who carry out the details, but this is no excuse for indifference on the part of the medical profession which long ago should have devoted more thought to the medical needs of the groups in the low income brackets.



## ANTERIOR POLIOMYELITIS CASES FOR 1935

City or Town	Jan May	June	July	August 1-17	August 19 24	Total to Date For Year
Brewster	0	0	0	0	1	1
Fall River	0	0	6	32	12	50
New Bedford	0	0	0	0	1	1
Plymouth	0	0	0	1	0	1
Somerset	0	0	0	0	1	1
Westport	0	0	0	1	1	2
Braintree	0	0	0	1	0	1
Brockton	0	0	0	4	1	5
Dedham	0	0	0	1	1	2
Hopkinton	0	0	0	0	1	1
Quincy	0	0	0	0	3	3
Weymouth	1	0	1	1	1	4
Arlington	0	0	0	2	0	2
Belmont	0	0	0	2	0	2
Boston	0	1	19	92	40	152
Brookline	0	0	0	2	0	2
Cambridge	1	0	1	5	3	10
Chelsea	0	0	0	6	1	7
Concord	0	0	0	1	0	1
Everett	0	1	1	1	6	9
Malden	1	0	0	2	1	4
Medford	0	0	0	2	1	3
Melrose	0	0	0	1	1	2
Newton	0	0	0	0	1	1
Revere	0	0	0	2	0	2
Somerville	0	0	0	4	1	5
Waltham	1	0	2	6	1	10
Watertown	0	0	1	2	3	6
Winthrop	0	0	0	2	2	4
Amesbury	0	0	0	1	2	3
Andover	0	0	1	1	0	2
Beverly	0	0	1	5	2	8
Billerica	0	0	0	2	0	2
Danvers	0	0	0	0	2	2
Gloucester	1	0	0	2	0	3
Haverhill	0	0	1	7	7	15
Ipswich	0	0	0	1	0	1
Lawrence	0	1	3	0	0	4
Lowell	0	0	3	7	6	16
Lynn	0	0	2	4	0	6
Manchester	0	1	0	0	0	1
Marblehead	0	0	1	0	0	1
Newburyport	0	0	0	0	1	1
North Andover	0	0	0	0	2	2
Peabody	0	0	0	1	0	1
Salem	0	0	0	1	0	1
Saugus	0	0	0	1	0	1
Swampscott	0	1	0	1	0	2
Westford	0	0	0	0	1	1
Fitchburg	0	0	0	0	2	2
Marlboro	0	0	0	1	0	1
Millbury	1	0	0	0	0	1
Northbridge	0	0	0	1	0	1
Shrewsbury	2	0	0	0	0	2
Westboro	0	0	0	2	0	2
Worcester	0	0	1	0	2	3
Chicopee	0	1	0	0	0	1
Northampton	0	0	1	0	0	1

Springfield	0	0	1	1	1	3
Greenfield	0	0	0	1	0	1
Pittsfield	0	0	0	1	0	1
Total	8	6	46	214	112	386

### A STUDY OF THE HEALTH AGENCIES OF BOSTON

In 1934 Dr Haven Emerson and Anna C Phillips made a comprehensive study of the organized care of the sick and of the health agencies of Boston for the committee on the study of the social and health agencies of the city. The report of this study has been abstracted and the findings and recommendations of so well recognized an authority as Dr Emerson are well worth careful consideration.

The problems presented to the committee primarily concerned hospitals, outpatient services, medical social service, domiciliary care and health agencies. So far as hospital beds for acute conditions and obstetrics are concerned, Boston apparently has an excessive number in relation to the population needs of the city proper; however, Boston's traditional provision for hospital care for patients from the Metropolitan area beyond the city limits and from residence elsewhere in Massachusetts and other New England states is probably sufficient justification for this apparent excess.

A serious inadequacy exists in the institutional provision for chronic invalids, evidenced both by the lists of persons waiting their turn for admission to the existing six institutions and by the proportion of patients in the general hospitals who should be cared for in institutions for the chronically ill. Studies by the Massachusetts Department of Public Health in 1929, 1930 and 1931 also indicate that Boston lacks sufficient care for chronic disease.

Existing facilities for convalescent care are also seriously inadequate. Boston has approximately 13,440 patients annually who would benefit by convalescent care with sufficient beds at present for not over half this number.

Domiciliary medical care long handled by the Boston Dispensary, the Massachusetts Memorial Hospitals, the Medical Mission Dispensary and the Jamaica Plain Dispensary has been a bone of contention and the city has only recently recognized its responsibility in the matter.

Visiting nurse service has been provided by the Community Health Association, and it is time that the municipality recognized its responsibility for appropriate care of the dependent sick, whether the cost of care falls upon the hospitals of the city, the hospital operated by private control or upon the Community Health Association Visiting Nurses.

In social service work, additional personnel is needed in the medical social service department of the City Hospital.

It is recommended, in conclusion, that the city should make contractual agreements with the privately controlled hospitals to care for patients at times when the general medical and surgical beds

at the Boston City Hospital are occupied to normal or ninety per cent of the capacity of the hospital; that the city should provide either by an external service at the City Hospital or by contractual agreement with private organizations domiciliary care for persons eligible for free care; that a home for chronic patients be provided on the mainland; that hospitals or houses devoted to the care of convalescent patients are needed to relieve the general hospitals of the care of those patients who no longer need the costly and elaborate skill and equipment required during acute illness.

It is further recommended among other things, that the private hospitals go forward with plans at present under consideration to make possible for persons of moderate means the payment for hospital care by periodic payment on a membership basis of sums sufficient to assure them of hospital care at such time as subsequent sickness may require. Various minor institutions it is believed should discontinue their activities and various possible mergers in the interests of efficiency and economy are suggested.

### THE CONTROL OF COMMUNICABLE DISEASES

In the Bulletin of the United States Public Health Service, Volume 50, Number 32, August 9, 1935, there appears the revision of previous reports covering the control of communicable diseases. This is the product of the Subcommittee on Communicable Disease Control of the Committee on Research and Standards of the American Public Health Association, and it has been approved by the United States Public Health Service.

This publication should be in the offices of all practicing physicians for it sets forth in concise form the definitions of terms employed in public health rules and regulations, a list of the diseases requiring notification to health authorities, the diagnosis, etiology, source of infection, mode of transmission, incubation period, period of communicability, susceptibility and immunity, prevalence, methods of control and general measures to be observed.

When practitioners learn and apply all that is set forth in this publication, the dangers incident to communicable diseases will be greatly modified and physicians will be more effectively adjuncts to public health authorities.

### DR. JOHN P. SUTHERLAND IS ON A MEDITERRANEAN CRUISE

On August 24, Dr. John P. Sutherland sailed from New York on the SS. Roma for a Mediterranean cruise.

COMPARISON OF DISEASE INCIDENCE IN CONNECTICUT WITH 1934  
AND SEVEN YEAR AVERAGE

MONTH ENDING AUGUST 17, 1935

Diseases	1935				Average cases reported for week corresponding to Aug 17 for past seven years	1934			
	Week ending July 27	Week ending August 3	Week ending August 10	Week ending August 17		Week ending July 28	Week ending August 4	Week ending August 11	Week ending August 18
Chicken Pox	22	10	3	8	8	12	14	8	5
Conjunctivitis, Infectious	1	—	—	—	—	1	—	—	—
Diphtheria	9	2	2	4	7	—	—	3	2
Dysentery Bacillary	2	1	1	2	—	1	2	1	—
Encephalitis Epidemic	—	—	—	1	—	—	—	1	—
German Measles	14	5	5	9	—	2	1	3	—
Influenza	—	1	—	—	1	—	—	1	1
Malaria	—	—	—	1	—	—	—	—	1
Measles	68	35	26	15	14	32	32	16	10
Meningococcus Meningitis	1	1	—	1	—	—	—	1	7
Mumps	13	14	9	7	7	13	14	4	—
Paratyphoid Fever	—	1	12	5	—	2	—	2	2
Pneumonia (Broncho)	3	10	6	3	6	5	5	4	2
Pneumonia (Lobar)	4	5	4	3	5	3	6	4	—
Poliomyelitis	5	10	22	43	12	—	1	1	—
Scarlet Fever	15	8	11	8	9	9	4	3	3
Streptococcus Sore Throat	1	—	—	4	—	2	—	1	—
Tetanus	1	1	1	—	—	1	—	—	—
Trachoma	1	—	—	—	—	—	—	—	—
Trichinosis	2	—	—	—	—	—	—	—	—
Tuberculosis (Pul)	17	29	38	20	31	20	32	25	32
Tuberculosis (O F)	3	2	3	1	3	3	2	—	2
Typhoid Fever	2	—	1	5	3	2	3	3	1
Undulant Fever	—	1	2	—	—	1	1	—	—
Whooping Cough	42	51	45	35	43	80	53	43	35
Gonorrhea	50	37	17	21	35	60	63	30	36
Syphilis	56	53	32	23	37	68	61	28	61

Remarks No cases of Asiatic cholera, glanders, plague or yellow fever during the past seven years

INTERNATIONAL UNION AGAINST  
TUBERCULOSIS

The Executive Committee and the Council of the International Union Against Tuberculosis, whose Secretary General is Prof Fernand Bezançon, met in Paris, at the Headquarters of the Union, 66, Boulevard St Michel, on July 10 and 11, 1935, under the chairmanship of Dr Piestrzynski, Under Secretary of State for Poland. Delegates from twenty countries attended this meeting. The administrative meeting of the Council was devoted to the preparation of the programme of the Conference of Lisbon which is due to take place on September 8, 9 and 10, 1936. The agenda of this Conference are now definitely settled and will include the three following subjects: "Radiological Aspects of the Pulmonary Hilum and Their Interpretation", opening report of Prof Lopo de Carvalho (Portugal), "Pri-

mary Tuberculosis Infection in the Adolescent and the Adult", opening report by Dr Olaf Scheel (Norway), "The Open Case of Tuberculosis in Relation to Family and Domestic Associates", opening report by Sir Henry Gauvain (Great Britain).

At the scientific meeting of the Council Prof Lyle Cummins (Cardiff) occupied the Chair. Professor Madsen, of Copenhagen, submitted a report on "Tuberculin Standardization and Tuberculin Tests". Dr Kendall Emerson, Managing Director of the National Tuberculosis Association, gave an account of the work of Dr Long and his collaborators who claim to have isolated the active principle of tuberculin. In a discussion in which Prof Madsen, Prof Lyle Cummins, M Boquet, Prof F Bezançon, Professor Sergeant, Prof Debré, Dr Lesné, Dr Rist, Dr Troisier, Dr Saenz, etc, took part, the respective merits of Pirquet's cuti-

reaction and Mantoux's intradermal test were compared. The majority of the French speakers expressed a preference for the former method while their colleagues from other countries spoke on behalf of Mantoux's test. They all agreed on the advisability of adopting a standard tuberculin and a uniform tuberculin test.

### THE ILLEGAL PRACTICE OF VETERINARY MEDICINE

In a letter to Dr Begg Secretary of the Massachusetts Medical Society Dr E. W. Babson Secretary of the Board of Registration in Veterinary Medicine, has called attention to a number of complaints received by that Board that physicians have practiced one or more branches of veterinary medicine such as vaccinating dogs against rabies and distemper treating fractures and eye troubles, and have collected fees for some of this work.

Section 59 of Chapter 112 of the General Laws of Massachusetts provides that any person who practices or attempts to practice veterinary medicine shall except as provided in section sixty-five be punished by a fine of not less than fifty dollars or imprisonment for not less than two months or both. Exemptions set forth in section 60 permit veterinary service by a person in case of an emergency and by farmers who may be serving neighbors.

No exemptions are given for physicians even in treating their own dogs, so far as the wording of the law appears in the copy submitted Dr Babson evidently does not want to have to proceed against physicians and hopes that general knowledge of the law will relieve him of this necessity.

### RELIABLE APPARATUS

The *New England Journal of Medicine* has received from the American Medical Association a small pamphlet containing a list of the apparatus accepted by the Council on Physical Therapy the first one published under the direction and supervision of the Council. In addition to the list and description of accepted apparatus, the pamphlet contains indications for the use of each type and a statement relative to efficacies and dangers.

This pamphlet is a real contribution on the part of the American Medical Association in behalf of rational therapeutics and is an effort to help place physical therapy on a sound, scientific basis for the benefit of the medical profession.

One of the purposes of the Council on Physical Therapy is to protect the medical profession and thereby the public, against inefficient and possibly dangerous apparatus and against misleading and deceptive advertising in connection with the manufacture and sale of devices for physical therapy.

*Apparatus Accepted* includes all the devices accepted by the Council prior to May 1935. Any physician can obtain this pamphlet free by writ-

ing to the Secretary Council on Physical Therapy A. M. A., 535 North Dearborn Street, Chicago, Illinois.

### MEMBERS OF THE COUNCIL

H. E. Mock, M.D. D.Sc., Associate Professor of Surgery Northwestern Medical School Chicago, *Chairman*

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Olin West, M.D. (Ex-Officio) Secretary and General Manager of the American Medical Association Chicago.

Morris Fishbein, B.S., M.D. (Ex-Officio) Editor of the *Journal of the American Medical Association* Chicago.

Howard A. Carter, B.S., in M. E. Secretary of the Council on Physical Therapy American Medical Association 535 North Dearborn Street, Chicago

### EXTENSION EDUCATION IN PHYSICAL THERAPY

One of the aims of the Council on Physical Therapy of the American Medical Association is to promote extension education in physical therapy.

The Committee on Education of the Council believes that one of the best ways of extending post graduate instruction in physical therapy is to arrange for practical talks to be given before state, county or other medical societies. Experience, especially in New York and Pennsylvania, has shown that such programs are eagerly received by the profession.

The Council is prepared to assist medical societies by furnishing general advice as to programs and by suggesting qualified personnel

The following topics are offered as being of interest to the general practitioner

The Present Status of Physical Therapy

Physical Therapy in General Practice

Body Mechanics and Posture Training

Massage—Indications and Effects

Pathological Conditions Helped by Physical Therapy

Therapeutic Exercise

Radiation Therapy

Hydrotherapy

Fever Therapy

Diathermy, Medical and Surgical, Including Short Wave

Motion pictures on the following subjects are available for loan

Massage—Technic

Graduated Active Motion

Occupational Therapy

Effects of Heat and Cold on Blood Circulation

Effects of Massage on Blood Circulation

In addition, exhibits on physical therapy can be arranged in conjunction with the Committee on Scientific Exhibit, available on request

Anyone desiring help in program planning or loans of films or exhibits is advised to write the Secretary, Council on Physical Therapy, A. M. A., 535 North Dearborn Street, Chicago, Illinois

#### HEALTH OFFICERS' MONTHLY STATEMENT OF VENEREAL DISEASES IN NEW ENGLAND FOR JUNE, 1935

State	SYPHILIS		GONORRHEA	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Connecticut	230	140	129	78
Maine	35	44	53	66
Massachusetts	418	97	526	122
New Hampshire	18	38	16	34
Rhode Island	79	113	52	74
Vermont	20	55	35	97

—Treasury Department Public Health Service

#### WEIGHT REDUCER CAUSES BLINDNESS GOVERNMENT AGAIN WARNS PUBLIC

"Blindness from the use of dinitrophenol for reducing weight has not stopped the use of the drug in spite of repeated warning," says W G Campbell, Chief of the Federal Food and Drug Administration

The eye cataracts observed in dinitrophenol poisoning develop with a rapidity and malignancy hitherto unknown, and result in total blindness within a comparatively short time This drug may

produce acute poisoning, the symptoms of which are nausea, stomach and intestinal distress, sweating, flushed skin, high fever, rapid breathing, and muscular rigor followed by death The drug also damages the liver, kidneys, heart and sensory nerves It produces agranulocytosis, a blood disorder also noted in cases of poisoning with amidopyrine, a common ingredient of medicines for the relief of pain

Dinitrophenol is sold under many fanciful names sometimes accompanied by a statement of the presence of the drug itself Some of the names under which it has been or is now being sold are reported by the Food and Drug Administration as follows Nitromet, Dinitrolac, Nitra-Phen, Dinitriso, Formula 281, Dinitrose, Nox-Ben Ol, Re-Du, Aldinol, Dinitrenal, Prescription No 17, Slim, Dinitrole, Tabolin and Redusols

#### RÉSUMÉ OF COMMUNICABLE DISEASES IN MASSACHUSETTS FOR JULY, 1935

Disease	July 1935	July 1934	5 Yr Average*
Anterior Poliomyelitis	46	20	37
Chicken Pox	379	371	357
Diphtheria	30	43	109
Dog Bite	1208	1405	866
Epidemic Cerebrospinal Meningitis	8	6	5
Gonorrhea	594	559	609
Lobar Pneumonia	163	155	113
Measles	595	775	1100
Mumps	241	207	241
Scarlet Fever	281	270	400
Syphilis	339	291	325
Tuberculosis Pulmonary	332	280	367
Tuberculosis Other Forms	29	40	51
Typhoid Fever	13	17	21
Undulant Fever	3	0	0
Whooping Cough	347	930	673

\*Based on figures for the preceding five years

#### RARE DISEASES

*Actinomycosis* was reported from Boston, 1

*Anterior poliomyelitis* was reported from Andover, 1 Beverly, 1, Boston, 19, Cambridge, 1, Everett, 1, Fall River, 6, Haverhill, 1, Lawrence, 3, Lowell, 3, Lynn, 2, Marblehead, 1, Northampton, 1, Springfield, 1, Waltham, 2, Watertown, 1, Weymouth, 1, Worcester, 1, total, 46

*Dysentery (amebic)* was reported from Worcester 1

*Dysentery (bacillary)* was reported from Quincy, 1  
*Encephalitis lethargica* was reported from Salem, 1  
*Epidemic cerebrospinal meningitis* was reported from Boston, 3, Fall River, 1, Gloucester, 1, Malden, 1, Revere, 1, Shrewsbury, 1, total, 8

*Malaria* was reported from Boston, 1

*Pellagra* was reported from Boston, 1, Salem, 1, Stoughton, 1, total, 3

*Septic sore throat* was reported from Boston 2  
Cambridge, 1 Dighton 1 Fall River 1 Lowell 1  
Lynn, 3 Malden 1 Medford 4 Quincy 1 total 15

*Tetanus* was reported from Boston 1 Lynn 1  
Pelham 1 Quincy, 1 total 4

*Trachoma* was reported from Boston 4 Fitch  
burg 1 New Bedford 1 Revere 1 total, 7

*Trichinosis* was reported from Brockton 1

*Undulant fever* was reported from Williamsburg  
2 Worcester 1 total 3

Infantile paralysis, through July showed nothing  
alarming. The cases were localized in Boston Fall  
River and the northeastern area.

Diphtheria was reported to less than one quarter  
of the July 1932 figure

Typhoid fever showed its usual summer increase  
but compares well with last years low incidence

Pulmonary tuberculosis and lobar pneumonia  
showed a slight, though not remarkable increase  
over the previous years figures.

Tuberculosis (other forms) had its lowest reported  
July incidence

Scarlet fever for the second consecutive month,  
was reported to a higher figure than for the previous  
year which may mean an increased prevalence this  
coming fall and winter

Measles, epidemic cerebrospinal meningitis, chicken  
pox and mumps showed nothing remarkable.

German measles while on the decline for the year  
had its highest reported July morbidity

## CORRESPONDENCE

### AN APPEAL FOR DATA TO BE INCORPORATED IN THE DIRECTORY OF THE AMERICAN MED- ICAL ASSOCIATION

American Medical Association  
535 North Dearborn Street, Chicago  
Directory Department

August 13 1935

Dr Alexander S Begg Secretary Massachusetts  
Medical Society

Dear Dr Begg

The work of revising and compiling the new Four  
teenth Edition of the American Medical Directory  
has been started

After every Directory is published we receive a  
number of complaints from physicians who have not  
been listed as Members or Fellows of the American  
Medical Association Some of these men have pos-  
sibly lost appointments with industrial firms insur-  
ance companies railroads etc., because they were  
not indicated as members. They may have been  
members and let their membership lapse or new  
men in the community who failed to join their local  
society in time to indicate this information in the  
Directory

To eliminate such criticism, we are asking Sec-  
retaries of State Medical Societies and Editors of  
State Medical Journals to cooperate in notifying all

delinquents and eligible applicants that a new Direc-  
tory is going to be published. It would aid greatly  
if a notice were placed in your publication calling  
to the attention of your readers the importance of  
sending in their data promptly when requested and  
the keeping up of their membership in your Society

It will probably be two years, or 1938 before an  
other Directory will be issued

Thanking you for your assistance in this matter  
we are

Very truly yours

F V CARROLL, *Manager*

### OFFICIAL ACTIONS OF THE BOARD OF REGISTRATION IN MEDICINE

State House Boston

August 16 1935

Editor *New England Journal of Medicine*

This is to inform you that at a meeting of the  
Board of Registration in Medicine held August 15  
1935 it was voted to suspend until the first of Sep-  
tember 1935 the registration of Dr Alsworth  
Isherwood of Dracut, Massachusetts for neglect in  
the care of a patient.

Yours very truly

STEPHEN RUBINOW, M.D., *Secretary*

### THE TREATMENT OF EPISTAXIS

August 23 1935

Editor *New England Journal of Medicine*

For several years I have found quite efficacious  
in cases of epistaxis a simple expedient which so  
far as I know has not been published in medical  
books or in first aid manuals

Based upon the fact that the site of most nasal  
hemorrhages is the forepart of the septum, it con-  
sists merely in firmly squeezing or having squeezed  
with the thumb and index finger of either hand the  
sides of the lower or flexible part of the nose as  
closely as possible to the upper or hard part and  
to the adjacent regions of the cheeks and, after  
several minutes gradually releasing the pressure  
unless the bleeding should recur

Yours truly

G W HANDEL

243 Burncoat Street,  
Worcester Mass

### RECENT DEATHS

JACKSON—CHARLES WILLIAM JACKSON M.D., a re-  
tired physician of Springfield, Massachusetts died  
at his home August 21 1935 He was born at North  
Brookfield in 1852 the son of Charles and Phoebe  
(Harwood) Jackson and was a descendant of Major  
Peter Harwood who served in the War of the Revolu-  
tion.

Dr Jackson graduated from the University of  
Vermont Medical School in 1884 He joined the

tary training to the young Medical Corps Reserve Officers on the staff of that institution, who could not attend summer camps. It developed that Reservists not connected with the Clinic desired to attend. It was noted that inasmuch as the military work was given in the afternoon and evening hours, these men were able to attend the strictly professional presentations by the staff of the Mayo Clinic during the morning hours. In recent years, special professional presentations have been arranged as a regular part of the course.

The program will follow the plan which has been so successful in past years. The morning hours will be devoted entirely to professional work in special clinics and study groups. Officers in attendance may select the course they wish to follow from the wide variety of presentations offered. The afternoons and evenings will be devoted to Medico-Military subjects.

The Staff and Faculty of the Mayo Clinic will present the professional training, while the Medico-Military Program will be under the direction of the Surgeon of the Seventh Corps Area (Army) and the Surgeon of the Ninth Naval District (Navy).

Enrollment is open to all Army and Navy Reservists of Medical Departments, in good standing. Applications should be submitted to the Surgeon, Seventh Corps Area, Omaha, Nebraska, or the Surgeon, Ninth Naval District, Great Lakes, Illinois. Enrollment is limited to two hundred.

The Surgeon Generals of the Army, the Navy and the Public Health Service have all signified their desire and intention of being present during at least a portion of the course.

#### INTERNATIONAL MEDICAL POSTGRADUATE COURSES IN BERLIN

The Berliner Akademie für ärztliche Fortbildung, the successor of the Dozentenvereinigung für ärztliche Fortbildung in Berlin, which is managed by the Chief Burgomaster of Berlin, is holding the following medical postgraduate courses in the Autumn of 1935:

- 1 Throat, nose and ear course (30 September 12 October) Fee 120 RM
- 2 Course in infectious diseases (30 September 5 October) Fee 40 RM
- 3 Internal medicine from the point of view of functional pathology and therapy (7-19 October) Fee 60 RM
- 4 The biology of heredity and racial purity in medical practice (7-12 October) Fee 40 RM
- 5 Course in tuberculosis in the City of Berlin's Tuberculosis Hospital "Waldhaus Charlottenburg" in Sommerfeld (21-26 October) Fee 50 RM
- 6 The surgery of intrathoracic diseases with special regard to pulmonary tuberculosis (28 October 1 November) Fee 80 RM
- 7 Special courses in all branches of medicine, with practical work at the bedside and in the

laboratory, are held every month. The fee is 50 80 RM for eight periods of two hours.

For programmes and further information apply to the Geschäftsstelle der Berliner Akademie für ärztliche Fortbildung, Robert Koch Platz 7 (Kaiserin Friedrich Haus), Berlin NW 7.

Foreign doctors and German doctors resident abroad are granted a reduction of fare of 60 per cent on the German Railways Company's lines, a foreign doctor can reduce the cost of his stay considerably by utilizing what are called "registered marks", arrange matters with the local bank before starting.

#### SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

##### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, SEPTEMBER 2, 1935

Wednesday, September 4—  
11-12 M Clinico-Pathological Conference Children's Hospital

Saturday, September 7—  
\*10-12 Staff rounds at the Peter Bent Brigham Hospital

\*Open to the medical profession  
†Open to Fellows of the Massachusetts Medical Society

September 5, 6, 7—American Congress of Physical Therapy will meet at the Hotel Kansas City, Kansas City, Missouri. Program and circular of information may be secured by addressing American Congress of Physical Therapy, 30 North Michigan Avenue, Chicago, Illinois.

September 17, 18, 19—Eleventh Clinical Congress of the Connecticut State Medical Society. For details address Dr. Creighton Barker, 129 Whitney Avenue, New Haven, Conn.

September 30 October 12—International Medical Postgraduate Courses in Berlin. See notice elsewhere on this page.

October 6-20—Seventh Annual Training Course For Medical Reservists at the Mayo Clinic. See page 441.

October 7-10—American Public Health Association will meet in Milwaukee, Wisconsin. For information address the American Public Health Association, 50 West 50th Street, New York City.

October 21 - November 2—1935 Graduate Fortnight of the New York Academy of Medicine. See page 398, issue of May 9.

October 28 - November 1—The Twenty-Fifth Clinical Congress of the American College of Surgeons. See page 1065, issue of May 30.

#### BOOK REVIEWS

**The Nervous Patient.** A frontier of internal medicine. Charles P. Emerson. 453 pp. Philadelphia, London, and Montreal: J. B. Lippincott Company. \$4 00.

This large book is a general review of various mechanisms of the body as they are reflected largely in nervous symptomatology. The approach is from the general field of medicine toward psychiatry, rather than from the field of psychiatry toward medicine. Because of this the book has considerable value, for it not only forms an interesting correlation between mental and nervous states and somatic disease, but, in addition, it reviews nearly all the common disease conditions of the body. Its chief weakness is its diffuseness. Had the author covered a less extensive field, the book would have been of more value. The short bibliographies following each chapter, moreover, are not a critical review of the most important literature on the subject.

Wish and Wisdom Episodes in the vagaries of belief Joseph Jastrow 394 pp New York and London D Appleton-Century Company Inc. \$3.50

Professor Jastrow who is well known as a psychologist and the writer of popular books on the subject has made a careful review of the history of erratic beliefs many of which have had a wide influence in the course of civilization. Here one finds the story of ancient miracle-mongers the cult of the magnet, the ouija board psychic adventures and animal geniuses queer side-shows of sciences such as numerology palmistry the philosopher's stone auras and vibrations ectoplasm and other psychic phenomena. The book is well written and of considerable interest, for it contains much material not easily found elsewhere. Its value as a serious book however is much impaired by the lack of references. A few illustrations are of interest. As a popular study of the queer reactions of the human mind this book is to be recommended.

Martini's Principles and Practice of Physical Diagnosis Edited by Robert F. Loeb From the authorized translation by George J. Farber '13 pp Philadelphia, Montreal and London J. B. Lippincott Company

This volume is a translation of a German work and in 300 pages gives a comprehensive survey of what is essential in physical examination of the patient.

It is difficult to dissociate physical diagnosis disease pictures and physiology but by clinging to bare essentials the authors are able to explain the causes of physical signs without incorporating chapters from general medicine. The largest part of the book is devoted to examination of the heart and lungs with the combination of signs found in common diseases tabulated in convenient form.

If anything the book is too concise but with physical diagnosis taught largely in hospitals as it is today students will find a ready elucidation of the brief descriptions in their clinical material. The translators have added a very valuable textbook to clinical teaching in English.

Clio Medica Edited by E. B. Krumhaar XV French Medicine M. Laignel-Lavastine and M. Raymond Molinry 187 pp New York Paul B. Hoeber Inc. \$2.50

This is a well written short, concise book on the history of French Medicine. It is one of a series of historical narratives aimed to give the reader the high spots of medical history with the hope that his interest in this field will be stimulated to further reading.

The chapters dealing with French Medicine during the Renaissance and the 17th and 18th centuries are very instructive and interesting. Short accounts of Ambroise Paré Paracelsus Rabelais and Fagot are given. The history of the Faculty of Medicine of Paris and the traditional rivalry between the surgeons of the above faculty and those

associated with the College of Saint-Come is very fascinating.

The book is inexpensive, and can be read in a few hours.

**Onchocerciasis** With special reference to the Central American form of the disease. Contributions from the Department of Tropical Medicine and The Institute for Tropical Biology and Medicine. No. VI. Part I by Richard P. Strong. Part II by Jack H. Sandground. Part III by Joseph O. Bequaert. Part IV by Miguel Munoz Ochoa. 234 pp Cambridge Harvard University Press

Pursuant to expeditions to Guatemala in 1931 and 1932 to study *Onchocerca coactiensis* the blinding filaria Dr. Richard P. Strong and his Associates have published an important monograph on Onchocerciasis.

Part I of the monograph was written by Strong himself. Among other topics, it deals with the distribution of onchocerciasis, its epidemiology and its clinical and pathological characteristics. Other sections of Part I describe the mode of transmission and discuss prophylaxis and treatment as well as other important aspects of onchocerciasis.

In Part II Jack H. Sandground discusses questions of taxonomy relating to the Genus *Onchocerca*.

Joseph O. Bequaert, in Part III deals with the various species of black flies or *Simuliidae* of Guatemala and devotes special attention to those found in the region in which onchocerciasis is endemic.

In Part IV Dr. Ochoa, of the Health Department of Guatemala contributes additional facts of epidemiological significance.

The monograph as a whole is the most comprehensive work that has yet appeared on onchocerciasis. It contains much new information points the way to control of the disease and possibly to its eradication. The authors found that, not one only, but at least three species of *Simulium* can transmit onchocerciasis. The various phases of the work are well illustrated with photographs, photomicrographs or colored plates.

**Epidemics and Crowd Diseases.** Major Greenwood 409 pp New York The Macmillan Company \$5.50

The author states that "this book is based on the instruction which I give to professional students at the London School of Hygiene and Tropical Medicine but it is not a text book prepared with an eye to an examination syllabus. I have tried to cater to all educated men and women interested in the communal aspects of health and disease—

Such readers will find the book most interesting particularly in its historical aspects. Its style is philosophical. The author does not hesitate to qualify a previous deduction whenever the subsequent consideration of some other phase of the subject seems to make it desirable to do so. His style however often makes it difficult to tell



whether he is stating his own conclusions or presenting the ideas or methods of epidemiologists who assume that the factors, variable or otherwise, in the etiology of diseases which handicapped Hippocrates and Galen, have been eliminated by modern research to such an extent that, if a large group of human beings be exposed to infective agents with varying pathogenic possibilities and simultaneously subjected to mysterious biological variables, the consequences may be expressed by means of a mathematical formula

Whether with the author's endorsement or not, he shows us examples of the exercise of selectivity with respect to observations which serve to provide premises for logical conclusions, of a faith in records of morbidity and causes of death practically amounting to gullibility, and of the employment of mathematical devices in ways which remind one of the confused student who tries to solve an algebraic equation by differentiating it, and which leads the reader to expect to see that somebody has demonstrated how something can be intergraded to explain why epidemic manifestations of anterior poliomyelitis abruptly cease at the very season of the year when epidemics of personal contact diseases regularly begin

A difference in the point of view will likewise lead a reader of this book, who has felt personal responsibility, military or civil, for the maintenance of the health of large collections of human beings, to note the author's failure to observe that epidemic curves may be changed in shape by an intelligent practical recognition of the fact that contagious diseases are contagious before a positive diagnosis is possible, that the absence of positively diagnostic symptoms in the course of influenza and the freedom with which English physicians are accustomed to employ this term, make deductions from records of the relative prevalence of influenza in different English schools at different times extremely precarious, and also in connection with the same disease, that its mortality curve will be determined by the opportunity which those who may be stricken by a relatively harmless primary infection are given to acquire also hemolytic streptococci and other pathogenic potentialities with murderous proclivities as secondary invaders

**Ideal Health or The Laws of Life and Health** Alexander Bryce Third Edition 340 pp Baltimore William Wood & Company \$2 75

This book is one which should make a strong appeal to the younger practitioners, whose medical scholastic training of four years supplemented by two years at least of internship, has lacked a coherent, individualized course in the all important, everyday, rational work of taking good care of their bodies and preserving their health. These matters which vitally concern everybody are supposed to come to us by heredity, family training, earliest maternal instruction, nurses' upbringing, racial customs, traditions

and conventionalities, but most of all from home influences. Unfortunately these vital matters are left too much to chance, or one might say they are "everybody's business", and therefore they are nobody's special business

Dr Bryce, the author of this practical and useful little book, makes it his special business to sum up traditions, customs, racial habits, hygienic advice and theories, universal experiences, fads and scientific dicta, in twelve chapters. Each chapter has a sort of "golden text," or so-called "law" of health as a beginning. The first two chapters have the same law as a text, namely, Law I "Eat three meals each day of plain, wholesome, solid, nourishing food at or about the same time as far as possible." Chapter I is devoted to "Food in General" and Chapter II to a detailed consideration of food

The concluding chapter instead of illustrating any special law has for a motto "Do Unto Others as Ye Would that They Should Do Unto You," which is applicable enough for its subject, "Eugenics, the Science of Race Culture." Each of the twelve chapters concludes with an admirable, succinct and adequate summary

Dr Bryce does not seem to be strongly partisan in his views or devoted to any special theories, but discusses his various subjects (and they are numerous) from a very conservative, common sense standpoint, in a scholarly way without exuberance or overenthusiasm. Although a "total abstainer" he is not fanatical. He does not recommend the free and constant drinking of tea, coffee and alcohol, or the use of tobacco. One might say everything having to do with food, digestion, drink, sleep, rest, exercise, bathing, work, recreation, effect of the mind on the body, regularity, habit formation, air, cleanliness, clothing—in short everything that influences the body for good or evil, is very briefly considered by Dr Bryce, and an opinion in favor of or in opposition to, is definitely expressed

No new theories, facts or opinions are given but the sum of knowledge concerning the laws of health and how to keep well are presented, in clear, unmistakable language, in an attractive and convincing manner. The book is sure to make friends for itself

**The American Illustrated Medical Dictionary** A complete dictionary of the terms used in medicine, surgery, dentistry, pharmacy, chemistry, nursing, veterinary science, biology, medical biography, etc., with the pronunciation, derivation and definition W. A. Newman Dorland Seventeenth Edition 1573 pp Philadelphia and London W B Saunders Company \$7 00

An octavo volume of 1573 pages with 945 illustrations including 283 portraits, this edition represents three years' work under editorial supervision of the Staff of the American Medical Association

The text is clear, the paper and binding of excellent quality

**Methods and Materials of Health Education.** Jesse Feiring Williams and Fannie B Shaw 331 pp New York Thomas Nelson & Sons

This book is written mainly for educators. In it the authors have shown how in a modern community, the school system may function decisively in promoting and safeguarding the health of the school population. For the authors "health education" signifies far more than mere instruction in personal hygiene. It means the integration of all the forces that the school may exert for the healthful mental and physical development of the school child.

In the first part, under the heading "Nature of the Child" are discussed the various phases of normal mental and physical growth and development, the factors which influence them and the chief causes of morbidity and mortality affecting children. Under the caption "Healthful School Living" are discussed the various health-promoting elements in the school environment. Under "Health Service" are discussed the subjects of physical examination, the correction of physical defects and the protection of the school population from communicable diseases including tests for susceptibility prophylactic vaccinations and inoculations.

The section on "Health Instruction" deals with methods of imparting correct and useful instruction on personal hygiene and healthful living to school children.

The final section deals with a subject too often neglected, the personal health of the teacher. Statements in the book are supported by many references. This is a useful textbook for teachers.

**Diet and Physical Efficiency.** The influence of frequency of meals upon physical efficiency and in industrial productivity. Howard W Haggard and Leon A. Greenberg 180 pp New Haven Yale University Press \$3.00

In an attempt to discover and formulate the best times of eating the investigators have observed and described in this book, the effects of variations in the consumption of meals on the blood sugar respiratory quotient, and physical efficiency of human beings. Most of the observations were made on factory workers and some of them were found to increase their productivity if five instead of three meals of much the same kind and amount of food were consumed. And the observations made on the blood sugar and respiratory quotient of children, students, and men and women doing light and heavy work, were also found advantageous, if more than three meals were ingested. The results of this study appear beneficial from the standpoint of productivity for a short period on the other hand as Americans are generally considered to overeat at three meals, such a regimen is likely to prove inimical to health if carried out for a long period. The book contains many figures and tables, a few illustrations, and a complete bibliography and as it

is devoted to a special field of nutrition should be of interest to manufacturers and specialists in nutrition.

**The International Medical Annual.** A year book of treatment and practitioner's index 1935 Fifty Third year Edited by H. Letheby Tidy and A. Rendle Short. 522 pp Baltimore William Wood & Company \$6.00

This volume edited by H. Letheby Tidy and A. Rendle Short, marks the thirty-third year of its publication. In the introduction the editors briefly review the major achievements of medicine in the past year. The main part of the book consists in an encyclopedically arranged review of the most important articles in the entire field of medical literature. The long list of contributors is selected from the leading men in their respective specialties in Great Britain.

The skill that has been shown in condensing such a great amount of material into one volume is truly remarkable. The generous use of illustrations, the bibliography accompanying each article and the detailed general index add greatly to its practical value. It is a quick reference book that should prove useful to every practitioner of medicine.

**Studies from the Rockefeller Institute for Medical Research Reprints.** Volume 93 588 pp New York The Rockefeller Institute for Medical Research. 1935

There are two groups of articles of special interest in this volume containing a wide variety of material from the laboratories and hospital of the Rockefeller Institute. The first group concerns the work of Page on pressor and depressor substances obtained from the human blood. The work is done with unusual care and accuracy and should do much to clarify the rather confusing statements at present current in the literature.

The second group consists of the studies on the virus-induced tumor of rabbits reported by Peyton Rous and his collaborators. This Shope rabbit papilloma is one of the most interesting of the animal tumors owing to its known etiology and the marked similarity of the growth to certain neoplasms. At times this reaction to virus has some of the characteristics of a malignant neoplasm.

From the standpoint of those interested in legal medicine Landsteiner's able review "Forensic Application of Serologic Individuality Tests" will be of definite interest.

**Diseases of Children.** Edited by Hugh Thursfield and Donald Paterson Third Edition. 1152 pp. Baltimore William Wood & Company \$10.00

Thursfield and Paterson's third edition of *Diseases of Children* is not just another book on a subject already very satisfactorily covered in English. It is one of the most comprehensive of pediatric texts

and is written by thirty six contributors who have in this edition again successfully added the important advances in this field. The reviewer feels that this textbook can be especially recommended to American students and physicians interested in this subject. The reader is always impressed by Cameron's contributions. This author's presentation of "Functional Diseases of the Nervous System" is illustrative of many almost classical textbook expositions of clinical subjects found in this volume.

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**Recording of Local Health Work** W F Walker and Carolina R Randolph 275 pp New York The Commonwealth Fund, London Humphrey Milford, Oxford University Press \$2 00

Obviously the records kept by local health organizations are the only means for evaluating the effectiveness of the work, determining the trends of communicable and other diseases and of demonstrating to taxpayers and appropriating bodies the dividends on their investment in health protection.

Yet the inadequacy of the records kept are too often the weakness of an otherwise aggressive and effective local health organization. By the presentation of the system of record keeping set forth in their book, Dr Walker and Miss Randolph have made a useful contribution to the Science of Public Health Administration. The book constitutes a complete manual of record keeping in local health work. A series of standard forms for records approved by the Committee on Administrative Practice of the American Public Health Association are presented with the necessary explanatory comments. This is a book which merits a place on the bookshelves of local health offices. The practical application of its principles of record keeping would give the local health officer a firm grasp on the local health situation and point the way to obvious means for strengthening and improving local health organizations. Reports based on such records would give the State Health Officer an accurate picture of the activities of local health organizations and greatly facilitate the work of supervision, standardization and coordination.

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**The Surgical Clinics of North America** June, 1935 Volume 15, Number 3 Chicago Number 782 pp Philadelphia and London W B Saunders Company Paper, \$12 00, Cloth, \$16 00 net

The feature of this issue of the Surgical Clinics is a symposium on fractures. Speed reports two cases of unusual nerve involvement, one with a fracture of the head of the fibula and the other following an elbow fracture with overgrowth of the head of the radius. Strauss presents a rather detailed discussion of fracture of the femur in children, emphasizing the value of Russell traction. Some new points in the treatment of fractures of the sternum are brought out by Ellis.

His careful methods of examining the back are

outlined by Magnuson while Kreuscher discusses the surgical aspects of backache.

Among the other more interesting clinics are one by Bettman on injuries of the chest and Bevan's able presentation of the problem of the treatment of peritonitis.

The other clinics include several that help make this issue one of practical value to all surgeons.

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**The Story of Medicine in the Middle Ages** David Riesman 402 pp New York Paul B Hoeber, Inc \$5 00

The revival of scholasticism in philosophical circles in these days is accompanied by renewed interest in other phases of medieval thought and life as shown by the biographies, historical novels and even the rewriting of history itself. Since scholasticism is the forerunner of modern scientific thought it is natural that a review of medicine in the Middle Ages should be made.

This book—intended largely as a text for medical students—tells the story of medieval medicine in an interesting although familiar manner. Even though the presentation is not so sympathetic with those not-so-distant years, as one might wish, the facts presented closely agree with the writings of other serious students of those times (Sudhoff, Walsh, Sigerist, etc.), and the differences lie in emphasis and interpretation. Most of the information can be obtained, in a scattered way, elsewhere, but the material is so pleasantly assembled and, in addition to the factual medical history, the pages are filled with so many interesting digressions, anecdotes and short dissertations on universities, guilds, monasticism and other aspects of medieval life that had important bearings on medicine, that the student accustomed to thinking only of the feudalism and tenure of the Dark Ages, will find the book refreshing. It is thoroughly indexed and adequately illustrated and ought to serve its purpose rather well.

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**L'Examen du Malade** Guide clinique de l'étudiant et du médecin Médecine, Chirurgie, Obstétrique, Neurologie et Spécialités P Delmas, G Giraud, et al 318 pp Paris Masson et Cie 30 fr

This small volume of three hundred and eighteen pages on the examination of the patient is extremely well done. While not a treatise on diagnosis or physical diagnosis, the book should serve as a useful guide to students and general practitioners. It is indeed interesting to note the stress placed on "Observation" or, what we call inspection, and the signs that can be observed in various diseases from inspection alone.

The specialties such as ear, nose, throat, gynecology, neurology, pediatrics and others are adequately discussed in reference to signs and symptoms, and presented in a very practical manner.

The last chapter is devoted to laboratory procedures, and the authors mention the precautions one should take in the interpretation of them.

# The New England Journal of Medicine

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SEPTEMBER 5, 1935

NUMBER 10

## The Massachusetts Medical Society

### SECTION OF SURGERY

Ball Room Assembly, Hotel Statler Boston, Tuesday, June 4, 1935, 9.15 A.M.

#### PRESIDING

Ralph W. French Fall River Chairman.  
E. Parker Hayden Boston, Secretary

**CHAIRMAN FRENCH** If the meeting will come to order we will begin. Before introducing the first speaker I will state that this year we have made some change from the procedure heretofore followed. Instead of listening to four papers each followed by discussion this year we have provided for eight papers and no discussion. It is obvious that

we could not have any discussion and listen to that number of papers too. We await your reaction to this change in program.

The first paper this morning is entitled Two Hundred Acute Perforated Ulcers of the Stomach and Duodenum from the Boston City Hospital by Dr. William Reid Morrison of Boston. Associate Professor of Surgery at the Boston University School of Medicine and Visiting Surgeon Boston City Hospital.

## TWO HUNDRED ACUTE PERFORATED ULCERS OF THE STOMACH AND DUODENUM FROM THE BOSTON CITY HOSPITAL\*

BY WILLIAM REID MORRISON, M.D.†

ONE of the most serious of surgical conditions which medical men encounter in their practice, is perforation of an ulcer of the stomach or duodenum.

Since the Boston City Hospital admits more acute surgical emergencies than any other hospital in New England a review of two hundred recent consecutive cases may reveal findings of value. The writer has been particularly interested in this type of stomach surgery, having been given by the surgical staff of the Boston City Hospital the special assignment for study and operation of all perforated ulcers of the stomach and duodenum on the five general surgical services some years ago.

An average of forty to fifty acute perforations are operated upon each year at the hospital, these cases under consideration comprise admissions from the year 1930 to 1935.

The ages of these patients varied from fifteen to seventy eight years. Perforations may occur at any age cases are on record in the very young and very old, but the decade in which our perforations most frequently occurred was between thirty five and forty five years of age.

Women seldom develop perforated ulcers there were but five females to one hundred and ninety five males.

One hundred and fifty five were typical obvious acute perforations. The atypical case was diagnosed cholecystitis eight times, appendicitis nineteen times, other diagnoses were pan-

creatitis, peritonitis, alcoholic gastritis, cardiac disease intestinal obstruction, renal calculus, and surgical observation.

The typical acute case has a history of ulcer for years, described as persistent indigestion, dyspepsia, distress in the pit of the stomach, etc. in about seventy five per cent of the series. Forty six, about twenty five per cent, gave no history of prior stomach trouble whatever the acute perforation coming out of a clear sky. Twenty nine patients did not vomit at perforation, and eighteen had neither nausea nor vomiting. Therefore one should not hesitate to make a diagnosis of perforation, in the face of positive physical findings with absence of prior symptoms or absence of vomiting. To be sure everyone has had experience with gas and indigestion at times following indiscretions in diet.

Sudden, terrific, pain in the upper abdomen, usually the epigastrium often associated with nausea and vomiting doubles the patient up and the victim writhes in intense agony. Evidence of surgical shock is present at the time of perforation but in several hours the patient recovers from the shock symptoms, and may be up and about the house smoking a cigarette or sitting in a chair. The epigastric pain may be referred to the right or left shoulder, to the umbilicus or right lower quadrant.

Most of our patients, one hundred and thirty two had normal temperature, pulse and respiration, on being admitted to the hospital a matter of several hours after perforation, having recovered from their surgical shock. Sixty-eight had elevation of pulse and temperature above

\*Read at the Annual Meeting of the Massachusetts Medical Society Section of Surgery June 4, 1935.  
†M. Reid Morrison, B.S.—Senior Visiting Surgeon Boston City Hospital, Second Surgical Service. For record and address of author see This Week Issue page 499.

one hundred It is most important that general practitioners be not misled by normal or nearly normal temperature, pulse and respiration, and as above mentioned, the frequent lack of prior ulcer story

The interval between perforation and operation is of vital importance, because the earlier the patient is operated on, after recovering from shock, the better the chance for recovery, and best end result One hundred and forty-four perforations were operated on within six hours Most cases operated on within six to eight hours or less have an excellent result, our shortest interval was one and one-half hours, the longest was thirty-six hours Fatal results are caused by delay on the part of the patient, family doctor, or surgeon Administration of home remedies, drug store advice, morphine administered to allay the pain, and allow procrastination, often result in the death of the patient Incorrect diagnosis of "unknown gastrointestinal disease", "heart trouble", intestinal gripe, or intestinal obstruction interferes with proper care

It is quite significant that our recent cases have been better diagnosed, and sent into the hospital for operation much earlier, than in the last decade, demonstrating better knowledge and treatment of this emergency by the general practitioner

Palpation of the abdomen, with the board-like rigidity caused by involuntary abdominal spasm, associated with acute tenderness, particularly in the epigastrium, is of prime importance General physical examination of the patient should not be neglected If the systolic blood pressure is below fifty to eighty millimeters of mercury, it is obvious that the patient is too poor a risk for operation, until the blood pressure is raised The writer was the first surgeon at the Boston City Hospital to demonstrate air in the peritoneal cavity, which had escaped from the stomach or duodenum through the perforation

Fluoroscopic or x-ray pictures of the patient in the erect position may show a positive pneumoperitoneum, the presence of air in the peritoneal cavity, usually between the liver and diaphragm which effectively establishes the diagnosis Absence of air does not rule out perforation Pneumoperitoneum was present in about half of the cases examined by x-ray It is apparent that any patient in poor condition should not be x-rayed at all Air may be demonstrated between the spleen and diaphragm, or along the side of the abdominal wall, with the patient lying on the side The air may escape into the peritoneal cavity from the perforation in either the stomach, or intestines A large layer of air may be found under the right and left portions of the diaphragm, or merely a small bubble may appear

The white blood count may be raised, but if

normal, it does not rule out the presence of perforation

The diagnosis of a typical case is made on the history of the case, the usual terrifying epigastric pain, tenderness in the epigastrium, or all over the abdomen, board-like rigidity of the abdominal muscles, and if present, pneumoperitoneum Absence of liver dullness, and tenderness in the pelvis on rectal or vaginal examination, with elevation of white blood count, aid in making a correct diagnosis

Preoperative care consists of shock treatment particularly subcutaneous injection of salt solution or intravenous glucose, or blood transfusion

Ether anesthesia was given in 100 cases, spinal injections in ninety-five, local anesthesia in two cases, which were very poor operative risks Three patients were not operated on Our experience has been to use spinal anesthesia in the better risk patient, and not in the poor risk class

In most of this series a right rectus incision was used, a transverse incision is preferable for local anesthesia.

A notation of the presence or absence of air coming out of the belly should be made Filling the abdominal wound with salt solution, just prior to opening the peritoneum, allows air to bubble out, if present

Presence of free fluid and its type should be observed, and a culture should be taken of the peritoneal cavity which is usually negative The type of fluid in the belly depends on what the stomach or duodenum contained at the time of perforation Thin mucoid dish-water stomach contents containing meat, baked beans, milk, etc, may be found, or bile stained pea soup varieties

At perforation, the stomach contents are shunted by the root of the mesentery, toward the right lower quadrant, then into the pelvis, accounting for the frequency of right lower quadrant pain simulating appendicitis

The escaped stomach contents adjacent to the abdominal wound should be removed with gauze strips Certain surgeons insert a mechanical sucker into the pelvis to remove stomach contents The writer feels that this is an unnecessary procedure, for it injures the intestines, and is not needed, for a chemical peritonitis is present in the early cases, and the peritoneum takes care of what little infection may be present

In this series of two hundred cases, a single perforation was found in each instance We have a case on record which had two acute perforations at the same time, one of which was overlooked, therefore the surgeon should hunt for more than one perforation Re-perforation occurred twice

Perforations usually occur at the pylorus,

about an inch on either the duodenal or gastric side, and on the anterior surface of the stomach or duodenum.

Less frequently they are found on the posterior wall of the stomach, which occurred in two cases or on the lesser curvature of the stomach in twenty five cases, rarely on the gastric greater curvature with only two cases of this type in this series. The perforation is usually the diameter of a slate pencil and is surrounded by an area of induration the size of a silver quarter. In none of this series was bleeding noted. I have seen changed blood in the peritoneal cavity at the site of perforation but twice.

The perforation was closed by either purse-string or mattress sutures, or both in our cases. The ulcer may be excised with either knife or cautery, or let alone. No operative procedure was needed in one case since the great omentum closed the perforation.

The perforation may be wholly or partly sealed up by the omentum, intestine, liver gall bladder, or by a piece of food, or by fibrin.

The location of the perforation was not found in one case, although baked beans were floating among the intestines in the free peritoneal cavity. At autopsy five days later, the site of perforation could not be found by Dr. Mallory or his assistants.

The exact site of perforation cannot be determined in most cases, as the pylorus usually cannot be palpated because of adjacent induration and the pyloric vein is usually obliterated.

Excision of the indurated area with the perforation, allows the surgeon to insert a finger in side the stomach and duodenum, definitely locating the site of perforation, and allowing palpation for other ulcers, if present. Closure by interrupted mattress gastrointestinal sutures of the normal stomach or duodenal wall over the site of perforation is the procedure of choice.

Attempts to suture through the indurated area are futile as the stitch cuts through the porky tissue if it is pulled tight enough to close the perforation. The great omentum is usually sutured over the site of perforation.

Twenty two cases were closed without drainage. One hundred and seventy-eight were drained. The abdominal wound or a stab wound may be used for drainage.

The multiple drained cases may develop more residual abscesses than those undrained.

The writer believes that cases which have been perforated under six to eight hours in which the intestines are smooth and shiny and not dull and lustreless should have the abdomen closed without drainage. If a drain is inserted, it is best placed as a suprapubic wick

to the pelvis. The writer does not believe that the abdominal wound should be drained at all, as it invites evisceration, or a gastric or duodenal fistula. Multiple drainage is to be avoided as unnecessary but the patient often survives despite it.

In such cases the peritoneum is closed by the writer with continuous catgut sutures then the wound is washed out with salt solution to clean out stomach contents and bacteria. Other wise semi-septic wounds result, with evisceration occasionally. In six cases of this series, rupture of the abdominal wound occurred. Stay sutures should not be removed under fourteen days, and adequate support for stitches should be given by the scultetus or many tailed bandage.

If the pylorus is occluded, a posterior gastroenterostomy may be needed, a pyloroplasty may be done rather than posterior gastroenterostomy, if the outlet of the stomach is narrowed by the operative procedure.

After treatment consists of head rest, four hours having elapsed in spinal anesthesia cases nothing by mouth for twenty four hours, then sips of hot water, sips of cold water later followed by equal parts of milk and lime water then a Sippy diet. Some surgeons prefer to insert a duodenal tube through the nose into the stomach for several days, postoperatively to avoid vomiting.

There were forty three deaths, a mortality of about twenty-one per cent.

Complications were general peritonitis, bronchopneumonia, pelvic abscess, surgical shock, infection of the wound, cardiac disease, gastric and duodenal fistulae. Other sequelae were septic parotitis, pulmonary tuberculosis, embolism, empyema, gastritis, cellulitis of the neck, psychosis, liver abscess and jejunostomy for intestinal obstruction.

Forty-six patients returned for follow up, about twenty five per cent of the series. Forty three had a satisfactory result, three were unrelieved, despite being on a careful medical diet.

CHAIRMAN FRENCH: We will pause for a moment just to name a Nominating Committee who will bring in names for Chairman and Secretary for this Section for next year. I will name Dr. William O. Faxon, Dr. Lester Whitaker and Dr. G. A. Moore.

The next paper is entitled "The Treatment of Recurrent Varicose Ulcer" by Dr. Edward A. Edwards, of Brookline.

DR. DAVID CHEEVER: Mr. Chairman, may I ask whether it would be wise to have a call for discussion?

CHAIRMAN FRENCH: We had planned Dr. Cheever not to have any discussion and just try it out, something different this year. To have eight papers without any discussion we thought might be more interesting than to have four papers with discussion.

## THE TREATMENT OF THE RECURRENT VARICOSE ULCER\*

BY EDWARD A EDWARDS, M D †

**N**O varicose ulcer, whether or not it is seen for the first time, can be rationally managed except by treatment of the underlying cause, i.e., the varicose veins. Any other treatment directed to the ulcer itself, such as the application of salves, pressure dressings or bed rest, merely acts in a symptomatic fashion, healing the ulcer temporarily but giving no protection against recurrence.

One cannot always see the varicose veins in the ulcerated limb. The really bad limb is apt to be greatly swollen and edematous to the point of board-like induration. In consultations on such a limb, one hears much talk of "deep varicose veins" with the inference that the varicosities are beneath the deep fascia, a condition that actually does not exist unless the patient has the unusual condition of congenital venous angioma. Or the referring physician may call the condition by the continental name of "ulcus cruris", a term that infers that ulcers of the leg can exist as a peculiar primary state. To speak in such terms is not to take cognizance of a mass of evidence from dissections and other visual preparations, and serves merely to detract the surgeon from demonstrating the exact pathology and instituting a rational line of treatment.

On seeing the patient for the first time, the examiner must try to satisfy himself whether the ulcer has the characteristics of a varicose ulcer. A varicose ulcer is usually situated in the lower third of the leg, has an irregular, dirty, and cyanotic base, is surrounded by brownish pigmentation and edema. If one rules out trauma, syphilis, and diabetes such an ulcer must then be called varicose, remembering that any one of these conditions may contribute to a varicose ulceration. Having therefore, labeled the ulcer varicose, the surgeon can then try to determine the exact state of the veins in the given case.

Our experience at the Boston City Hospital has convinced us that the treatment of recurrent varicose ulcers is simply the treatment of recurrent varicose veins. Through the study of these cases of recurrent varicose veins we have evolved certain criteria of treatment which I have discussed fully in a previous paper<sup>1</sup>.

We had noticed, in common with previous observers, that the processes of recanalization and widening of previously normal veins went on

\*Read in abbreviated form at the Annual Meeting at the Massachusetts Medical Society Section of Surgery June 4 1935 and here printed in extenso. From the Circulatory Clinic of the Boston City Hospital and the Dept of Surgery Tufts Medical School. Aided by a grant from the Charlestown Research Fund Tufts College Medical School.

†Edwards Edward A—Assistant in Surgery and member of the Circulatory Clinic Boston City Hospital. For record and address of author see "This Week's Issue" page 499.

most swiftly and completely in the severe cases of varices<sup>2,3</sup> (Figures 1, 2, 3). These severe cases of varices are those in whom there is a dilatation of the great saphenous vein, with a resulting valvular incompetence and a down-

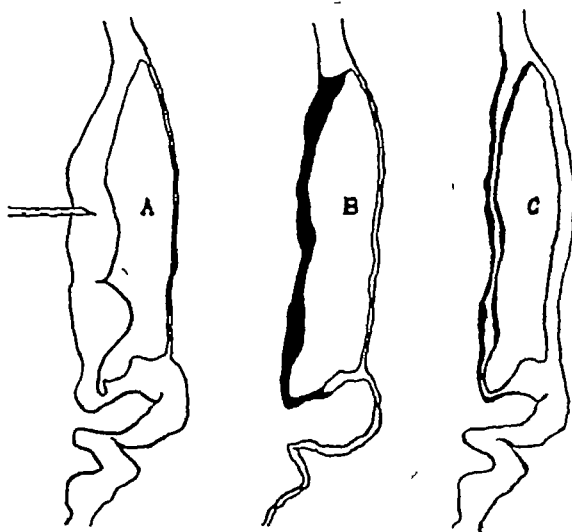


FIGURE 1 The two modes of recurrence of a varix

In A sclerosing solution is being injected into the middle of a dilated venous trunk. A normal collateral also communicates with the varix below. In B the entire dilated trunk is obliterated and the varix below is collapsed. In C the varix has been reformed by (1) recanalization of the previously sclerosed trunk and (2) dilation of the previously small collateral. Either or both of these two processes may occur in any given case. (From Surg Gynec Obst 59 916 1934)

ward flow of blood. That is, a so-called singly positive Trendelenburg test.\* For these cases we section and ligate the great saphenous vein at the sapheno-femoral junction, and then deal in the same way with every one of the entering tributaries at this point (Fig 2).

This section of the saphenous and all its tributaries at this highest level must be the starting point of treatment of the severe varices, and insures against recurrence. The veins below are subsequently treated by injection.

The other two classes of varices which I consider of less severity are as follows. First, small

\*Trendelenburg's description reads: "Lay the patient flat lift the leg up vertically the varices empty. Now compress the saphena magna with the finger. Stand him up quickly. The varices fill slowly but not so much as previously. Now let the finger go and the varices fill very quickly and fully by a column of blood which is seen to shoot downward in the saphena magna."

This is now commonly called a singly positive Trendelenburg test. It denotes insufficiency of the saphenous valves.

The term negative Trendelenburg test refers to that result in the above experiment in which there is no increased or rapid distention of the varices either before or after the compressing finger is removed from the saphenous. It indicates competency of the valves of the saphenous as well as of the perforating veins connecting the deep with the superficial veins.

A doubly positive Trendelenburg test shows itself as a quick filling of the varices before the release of the saphenous as well as a downward reflux after its release. It indicates (1) incompetency of the valves of the perforating veins with a flow from the deep to the superficial veins (the reverse of normal) as well as (2) incompetence of the valves of the saphenous veins.

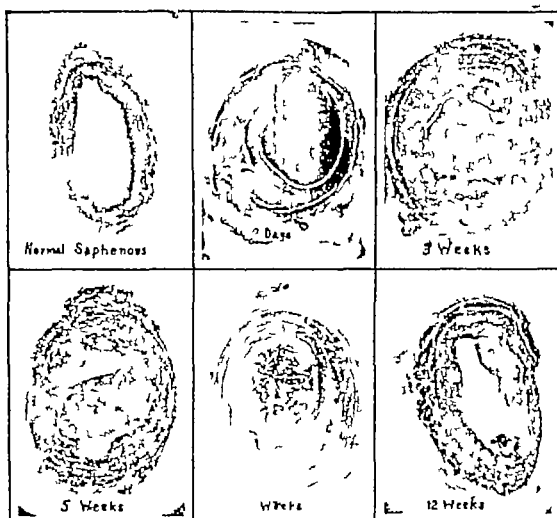


FIGURE 3 The process of recanalization

Two days after injection the clot fills the varix. The cleft is obliterated by entering tributary. At three weeks the clot is but endothelial lined cleft. At five weeks, the organized tissue of the capillary channels are so loose that the capillary channels are so loose. At eight weeks the organized tissue has formed a gross mass. At twelve weeks the organized tissue has shrunk in size but the lumen is complete and but little smaller than that of the normal saphenous. The vein wall remains greatly thickened.

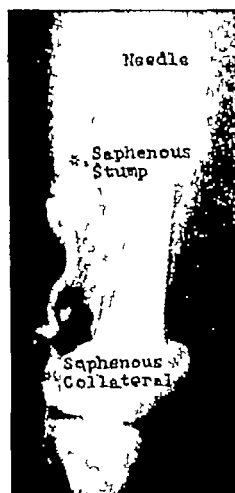


FIGURE 3 Regeneration of saphenous varices by dilation of previously normal collateral veins.  
The patient had had an excision of the saphenous up to the middle of the thigh. The injecting needle is shown in the proximal stump of the saphenous. (From New Eng J Med. 99 1227 1923.)

varices of the great saphenous vein when that vein does not show a reflux of blood, and secondly all varices of the lesser saphenous vein whether large or small. Delbet<sup>4</sup>, and more recently McPheeters<sup>5</sup> have demonstrated the high pressures that exist in the first class of varices noted and also the tremendous increases incident to exercise standing coughing etc. Delbet further made the statement that varicose ulcer occurs only in those patients with very high venous pressure in the leg. Additional pressure studies are being made which would indicate that these high pressures occur exclusively in the first class of varices noted above. Clinically, I have been looking for but have not yet found, any single case of ulcer occurring when the varices were of the lesser saphenous vein or when the greater saphenous vein did not show valvular incompetence and a positive Trindelenburg test.

The suggestion comes to mind that the vein in any case of ulcer should first be ligated without bothering to find out the state of the varices. We have, however, not done this, but have in each case of ulcer attempted to determine the exact state of the varices, and the result has been that in each case of ulcer we have because of the state of the veins ligated the saphenous vein and have subsequently injected the varices



below The only exceptions to this rule have been made in patients who have been very feeble from senility or other disease In these patients we have had to be content with repeated injections of the veins Occasionally also one meets a patient in whom there is considerable active infection with inguinal lymphadenitis In these patients I have deemed it wiser to try to clear up some of the infection before operating rather than to cut through infected lymphatics We have, therefore, carried these patients along for a few weeks with injections several inches away from the ulcer and frequent cleansing of the leg with hot soap and water, alcohol, ether, and then antiseptic dressings of alcohol or ammoniated mercury ointment or hot chlorinate dressings Then, when

dissection, as noted above, obtains all the tributaries of the saphenous, both below and above the fossa, and the operation is not completed until the entire circumference of the fossa is explored down to the deep fascia (Fig 4)

I have abandoned the injection on the operating table of sclerosing fluid into the distal segment of the saphenous for two reasons first, leakage of the fluid into the wound may cause induration and slow healing, and secondly, the resulting venitis is painful, and because it adds to the patient's discomfort, it prevents the patient from adequately exercising the limb This exercise is, I believe, necessary to avoid the possibility of stagnation thrombosis in the veins of the leg, which, if it proceeds to the deep veins may give embolism To avoid the stagnation I

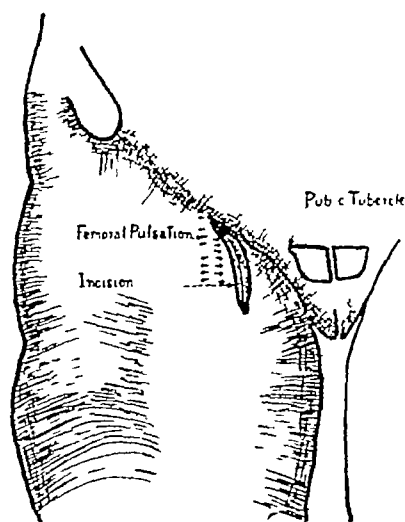


FIGURE 4a

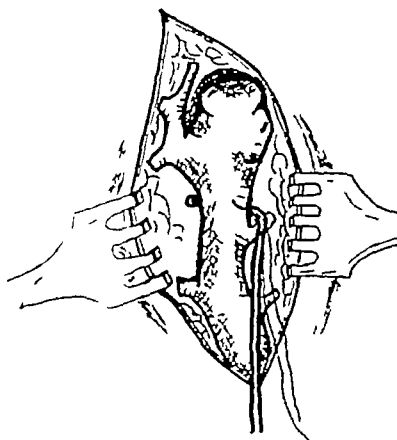


FIGURE 4b

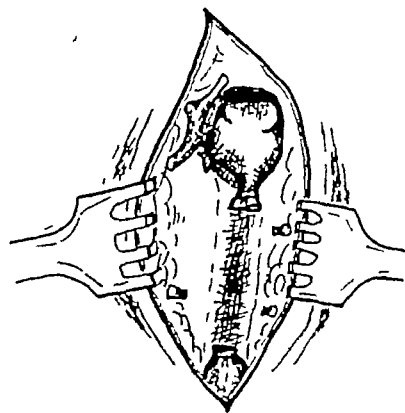


FIGURE 4c

FIGURE 4 The technic of high saphenous ligation In 4a is shown the location of the incision In 4b the saphenous is seen cleared at its termination in the femoral vein In 4c the saphenous tributaries have been cut across and ligated and a portion of the saphenous proper has been excised

by these means the infection is reduced and the lymph nodes have become smaller, the ligation is done and the remainder of the treatment continued

The ligation is carried out in the hospital under local anesthesia The procedure is one which has been well described by Homans<sup>6</sup>, Faxon<sup>7</sup>, and me<sup>1</sup> The essential point is to make sure that all tributaries are obtained and cut To this end the incision must be made high at the sapheno-femoral junction I have determined the average location of the sapheno-femoral junction by definite measurements recorded in my previous paper I prefer a roughly vertical or "hockey stick" incision This incision cuts through a minimum of lymphatics The incision starts in the line of the groin, somewhat lateral to the saphenous termination and then curves medially and downward for three or more inches It is placed less than two fingerbreadths lateral to the pubic tubercle, and one fingerbreadth medial to the femoral artery The

instruct the patient to raise each leg in the air and "bicycle ride" the leg six times This, the patient first does on the operating table and then every hour while in bed In bed also the legs are supported by a pillow so that the return flow should be favored The patient is not allowed a bedpan or urinal, but is forced to walk to the lavatory The day after operation the patient is instructed to get out of bed and encouraged to walk He is told to keep the leg up on a stool when sitting down, and is discharged this next day after operation, unless he comes from out of town, when I prefer to keep him a few more days

Although the use of elastic bandages while the patient is in bed is probably harmful because of stagnation of blood, it is distinctly beneficial once the patient gets up, and it should be almost routine As soon as the patient is sufficiently comfortable, usually within one or two weeks, the injections are begun I prefer sodium morrhuate (5 per cent) from 5 to 4 cc

at any one site, sometimes giving a total of 10 or 15 cc. These injections are started far from the ulcer and if no great venitis follows, the injections gradually are given nearer and nearer to the ulcer, until finally the veins in the ulcer bed are treated.

About ten per cent of extremities with ulcers show a doubly positive Trendelenburg test that is there is incompetence not only of the valves of the saphenous, but also of the perforating veins. These are especially stubborn cases. It has been advocated in the past to excise these incompetent perforators. While we have done this operation in three cases, I do not feel that it should be undertaken very frequently. The incision usually runs through indurated tissue and may be extremely hard to heal. As a matter of practice, one finds that after the ligation, and perhaps after a few injections, the perforating vein becomes sufficiently collapsed so that its valve is competent and the overlying varix may be successfully sclerosed, although it may take several repeated injections to do this.

#### RESULTS AT THE BOSTON CITY HOSPITAL

The Circulatory Clinic at the Boston City Hospital was organized in 1929. At that time there were, of course the usual large number of patients with severe, old, varicose ulcers. The injection treatment was responsible for the cleaning up of the majority of these cases in a very short time. Of course, this treatment was for these cases not permanent. There was, nevertheless, a fairly large group of patients who, by 1931 and '32 had been treated in the Circulatory Clinic with injections, and in whom the ulcers refused to heal. The duration of the ulceration varied up to twenty-seven years. In some of these patients new ulcers had come during the course of treatment. There were thirty-one of these patients when we first started doing ligations. Some of these patients had received over 100 injections and had in addition come to the clinic for treatment by dressing, or the application of Unna's casts, an additional 100 to 150 times. There were several cases who had also at some time previously had excision or stripping operations done for their veins.

Every one of these patients, without exception healed after ligation and subsequent injections. I wish to point out that we have not had to excise or skin graft a single ulcer. Most patients went home the day after operation. Occasionally one stayed in one or two weeks because of sepsis. Almost every patient returned to his or her work in a few days after operation. The mass effect of this type of treatment was well shown in the "cleaning up" of the clinic. Before we started doing ligations the patients were on a waiting list eight or nine months before starting their treatment, and we had thirty to forty patients on each clinic day. A few months after we started the ligations,

there was no waiting list, and we treated only eighteen to twenty five patients on each clinic day.

It is true that many of these ulcers did not completely heal until six months after the ligation, but most of them felt very much relieved within one or two weeks. The edema quickly diminished and the patient was comfortable. The number of injections necessary after the ligation was very small, varying from no injections in some cases and averaging about six. The ulcer was usually dressed with nothing more than seventy per cent alcohol. Occasionally balsam of Peru was used. Scarlet red was used by some of the men in the clinic, but I personally believe it to be too irritating and I do not use it. It may be noted that these patients were for the most part comfortable and at work during the period of healing. This is in contrast to the several weeks' stay in bed that is necessary when ulcers are excised, further more, it puts the method to the test, since obviously any method of treatment that can be efficient with the patient working and on his feet would seem to give more promise of permanency.

#### SPECIAL POINTS IN EXAMINATION

It is apparently not superfluous to point out again that syphilis can give ulcers of the legs. Diabetes, plus a little local trauma or infection, can initiate an ulcer which may be stubborn to heal. Either of these two conditions may coexist with varicose veins. Certainly their presence should be ruled out. I have seen two luetic legs in which the diagnosis was made by the finding of perostitis by x-ray, while the serum reaction was negative. I have seen a chronic ulcer in a myxedemic which cleared up promptly after the administration of thyroid. The influence of focal infection, though impossible to evaluate, is probably considerable in the patient with a frank case of pyorrhea or many apical abscesses, broken off dental roots, etc. It would seem that these should be attended to, in order to improve the patient's general condition if for no other reason.

Sometimes it is difficult to find varices in the leg. Many of the ulcers are surrounded by wide zones of board like induration. The veins can rarely be seen, but usually can be felt as soft areas within the indurated tissue. In doing the Trendelenburg test in a case of this sort, the filling of the vein must be determined by feeling the amount of tension in it with the finger, rather than by seeing it fill. The continuity of the veins in the leg with the saphenous in the thigh can oftentimes be determined by placing one hand over the line of the saphenous in the thigh, and slapping the veins below rather sharply. In this way a thrill is produced which is transmitted to the upper hand by the blood (Percussion Pulse Transmitted' of McPheters). This thrill can

probably not be transmitted through a normal-sized vein

For purposes of clarifying treatment and demonstrating palpable veins to others, I have made use of x-ray visualization of the veins after the injection of an opaque medium (vasography), and in other cases, infra-red photography. Both of these graphic methods illustrate the venous pattern of the recurrent veins (Figs 5 and 6). It can be readily understood that after excision of the saphenous and its main branches, as well as after thorough injection of the veins, that the veins, having lost their principal trunks, pursue a tortuous and festooned course

I have seen about twenty patients who have suffered from small ulcers in the presence of occlusion of the femoral or iliac veins, or of the inferior vena cava. Occlusion of the deep veins should be suspected if the patient gives a history of painful swelling of the leg after operation, typhoid fever, and other acute infections, or after obstetrical delivery. It can be diagnosed by seeing large collateral veins carrying blood upward from the saphenofemoral junction, over the abdomen, to end in the region of the axiphoid, axillae and back. It has been possible in several of these patients to confirm the diagnosis by vasography<sup>8</sup> (Fig 7). In such patients the superficial veins at the sapheno-



FIGURE 5a

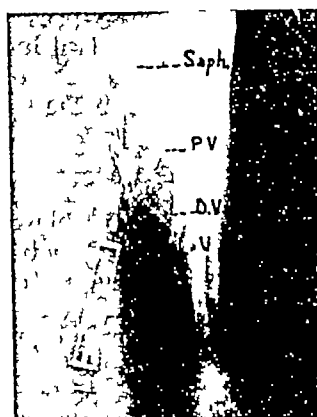


FIGURE 5b



FIGURE 5c

FIGURE 5 The venous pattern in recurrent ulcer

Case A. K. Boston City Hospital number 196670. Injections were started in 1930 and by June 1933 the patient had received 80 injections and had been treated by Unna's casts and other dressings an additional 146 times.

5a shows the leg before ligation. No varices were visible. Only a few small varices were palpable in the calf. A venogram 5b shows recurrence of the saphenous. Saph. dilation and valvular incompetence of the perforating vein PV leading to the deep posterior tibial veins DV and the presence of normal valves 'V' in these deep veins. The venogram was made with the patient lying down and with venous tourniquet applied. (From New Eng J Med 209:1337, 1933.)

High ligation of the saphenous was performed and the ulcer dressed with simple alcohol and gauze. The patient returned to his work as cook five days after the operation. Five weeks later the ulcer was healed. 5c

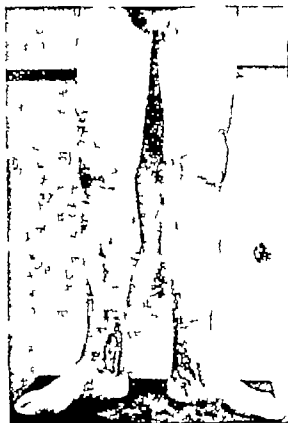


FIGURE 6a

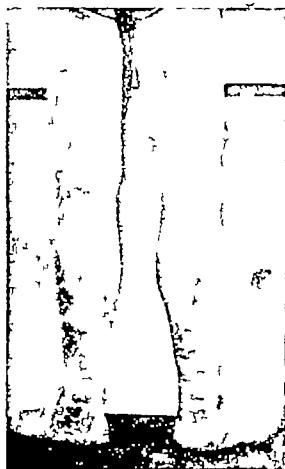


FIGURE 6b



FIGURE 6c



FIGURE 6d

FIGURE 6. The venous pattern in recurrent ulcer.  
"6a" and "6b" show ordinary photographs (panchromatic film) of a patient who had ulcers for 25 years. Excision of both great saphenous veins was performed 10 years ago. During the past 5 years the patient had 100 to 125 injections. Only in "6b" is any vein visible.  
"6c" and "6d" show infra red photograph of the same patient. Because of the extension and sclerosis of the main venous trunks the only veins remaining are narrow collaterals spreading from the saphenous stump in a tortuous and festooned manner.



FIGURE 7a



FIGURE 7b

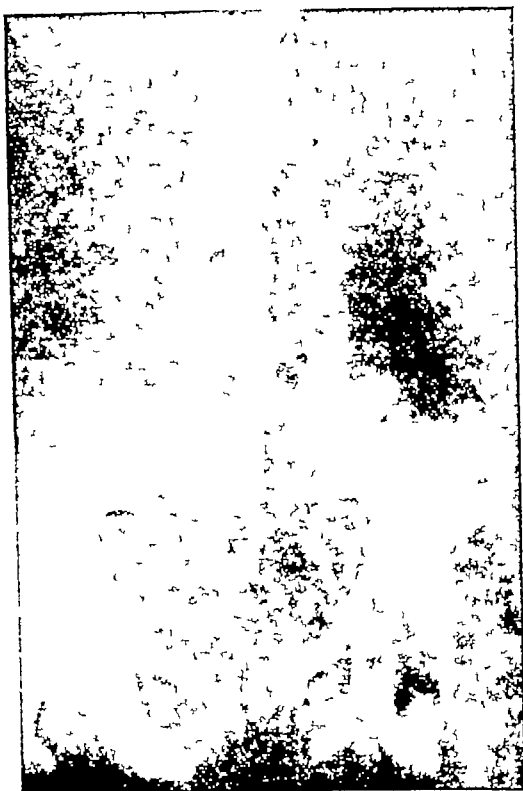


FIGURE 7c

FIGURE 7 A case of varices due to thrombosis of the inferior vena cava giving recurrent ulcer D S Boston City Hospital number 1800 Thrombosis of the inferior vena cava of 16 years duration The ulceration of the legs is successfully controlled by an occasional injection of the varices in the legs Such a patient should never have any injections or surgery done in the upper third of the thigh 7b and 7c show the venograms of this patient made by injecting Skiodan into the femoral veins The occlusion of the vena cava is still complete no iliac shadow being seen All of the injected material flows back along the needle to run upward by way of the superficial epigastric and circumflex iliac veins

femoral junction carry all, or a great part of the blood away from the inferior extremity and must not be removed or sclerosed These patients have a permanent defect They must wear a supportive stocking or bandage permanently If the deep veins of the lower leg can be shown to be patent, then it is proper to inject the superficial varices as high as the middle of the thigh I have seen several such patients who have returned for yearly or half-yearly injections and whose ulcers have in this way remained healed

#### CONCLUSIONS

The successful treatment of recurrent varicose ulcer depends upon making sure of the diagnosis, and then treating the underlying cause, i.e., varicose veins It has been demonstrated theoretically and practically that the varices are of the severest type when there is an ulcer pres-

ent For this type of varix the most successful treatment yet evolved is a section and ligation of the saphenous vein and its tributaries at the sapheno-femoral junction. This is then followed by subsequent injections. Using this method of treatment we have been able at the Boston City Hospital completely to heal every case of varicose ulcer including cases that had failed to heal after a thorough course of injections as well as the usual local applications.

It may be concluded that when a recurrent case of ulcer presents itself, if one can make the diagnosis of a varicose extremity by means of the usual diagnostic tests, that the past history of treatment is not of great significance in guiding the future. In other words if injections have been done, ligation is still indicated, and if operative excision has been done it is still likely that there are tributaries bridging the gaps coming down from the sapheno-femoral junction and these tributaries can be secured by high ligation. If ligation has been done it is still possible that the incision may not have been placed at the sapheno-femoral junction or that tributaries were missed at that operation. It is my feeling that if the operation is perfectly done and every tributary secured at the highest level, that the treatment will be permanent, but in view of the "perfect" types of

treatment that have been abandoned in the past, it would be rash to insist on this point. There is no question in my mind, however, but that this method, which has already proved its worth in healing ulcers which have remained open after other types of treatment, is the most efficient method so far advanced.

## REFERENCES

- 1 Edwards, E. A. Treatment of varicose veins. Anatomical factors of ligation of great saphenous vein. *Surg. Gynec. and Obst.* 59: 816 1934
- 2 deTakats G. Ambulatory ligation of saphenous vein. *J. A. M. A.* 84: 1294 1930
- 3 Howard N. J. Jackson, C. R. and Mahon E. J. Recurrence of varicose veins following injection. *Arch. Surg.* 23: 352 1921
- 4 Delbet, P. Du rôle de l'influence valvulaire de la saphène interne dans les varices du membre inférieur. *Semaine Méd.* 17: 272 1897
- 5 McPherson H. O.; Merkert C. E. and Lundblad, R. A. Mechanics of the reverse flow of blood in varicose vein as proved by blood pressure readings. *Surg. Gynec. and Obst.* 55: 234 1932
- 6 Homans John. Operative treatment of varicose veins and ulcers based upon a classification of these lesions. *Surg. Gynec. and Obst.* 55: 143 1912
- 7 Paxson, H. H. Treatment of varicosties preliminary high ligation of internal saphenous vein with injection of sclerosing solution. *Arch. Surg.* 29: 781 1924
- 8 Edwards, E. A.; Status of angiography. *New Eng. J. Med.* 209: 1257 1933
- 9 Edwards, E. A. and Biguria F. Comparison of aklodan and diodrast as vasographic media, with special reference to their effect on blood pressure. *New Eng. J. Med.* 211: 559 1934

CHAIRMAN FRENCH The next paper will be given by Dr George C. Prather. His subject is "X Ray and Autopsy Study of Anatomical Changes of the Upper Urinary Tract in Patients with Obstructing Prostates."

## X RAY AND AUTOPSY STUDY OF ANATOMICAL CHANGES OF THE UPPER URINARY TRACT IN PATIENTS WITH OBSTRUCTING PROSTATES\*

BY GEORGE C. PRATHER, M.D. † AND M. L. BRODNY, M.D. ‡

FOR many years "back pressure" has been the usual answer given for poor renal function in patients with obstructing prostates. This simple explanation of upper urinary tract changes has been made either on the basis of (1) incompetency at the ureterovesical junction or (2) on the assumption that the renal pelvis and ureters were working against an increased pressure caused by urinary residual in the bladder.

While it is true that upper urinary tract dilatation has been found many times as a terminal observation in prostatism and forms a "classical picture" we have wondered whether this is a constant relation, if not just how frequently does it occur?

Intravenous pyelography and observations at autopsies, seemed to be available methods for such a clinical study although the former is open to the objection that patients with poor renal functions are not proper candidates for such an

examination. The observations from our small series of cases should be checked by a larger series in order to see if the relations still hold.

Findings in thirty five prostatitics with intravenous pyelograms were reviewed. In addition, thirty three cases whose primary cause of death was prostate in origin, were used for our autopsy series.

As to the effectiveness of intravenous pyelograms in patients with prostate obstruction, we may refer to Chart A which summarizes the

## CHART A

PROSTATE CASES HAVING INTRAVENOUS PNELOGRAMS—35

Quality of films	good 19			
	fair 10			
	poor 6			
With 1 Large prostates	15 good	8 fair	4 poor	
2. Small prostates	2 good	1 fair	1 poor	
3 Cancer prostates	2 good	1 fair	1 poor	
With N.P.N below 40	21 good	0 fair	5 poor	
N.P.N above 40	2 good	4 fair	1 poor	
With P.S.P above 34%	8 good	3 fair	1 poor	
P.S.P below 34%	0 good	2 fair	1 poor	

Most often 30 minute plate the best

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findings In fifty-four per cent the films were satisfactory for an accurate kidney diagnosis, these are classified as good In twenty-eight per cent of the remainder the films were not good enough for an accurate kidney diagnosis but would permit an opinion as to whether dilatation of the upper urinary tract existed, these are classified as fair Poor films need no further comment Therefore, one might assume from this small series that intravenous pyelography would be successful in slightly more than fifty per cent to demonstrate upper urinary tract pathology accurately To demonstrate the presence or absence of upper urinary tract dilatation there is an eighty-two per cent chance

As seen in Chart A, the type of prostate appears to make little difference in the chance of success While one would hesitate to use intravenous pyelograms without discretion in patients with poor renal function, we were able to obtain good or moderately good films in six out of seven patients with n.p.n.'s above forty mg per 100 cc of blood

There appears to be very little evidence in the literature concerning the frequency of ureteral and kidney dilatation in prostatic obstruction Thomas<sup>1</sup> in a series of twenty-eight cases coming to autopsy, following relief of prostatic obstruction, found upper urinary tract dilatation in fifteen The results of our observations on this point are summarized in Charts 1A and 2A. In the series coming to autopsy 35.3 per

CHART 1A  
AUTOPSY STUDY—33 CASES

Types of Prostate		Upper Urinary Tract Dilatation	
		Yes	No
Small Fibrous	6	3	3
Cancer	1	0	1
Hypertrophy	27	9	18

75 years—average age showing no dilatation  
69 years—average age showing dilatation

CHART 2A  
INTRAVENOUS PYELOGRAPHIC STUDY—35 CASES

Types of Prostate		Upper Urinary Tract Dilatation	
		Yes	No
Small Fibrous	4	0	4
Cancer	4	0	4
Hypertrophy	27	6	21

68.4 years—average age showing no dilatation  
65.6 years—average age showing dilatation

cent revealed dilatation of the upper urinary tract in some degree The pyelographic series showed 17.1 per cent to have dilatation In each group the average age is higher in the division which shows no dilatation. This is, perhaps, contrary to what one might expect The

type of prostate appears to have no direct bearing on the question of dilatation The fact that the pyelographic series shows a higher percentage without dilatation, may be explained by assuming that these cases were less advanced in the course of prostatic obstruction, however, none of these were operated upon in a "prophylactic stage" The average duration of symptoms was somewhat over two years (including those with acute retention), and the average bladder residual was thirteen ounces (including those with acute retention)

We must consider every relation between upper urinary tract dilatation and poor renal function This combination of conditions has formed the typical picture of the advanced stage of prostatism for many years All modern texts of urology describe by words and pictures the association of poor renal function with dilatation of the ureters and kidneys in advanced prostatic diseases We have seen the same picture at autopsy We are interested in the question of how frequently these findings coexist in the hospital patient with prostatic obstruction

CHART 1B  
AUTOPSY CASES

CASES Showing upper urinary tract dilatation	
Adequate Function Tests	7
Poor Function Tests	5
CASES showing no upper urinary tract dilatation	
Adequate Function Tests	12
Poor Function Tests	7
CASES showing poor kidney function tests	
Upper urinary tract dilatation present in	5
Upper urinary tract—no dilatation	7
Type of prostate with poor kidney function tests	
Large (hypertrophy)	11
Small (fibrous)	1

CHART 2B  
INTRAVENOUS PYELOGRAPHY CASES

CASES showing upper urinary tract dilatation	
Adequate function tests	4
Poor function tests	2
CASES showing no upper urinary tract dilatation	
Adequate function tests	24
Poor function tests	8
CASES showing poor kidney function tests	
Upper urinary tract dilatation present in	2
Upper urinary tract—no dilatation in	7
Type of prostate with poor kidney function tests	
Large (hypertrophy)	7
Small (fibrous)	2
Cancer	1

Is it correct to assume, in a prostatic case with poor functions, that he has upper urinary tract dilatation? Does the patient with an obstructing prostate and upper urinary tract dilatation necessarily have depressed renal function as measured by urological standards?

Certainly we must keep in mind that at the time of life when prostatic obstruction is likely to develop, some chronic kidney pathology may already be established.

Adequate function tests as shown on Charts 1B and 2B, signify a nonprotein nitrogen no higher than 40 mg per 100 cc of blood and a two hour phenolsulphonethylamine test with a reading of at least thirty four per cent.

The above mentioned charts illustrate a very interesting finding which is true in both the pyelographic and autopsy groups. In those which show upper urinary tract dilatation there are more with normal kidney functions than with poor functions. However, cases with no upper urinary tract dilatation do have a higher ratio of good function.

Looking at these observations in the reverse manner it is evident in this small group that there are more cases with depressed renal function showing no upper urinary tract dilatation than those with dilatation. Thomas<sup>1</sup> reported eleven cases with an elevated n.p.n. in his series of twenty-eight autopsies. Only four of the eleven showed upper urinary tract dilatation. He also mentions ten cases in the group showing dilatation of kidneys or ureters in which the n.p.n. was normal.

It therefore, seems unwise to assume that these two conditions (upper urinary tract dilatation and depressed renal function) coexist even in a majority of instances in an average group of hospital patients with prostatic obstruction.

It would be interesting to know the cause of dilatation of the ureters and kidney pelves in certain cases of prostatic obstruction. We do not believe that the correct answer is available at present. Certain explanations have been offered by various writers.

Ureteral reflux seems to occur very infrequently in prostates if one judges by cystograms. We have done or seen a large number of cystograms with sodium iodide during the past five years. Reflux has been distinctly uncommon. When it occurs there has usually been a diverticulum near the corresponding ureteral orifice. Physiologists agree that it does not occur in human beings unless the ureteral orifice is injured. Lucas<sup>2</sup> and Bush and McCradie<sup>3</sup> using dogs, found no ureteral reflux with pressures in the bladder up to 130 cm of water (100 mm Hg). Kelly and Burnam<sup>4</sup> make the statement that "the lower end of the ureter in dogs strongly suggests the arrangement found in man". Graves and Davidoff<sup>5,6,7</sup> found ureteral reflux in 27 per cent in their experiments with normal dogs, with an average intravesical pressure of 87 mm. of Hg.

If one dismisses reflux as a factor he may hold to the idea that the ureter has a difficult time projecting urine into a bladder where we assume that the intravesical pressure is high.

This was reviewed by Bush<sup>8</sup> in 1923-24 with the following remarks. Campbell<sup>9</sup> who had observed intravesical pressure in acute retention found a maximum pressure of 30 mm. Hg, withdrawing small amounts of urine markedly reduced the prevailing pressure. Bush also quotes Lucas who has shown that the tonicity of the ureter is not normally overcome until 45 mm Hg pressure (intraureteral) is reached. Marked or long-continued trigonal alterations therefore, would be necessary to produce ureteral dilatation.

Tandler and Zuckerkindl<sup>10</sup> believed that prostatic hypertrophy displaced the vas, allowing it to compress the ureter and produce ureteral dilatation. Falc<sup>11</sup> studied sagittal and horizontal sections (gross and microscopic) through the region of the prostate, lower ureter, seminal vesicles and vas and disagrees with that conclusion. He attempted to discover the reason for dilatation in the lower ureter and adjacent tissue without the help of extrinsic pathology.

Young<sup>12</sup> interprets upper urinary tract dilatation in prostates as due to frequent and prolonged urination at which time the ureteral orifices are closed. This results in stasis in the ureters at that time interfering with peristalsis. When this is continued over a long period of time a similar effect is produced in the kidney. No clinical or experimental data are given by Young to support this hypothesis. No doubt most urologists have seen patients with large bladder residuals who have been asymptomatic so far as frequency or difficulty with voiding are concerned and who, by intravenous pyelogram have dilatation of the upper urinary tract. Certainly frequent or prolonged urination is not always necessary for the production of upper urinary tract dilatation. As shown in Charts 1C and 2C, there was very little difference in

CHART 1C  
AUTOPSY CASES

Duration of symptoms—(average)			
Cases showing upper urinary tract dilatation		4.5 years	
Cases showing no upper urinary tract dilatation		3.8 years	
Blood pressure findings			
Under 160 Systolic		Above 160 Systolic	
Dilated	Not Dilated	Dilated	Not Dilated
5	10	8	9
Cases showing upper urinary tract dilatation			
7 had acute retention			
6 residuals without acute retention			

average duration of symptoms between those with or without dilatation.

We have seen uninfected cases of prostatism which show marked urinary tract dilatation as



well as many with pyuria in whom there is no dilatation. Certainly infection is not the answer to the cause of upper urinary tract dilatation in prostatics, although it may be coexistent.

What factors are responsible for poor renal function in prostatics? Undoubtedly the same answer will not hold for all. Poor function sec-

## CHART 2C

## INTRAVENOUS PYELOGRAPHY CASES

Duration of symptoms—(average)			
Cases showing upper urinary tract dilatation		22	years
Cases showing no upper urinary tract dilatation		275	years
Blood pressure findings			
Under 160 Systolic		Above 160 Systolic	
Dilated	Not Dilated	Dilated	Not Dilated
4	14	1	3
Cases showing upper urinary tract dilatation			
2 had acute retention			
4 did not have acute retention			

ondary to ureteral and renal dilatation does exist. Superimposed inflammation in the kidney is another factor. Chronic cortical changes due to age or previous renal disease probably exist more frequently than we commonly suppose. Bush<sup>8</sup> has found that stimulation of the proximal and of the cut hypogastric nerve affects the functional activity of the kidney and that with prostatic changes there is a series of neural reflexes coming from the area of the trigone by way of the hypogastric afferents. This may be completed through the eleventh and twelfth thoracic autonomies to the kidneys. Too little has been demonstrated on an endocrine basis to warrant discussion as a cause of poor kidney function.

We repeat that in our small series, cases with poor renal function showed no upper urinary tract dilatation twice as frequently as those with dilatation.

We wish to express thanks to Doctors W C Quinby and E G Crabtree for the use of material under their control.

## SUMMARY

Intravenous pyelography in patients with prostatic obstruction is satisfactory for an accurate upper urinary tract diagnosis in 54 per cent.

The type of prostate makes little difference in quality of pictures.

There is meagre evidence in the literature as to the frequency of upper urinary tract dilatation in prostatics.

Our autopsy series shows 35.3 per cent with upper urinary dilatation—the pyelographic series 17.1 per cent with dilatation.

Upper urinary tract dilatation and poor renal function do not coexist in the majority of prostatics as seen in hospital.

The cause of upper urinary tract dilatation cannot be explained on any one hypothesis known at present.

In the prostatic, one should not assume that poor renal function is necessarily due to so called "back pressure."

## REFERENCES

- 1 Thomas G J, Exley E W and O'Brien W A. Causes of death following treatment for the relief of prostatic obstruction. *J Urol* 25: 343 1931.
- 2 Lucas D R. Physiological and pharmacological studies of the ureter. *Am J Physiol* 22: 245 1908.
- 3 Bush A D and McCradle R S. Competency of the ureter-vesical valves. *Am J Physiol* 68: 107 1924.
- 4 Kelly, H A and Burnam C F. *Diseases of Kidney, Ureter & Bladder*. D Appleton & Company New York and London 1922.
- 5 Graves R C and Davidoff L M. II. Studies on the ureter and bladder with especial reference to regurgitation of the vesical contents. *J Urol* 12: 93, 1924.
- 6 Graves R C and Davidoff L M. III. Studies on the bladder and ureters with especial reference to regurgitation of the vesical contents. *J Urol* 14: 1 1925.
- 7 Graves R C. IV. Studies on the ureter and bladder with especial reference to the vesical contents. *Trans. Amer. Assoc. G U Surgeons* 20: 89 1927.
- 8 Bush A D. Kidney involvement from prostatic hypertrophy: a new theory of explanation. *J Lab & Clin. Med* 9: 743 1923 24.
- 9 Campbell. Personal communication quoted by A. D. Bush.
- 10 Tandler J and Zuckerkandl O. *Clinical and Anatomical Studies of Prostatic Hypertrophy*. Berlin Julius Springer 1922.
- 11 Falci E. Contributo anatomico ed istopatologico alla conoscenza delle dilatazioni ureterali consecutive ad ipertrofia prostatica senza ritenzione vescicale. *Patologica* 25: 91 1933.
- 12 Young H H. Renal infections associated with prostatic obstruction. *Johns Hopkins Hosp Bull* 53: 1 1933.

CHAIRMAN FRENCH. The next paper will be given by Dr William C Quinby. His subject is "Some Aspects of the Treatment of Carcinoma of the Bladder."

## SOME ASPECTS OF THE TREATMENT OF CARCINOMA OF THE BLADDER\*

BY WILLIAM C QUINBY, M D †

BY the use of present-day methods a patient afflicted with a cancer of the urinary bladder can be investigated in great detail and the individual characteristics of the growth evaluated. By microscopic analysis of the urine,

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blood and pus can be seen. After filling the bladder with a solution opaque to the x-ray a defect in the normal outline of the bladder may be demonstrated. Through the cystoscope the extent and position of the growth, as well as its surface appearance, can be accurately determined. Through the same instrument a portion of the growth can be removed and study of its cellular structure made by the pathologist. But in spite of these and other diagnostic

advantages our efforts to cure patients with vesical cancer still end all too often in failure. Why is this so?

As in malignancy, wherever situated, delay on the part of the patient in asking for medical advice plays a definite part in the number of unfavorable results. But in this especial form of carcinoma this element should not be nearly so prominent as in many other forms. In over sixty per cent of the cases the first symptom is a hematuria, an event which should be sufficiently striking to send the patient to the doctor at once. The medical profession on the whole is acutely aware of the possible seriousness of this symptom, so that only rarely does one now find the doctor to blame for delay in diagnosis and treatment, although this was rather commonly the case in the past. It is therefore, evident that aside from the degree of malignancy of any given tumor, a matter clearly influencing the prognosis but one over which we have no control, the end result depends very largely on the form of treatment instituted once the diagnosis has been made. This is a matter clearly in the hands of the surgeon. It is important, therefore, to review all possible forms of treatment at our command at present, hoping that by a better appreciation of the value and the limitations of each, more patients may be cured.

The methods of treatment from which to make a choice are

1 Closed

- a Deep x ray therapy
- b Fulguration through cystoscope
- c Implantation of radon seeds through cystoscope or application of radium salt.

2 Open

- a Excision
- b Resection
- c Cystectomy
- d Implantation of radon seeds
- e Electrocoagulation (diathermy)
- f Caustic destruction

As influencing the type of treatment chosen in any single case, several important points in the pathogenesis of bladder tumors in general should always be kept in mind. First, about ninety five per cent of all bladder tumors are epitheliomata, showing a marked tendency to recur, and such recurrences are frequently more malignant than was the original tumor. See only the surface appearance of a tumor may give no accurate information of the extent of invasion of the bladder wall beneath the surrounding mucosa, or into and beyond the muscularis. The cystoscope shows only one side of the growth. Thirdly bladder tumors show a marked tendency to be situated at or near the lower segment of the organ where they cause interference with the trigonal and sphincteric

muscles and with the ureter. About seventy six per cent of all tumors are so situated. Often even a small tumor in this position will be found to have caused extensive renal damage of an obstructive character, all the worse if accompanied by infection. Fourthly, metastases from bladder tumors, either regional or distant, have been found by various recent investigations to be present fairly soon after the onset of symptoms. This, though true, is an unfortunate contradiction of the older idea widely held that, as a whole, bladder tumors were very slow to show metastases. It emphasizes the necessity of early treatment and early operative investigation of the lymph drainage area of the bladder in all but the simplest and most benign cases.

In making a choice of which form of treatment, or combination of forms, best applies to the individual case, judgment must rest on the results of the detailed examination. A small pedunculated growth of papillary type in a portion of the bladder accessible to cystoscopic instrumentation can be easily controlled by endourethral fulguration, or if there is doubt of the relative benignancy of the tumor, after it has been destroyed by the electric current, gold radon seeds may be implanted in the area of the bladder wall from which the tumor arises. Such form of treatment is very successful in those cases to which it is applicable but it must never be overlooked that even the benign papilloma carries potentialities of malignancy, and that treatment even of this type must be followed by careful postoperative observation of the patient's bladder.

In other instances the bladder will be found to contain multiple tumors all of them appearing innocent but occupying various areas, possibly some of them on the anterior wall, a region hard to reach adequately by endourethral instrumentation. Such cases are much more easily controlled through the open bladder. When one has to deal with a growth the base of which cannot be seen or which is of a definitely sessile type the first step in treatment should always be by investigation through the open bladder. In fact there is no doubt in my mind that urologic surgeons have been remiss in being content with the limited attack which closed methods of treatment permit. Too many patients have been treated for too long periods of time by fulguration of their bladder tumors, thus permitting recurrences or unrecognized invasive growth, which later is found to have become inoperable.

It will thus be seen that increasing experience in dealing with bladder carcinomata clearly emphasizes the wisdom of open surgical revision in all cases except the simplest ones. The steps of this operative revision should consist of the following. The bladder should be opened

through a suprapubic approach and the incision in its wall should be so placed as to be well away from the site of origin of any area of neoplasm, a point which has previously been determined by cystoscopy. The tumor or tumors should then be carefully evaluated, (1) as to their character on microscopic examination, (2) as to the degree of involvement of the bladder wall, (3) as to their relation to either ureter or to the bladder outlet. Following this, if any conditions are found on palpation which suggest penetration of the tumor through the bladder wall above its lower segment, this portion of the bladder should be mobilized and the perivesical structures inspected. If the growth seems to be of considerable extent, or if the clinical history indicates that it is of several months' standing the peritoneum should be opened after the bladder has been isolated by gauze packs, and the lymph drainage area as high as the pre-aortic nodes carefully inspected for metastases. The presence of extensive secondary deposits will, of course, contraindicate radical surgical removal and restrict operation to one of palliation only. On the other hand, if only one or two lymph nodes are found involved these can be excised or treated by the implantation of radon seeds.

The present weight of urological opinion as regards the treatment of cancer of the bladder is toward more frequent excision of the tumor by open surgery even though this at times makes necessary the removal of the whole bladder. This trend is without doubt the result of the fact that accumulated experience with other less radical forms of attack has shown them to be too often inadequate. Much was hoped in the earlier days from the use of radium. To day, however, we have learned that though radium properly applied is able to control growths of the lesser degree of malignancy (groups 1 and 2 of Broder's classification) it is ineffective against those of more malignant type. Thus the use of radium alone while of advantage in the less invasive bladder tumors has not been nearly so efficacious in those of higher malignancy. The matter of proper dosage is always somewhat uncertain. The use of the one or one and a half millicurie seeds placed about one cm. apart has considerably simplified this, but judgment is still difficult. If too little is used recurrences will appear, if too much, fistulae may be formed between bladder and rectum or between bladder and vagina. A slough very slow to separate and causing much tenesmus is also rather frequently seen after the use of radium but this is less apt to follow the implantation of gold seeds than when the emanations were used in the older forms less well screened.

Radium seems today to find its greatest use

in the control of the more benign types of vesical carcinoma in which instances it is quite sufficient of itself to produce a cure. In the more malignant varieties it is of much value also when used in addition to some form of surgical excision of the growth.

We will, therefore, employ surgical excision or resection in all cases in which the tumor is so situated that its removal will not interfere with the bladder outlet. Often it will be wise to use radon seeds in the tissues surrounding the area of excision in order to give added assurance.

For those growths situated in the region of the bladder outlet and of high malignancy total ablation of the bladder offers the best outlook for cure. But this is a formidable procedure and not to be employed as a last resort operation. In the patient already cachectic, anemic from loss of blood, and with damaged kidneys and infected urinary tract, only some form of palliation can be offered, no serious attempt to remove the cancer being any longer possible.

A compilation of the results of treatment of cancer of the bladder which have thus far been reported in the literature is hard to make because there has been no standardization. Almost all reports deal with the length of life of the patient after operation either with recurrence or free from it. No account is at hand as to the function of the bladder during such time. An intolerant bladder causing much pain and frequency of urination, interrupting sleep and gradually breaking down the patient's morale may easily follow interference of any sort with those tumors situated in the lower segment of the bladder.

How often this happens does not appear, but it must be frequently. We have here an additional argument in favor of complete removal of the bladder. It may well be that fewer patients will survive this operation but in that case we must remember also that fewer will live wishing that they were dead.

The indications, therefore, for total cystectomy as at present construed are as follows. First, a growth which is of the higher degree of malignancy (groups 3 and 4) situated at the bladder outlet or so close to it or so extensive that bladder function, contraction and relaxation of sphincter and trigone, will be much impaired by its removal. Secondly a patient in good or at least fair general condition. Thirdly, no extensive local or distant metastases to lungs or bones. Fourthly, at least one kidney unobstructed, and of normal function. Under these conditions the patient's best chance is through removal of the entire bladder.

An outline of the steps in cases of cystectomy consists of the following. Two operations are necessary. At the first, surgical revision of the entire situation, as described earlier in this paper, is carried out, followed by the anastomosis

of one ureter to the sigmoid intestine. At the second the remaining ureter is anastomosed if it be normal. If the kidney on this side has been found to be functionless, however, this procedure is not worth while. The ureter should be ligated and severed. Then the bladder is excised, especial care being taken to remove all perivesical fatty tissue and if any areas remain which seem abnormal, into these radon seeds should be implanted.

#### CONCLUSIONS

1. Carcinoma of the bladder when of the less malignant type and without invasive growth is successfully treated by radium or electrocoagulation. Except in the simplest cases this will best be carried out through the open bladder.

2. Carcinomata of greater malignancy are often resistant to radium and should be resected when situated above the lower bladder segment. Here it may be wise to use radium in addition to the resection.

3. When rapidly growing carcinoma is found to involve the lower segment of the bladder total cystectomy should be performed if the patient's condition is good and no hopeless metastases are present.

4. Open surgical revision of all doubtful cases of bladder carcinoma should be employed much earlier than has been the custom heretofore.

CHAIRMAN FRENCH: The next paper will be given by Dr. David Cheever and is entitled "Methods and Results in the Surgical Treatment of Diseases of the Biliary Passages."

DR. DAVID CHEEVER, Boston: Mr. Chairman and members of the Section when one examines the results of surgical procedures with a view to determining how efficacious they are in the cure of disease I suppose it is very advantageous if a very large number of cases be the subject of inquiry but it has seemed to me that sometimes it may be useful to review a much smaller number of cases and to satisfy one's own personal experience to examine the results. Of course, I think that raises the question as to whether one can be candid in the examination of his own cases and that is a very important question. I assure you that such inquiry is very useful to the individual himself. Whether it is to other people will be a matter for you to determine.

Today I am going to present to you an examination of the cases of biliary tract disease which I have operated on personally at the Peter Bent Brigham Hospital since 1913. That is a period of about twenty-two years.

## METHODS AND RESULTS IN THE SURGICAL TREATMENT OF DISEASES OF THE BILIARY PASSAGES\*

BY DAVID CHEEVER, M.D.†

A REVIEW of clinical experience in order to secure evidence as to the most satisfactory way to treat illness is doubtless useful in proportion to the number of instances forming the basis of the inquiry. It is possible however that a review of a smaller but not inconsiderable number of cases, whose treatment has been conducted according to a consistent plan, over a considerable number of years, by the same surgeon, may afford useful information, certainly for himself and possibly for others. For this reason I venture to report my purely personal experience in the surgery of the biliary passages, from the date of opening of the Peter Bent Brigham Hospital to the present, a period of about twenty-two years.

The convictions that I reached early and which have formed the foundation of my method of procedure quite consistently ever since, were as follows:

1. There are no such things as harmless gall stones.
2. A gall bladder once inflamed or the seat of calculi, and treated by evacuation and drainage only, is much more likely than a normal gall bladder to be the source of symptoms.

3. The gall bladder, while having a definite physiological function, is a dispensable organ and its removal causes no demonstrable ill effects upon the individual, in the vast majority of cases.

4. In the absence of serious complications the removal of the calculous gall bladder is in competent hands a very safe procedure. The acutely inflamed or devitalized gall bladder presents a more difficult problem, but one which can usually be solved by the exercise of surgical judgment in the selection of the time and type of operation especially whether it shall be performed in one or two stages.

5. Calculi in the hepatic or common ducts will inevitably sooner or later cause pain, jaundice and cholangitis in varying combinations and degrees, and eventually fatal complications. They may be silent for long periods but are essentially incompatible with health. They occur in a considerable percentage, perhaps twenty per cent of all cases of acute or chronic cholecystitis.

6. No method of diagnosis, whether by history, physical examination, x-rays, laboratory tests or even actual inspection and palpation of the viscera themselves affords cer-

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tam evidence of the presence or absence of calculi in the ducts, negative evidence is especially unreliable in this respect

- 7 Incision, exploration and drainage of the common duct with dilatation of the papilla, afford the only approximately reliable means of diagnosis and relief. They result in no harm to the ducts. While together they constitute a procedure always requiring delicacy and skill, and sometimes extremely difficult, it adds but little to the mortality, if applied with good surgical judgment. Moreover, when indicated, it is absolutely essential that this procedure be carried out if the patient is to be relieved.

With these concepts in mind, it is hardly necessary to say that during these twenty-two years I have, with reasonable consistency, practiced the removal of the acutely or chronically inflamed and the calculus-containing gall bladder, and have explored the common duct whenever there was reasonable suspicion of calculi, provided no forbidding complications existed.

During this period I have made 426 operations on the biliary passages. The technique employed has been so nearly identical and consistent as to furnish, when the results are analyzed, a good basis of comparison with other methods. Deferring for the moment any discussion of the many controversial points in the matter of technique, its chief features may be described as follows:

*Anesthesia* Ether, by the open mask drop method was used in 362 cases, avertin in basal dose of eighty to ninety mg. with supplementary ether in thirty-one cases, gas-oxygen with novocaine infiltration and supplementary ether when necessary in eighteen cases, gas-oxygen alone in six cases, spinal anesthesia in four cases, various other combinations of these agents in five cases. My present preference is for avertin and supplementary ether.

*Incision* An incision beginning at the ninth costal cartilage, about two to two and a half cm. to the right of the midline, splitting the right rectus muscle near its medial border, and carried downward, beyond the umbilicus, far enough to give ample room, has invariably been made, the only exceptions being when simultaneous operations have been undertaken, such as partial gastrectomy or splenectomy, requiring a midline or left paramedian incision. I never carry the incision medially into the ensiform angle, dividing thus part of the origin of the rectus and tendon of the linea alba, and I never make a transverse incision, believing that these modifications are unnecessary and present more disadvantages than merits. The incision described has always proved sufficient and presumably does the least damage.

*Exploration of the Abdomen* A general ab-

dominal exploration is always made first, unless contraindicated by local infection, prevented by adhesions, or made unwise by the patient's general condition. In this connection let me say that much as I approve and practice the manual palpation of all the abdominal viscera, I believe that it may turn the scale against a critical case by favoring postoperative distention and stasis. If the appendix can be brought into the field with reasonable ease and is not atrophic, it is removed, this has been done in the majority of the present series. I am convinced, however, that incidental appendicectomy may be a false ideal. I have seen in consultation a vigorous patient dying of peritonitis after the simplest sort of cholecystectomy with incidental appendicectomy where I believed that some slip in technique related to the difficulty of handling the appendix through an inappropriate incision, was responsible.

*Removal of the Gall Bladder* After making certain that it may not be necessary for anastomosis, in case a neoplasm be obstructing the common duct, the diseased or calculous gall bladder is removed in one of two ways, preferably by laying open the peritoneal sheath of the cystic and common ducts, developing, clamping and dividing the former, securing the cystic artery just above and dissecting the gall bladder from its bed, leaving a peritoneal cuff and following the areolar tissue cleavage plane between the gall bladder and the capsule of the liver, or, if inflammatory edema, infiltration or adhesions makes exact identification of the cystic duct impossible or even difficult, the attempt is ceased and the dissection is begun at the fundus of the gall bladder, finally developing the artery and especially the cystic duct as an ultimate pedicle, about which no doubt exists. This method is somewhat bloody and it may hurt the operator's pride, but it is safe. It has been used in about one-third of the cases in this series. I have never regretted using it. The cystic artery and duct are transfixed and tied, usually separately, with double zero chromic catgut. No 1 gut makes actually a less safe ligature on such small soft structures. I have not had, to my knowledge, postoperative hemorrhage from the cystic artery.

*Exploration of the Duct* The free edge of the gastrohepatic omentum is split and the peritoneum reflected, exposing the duct, and permitting rough determination as to whether it is dilated. Palpation is carried out with the forefinger of the left hand in the epiploic foramen and the thumb anterior to the duct, hepatic artery and portal vein, all of which structures are thus palpated in their supra-duodenal portions, the retro-duodenal part of the duct is exposed by mobilizing the second portion of the duodenum to the left and the duct palpated in the enfolding substance of the head of the pancreas. If the indication exists, the duct is

opened by anterior longitudinal incision below the confluence of the cystic duct, and exploration carried out, first by a small scoop with malleable shank, secondly by graduated olive-tipped urethral bougies, whose successful passage through the papilla into the duodenum is proved by the irrigation test. The hepatic ducts are explored in a similar way. If calculi or detritus are present, the papilla is dilated by the passage of graduated bougies, as described in a previous paper. If the pathologically dilated stump of the cystic duct invites exploration through its lumen rather than through an incision in the common duct, this avenue is used but in my experience it is rarely so satisfactory and offers more disadvantages than otherwise over the former method. Drainage is nearly invariably carried out by an inlying rubber tube of suitable calibre, with a terminal opening and a lateral fenestration about two cm. proximal to the end passed upward with the intention that the end may pass into either primary hepatic duct and the lateral opening may be opposite their confluence, thus giving unobstructed drainage of bile.

*Drainage of the Wound* In the earlier cases in this series, the field was invariably drained by a small soft rubber or protective tissue egalette drain, with no gauze tampon, carried down to the deepest part of the subhepatic fossa and brought out at the upper angle of the wound. More lately, if the field is clean and dry, no drain has been used. Usually when an inlying tube has been placed in the common duct it is considered to be a sufficient drain for the whole field. I do not use drainage through a dependent lateral incision, believing that it has no compensatory advantages.

*Wound Closure* has been almost invariably by continuous No. 1 chromic catgut to the peritoneum and posterior sheath, overlapping interrupted mattress sutures of No. 1 or No. 2 chromic gut to the anterior sheath with or without supporting sutures of silk worm gut through all layers but the peritoneum. Since these wounds are never surgically clean, and as I am convinced that even sterile bile is a deterrent to sound healing, and since postoperative disruption and hernia are not uncommon in these wounds, it seems wise usually to use supporting sutures.

*Postoperative Care* has been conducted according to prevailing principles. I have all ways deprecated the application of tight binders as tending to diminish vital capacity and to create conditions favorable to pulmonary congestion, atelectasis and pneumonia. On the other hand I believe that fairly firm support for the lower part of the wound is advisable for the comfort which it gives and for security. Morphine in small doses is necessary to afford rest, lessen nervous wear and tear and aid pulmonary expansion by limiting pain. Ventila-

tion by CO<sub>2</sub> seems to be useful, but I am not certain.

The results of these concepts and principles of treatment are now presented. Table II shows

TABLE I  
426 OPERATIONS ON THE BILIARY PASSAGES  
PERSONAL CASES PETER BENT BRIGHAM HOSPITAL  
1913-1935

ANESTHESIA	
Ether open mask method	36%
Gas Oxygen novocaine infiltration (supplementary ether ?)	18
Avertin 30-100 mg supplementary ether	31
Gas Oxygen	6
Novocaine infiltration supplementary ether	3
Spinal	4
Not recorded	2
13 fatal cases received Ether	
1 fatal case received Novocaine	

that the total operative hospital mortality in 426 operations on the biliary tract (excluding carcinoma) was 3.2 per cent. A statement of the greatest, least and average age, of the proportion of sexes and of the average postoperative days in the hospital is given.

TABLE II  
PERSONAL CASES PETER BENT BRIGHAM HOSPITAL  
1913-1935

416 Patients had 426 Operations on the biliary passages exclusive of carcinoma.
There were 14 deaths a mortality of 3.2%
Oldest—83 years
Youngest—14 years
Males—80
Females—336
Average postoperative days in Hospital—19.4%

Table III gives the number of various pathological conditions the types of operations performed, and the mortality of each group. Here certain explanations must be made. Instances reported by pathological examination as "subacute cholecystitis" have been classified as acute. The term "subacute" seems to me not useful or exact. Similarly, in a few instances in which a pathological diagnosis of chronic cholecystitis is recorded, but which were characterized clinically by marked fever, leucocytosis, local tenderness and spasm, and by operative findings of a swollen, congested, edematous, mottled or even semi necrotic gall bladder containing puriform fluid, the disease has been recorded as acute. Whether this classification finds acceptance the fact may be pointed out that taking together all the cases of cholecystostomy and simple cholecystectomy for acute cholecystitis of all degrees, together with the cases of secondary cholecystectomy following prior cholecystostomy, we have ninety-three operations concerned with acute cholecystitis carried to a final conclusion without mortality. On the other hand, the evil influence of acute cholangitis and

calculi in the common duct requiring exploration of the latter, as a complication of acute cholecystitis, is seen in the twenty-one instances of cholecystostomy and primary cholecystectomy each with exploration and drainage of the common duct, which show three deaths, a mortality of 14.2 per cent. Similarly, the contrast of a mortality of 1.1 per cent in 169 instances of primary cholecystectomy for chronic cholecystitis, and of a mortality of 3.2 per cent in 123 instances of primary cholecystectomy for chronic cholecystitis with drainage of the duct,

TABLE III  
TOTAL BILIARY TRACT OPERATIONS

	Cases	Deaths	Mortality %
Cholecystostomy, alone, acute and chronic	17	0	0
Cholecystostomy and Drainage of Common Duct	5	1	20
Primary Cholecystectomy for acute cholecystitis	45	0	0
Primary Cholecystectomy for acute cholecystitis with Drainage of Common Duct	16	2	12.5
Primary Cholecystectomy, only, for chronic cholecystitis, with or without calculi	169	2	1.1
Secondary Cholecystectomy following Cholecystostomy	31	0	0
Primary Cholecystectomy for chronic cholecystitis, with Drainage of Common Duct	123	4	3.2
Drainage of Common Duct, alone, chiefly secondary, after operation here or elsewhere	12	1	8.5
Miscellaneous, including drainage of peritonitis and sepsis from spontaneous rupture of biliary passages, etc, including one cholecystectomy for acute yellow atrophy	8	4	50
	426	14	3.2%

Or, take 1, 2, 3, 4 and 6 together—mortality of 2.6%

shows the serious factor introduced by common duct disease into the surgery of the biliary system. The four deaths listed under "miscellaneous" should be further examined. The first concerned a secondary exploration of a complete biliary fistula, following drainage of a biliary and septic local peritonitis due to spontaneous rupture of the bile duct subsequent to cholecystectomy and failure to explore the duct, performed elsewhere. Autopsy showed peritonitis, multiple abscesses and arteriosclerotic kidneys. The second was an acutely ill woman whose gall bladder had been removed elsewhere two years previously. A right-sided biliary and purulent peritonitis was drained, and three weeks later exploration showed a spontaneous perforation of the retro-duodenal part of the duct,

with calculus. An anastomosis was attempted, death occurred in eighteen hours. Autopsy showed peritonitis, cholangitis, hepatitis and multiple abscesses. The third was a woman of sixty-eight with jaundice due to a stricture of the duct following operative injury two years previously. At operation a transduodenal approach was necessary to identify the duct, a reconstruction of the duct was done, death occurred on the eighth day, the autopsy showed peritonitis apparently due to a weakening of the duodenal wall occasioned by the separation of adhesions. The fourth case was a jaundiced woman complaining of epigastric pain, an adherent but otherwise normal gall bladder was removed (reported normal by the pathologist) and the duct opened with negative findings. The liver was small and soft, acute yellow atrophy was suspected, death occurred with toxic symptoms in thirty hours, autopsy showed that lesion to be the cause of death. This case was not included in table II under "Primary Cholecystectomy for Chronic Cholecystitis, with Drainage of Common Duct" because it did not seem to belong there, if it is included it will raise the mortality in that group from 3.2 per cent to 4 per cent.

Table IV indicates the number of times the

TABLE IV  
426 OPERATIONS ON THE BILIARY PASSAGES,  
PERSONAL CASES, PETER BENT BRIGHAM HOSPITAL  
1913-1935

The Common Duct was explored in 37.9% of 426 operations on the Biliary Passages, as follows:

Primary Cholecystectomy for acute cholecystitis	16
Cholecystectomy for chronic cholecystitis	123
Primary and Secondary Choledochostomy only	15
Primary Cholecystostomy	4
	168

Calculi were found in 70 cases, or 44.3% of instances of exploration of the Common Duct.

(Note—"Calculous débris," 9 cases, are classified with calculi.)

common duct was explored in certain types of cases, and the incidence of calculi. It was hard to know how to classify "calculous débris or detritus", it seemed fairest to classify them under calculi, with this word of explanation. This table shows that the common duct was explored in 37.9 per cent of all operations on the biliary tract, and that calculi were found in 44.3 per cent of those explored, or in 16.4 per cent of the total number. This proportion has remained fairly constant in my hands, because I was early convinced of the necessity and comparative harmlessness of opening the duct.

Table V lists the postoperative complications, excluding those in fatal cases which will be separately considered. The problem here is to distinguish between the various frequent and usual

sequelae of major abdominal operations which are so common and inevitable as to be expected in the average case, and those which are marked or severe enough to modify the course of convalescence or require special measures for their alleviation. There were twenty six instances of respiratory complications of which seven are listed as pneumonia, usually on the basis of roentgenological rather than physical evidence. Atelectasis is not listed since only minor degrees of the condition were noted which are included under the captions "pneumonia" or

TABLE V

PERSONAL CASES BILIARY TRACT DISEASE  
PETER BENT BRIGHAM HOSPITAL  
1913-1935

Postoperative Complications not fatal

Pneumonia	7
Minor Respiratory	19
Infection Wound	6
Separation of wound (no evisceration)	6
Hemorrhage	1
Pulmonary Infarction	1
Cardiac Decompensation	1
Secondary late discharge of bile	1
Phlebitis	1
Postoperative Intestinal Obstruction	1
Pancreatitis local peritonitis	1
Gall Stone Colic	1
Prostatic Urinary Retention	1
Persistent Vomiting	1

"minor respiratory" The six wound infections include cases where it was necessary to re-open and drain a considerable part of the wound for cellulitis. Naturally, very many of these wounds are slightly infected. In six instances there was some separation of the fascial and muscular layers, requiring either re-suture or firm strapping. In no case was there disruption with evisceration. Of the two cases of hemorrhage one was a slow leakage from the gall bladder bed in the liver requiring re opening of the wound and suture, the other was a minor oozing from a vessel in the rectus sheath. The two pulmonary infarctions were of comparatively minor type. The two instances of secondary late discharge of bile represented accumulations after the withdrawal of the drainage tube, and were of no consequence. There was no instance of persistent biliary fistula.

The question of the performance of other operative procedures during the course of operations on the biliary tract often arises and must be settled on the question of the urgency of the associated lesion and the probable ability of the patient to withstand the double strain. In very many instances, operations of pure expediency which could doubtless perfectly well be postponed to a later date can be performed with safety, to the great satisfaction of both doctor and patient. In the present series, nineteen simultaneous operations of some importance have

been performed with one death. This was in a cachectic, jaundiced woman with a history of gastric ulcer for years. There was marked gastric stasis. At operation a cholecystectomy for chronic cholecystitis and gall stones was done, the largest calculus of my experience removed from the common duct, and a Finney pyloroplasty made for the relief of pyloric obstruction. Death occurred in five days, no autopsy. It was my judgment that correction of all the lesions at one time was necessary for recovery, but perhaps a two-stage operation could have been carried out successfully. The list of the eighteen successful multiple procedures is as follows:

Cholecystectomy, removal of pancreatic cyst  
Cholecystectomy, sleeve resection of the stomach for ulcer  
Cholecystectomy, sleeve resection of the stomach for ulcer  
Cholecystectomy, Finney pyloroplasty  
Cholecystectomy, posterior gastro-jejunostomy  
Cholecystectomy and choledochostomy, gastro-jejunostomy  
Cholecystectomy, repair of old ventral hernia, three cases  
Cholecystectomy, removal of ovarian cyst, two cases  
Cholecystectomy, choledochostomy, removal of ovarian cyst  
Cholecystectomy, choledochostomy, splenectomy, three cases  
Cholecystectomy, ventral suspension of the uterus  
Cholecystectomy, ventral suspension, anterior colporrhaphy  
Cholecystectomy total mastectomy

TABLE VI

PERSONAL CASES BILIARY TRACT DISEASE  
PETER BENT BRIGHAM HOSPITAL  
1913-1935

20 Cases of Simultaneous Unrelated Operations

Resection of the stomach for peptic ulcer	2
Finney Pyloroplasty for peptic ulcer	3
Posterior Gastrojejunostomy for peptic ulcer	2
Removal of pelvic tumors	3
Suspension of the uterus	2
Repair of Old Ventral Hernia	3
Splenectomy for Various Types of Splenomegaly	3
Miscellaneous	3

There was one death, a case of cholecystectomy exploration of the common duct and Finney pyloroplasty for obstructing ulcer.

Cholecystectomy, choledochostomy and splenectomy simultaneously performed in three patients make a group of some interest. The first was a jaundiced markedly anemic man of thirty six, studied on the medical service, where a diagnosis of splenomegaly, cholelithiasis and perni-



cious anemia was made. The history was of recurring attacks of long continued jaundice over a period of two years, with vomiting, weakness, loss of weight and anemia. There was doubt as to whether the jaundice might be hemolytic in type. At operation under ether, through a midline incision, a spleen twice normal size was removed, the gall bladder containing many small calculi excised, the duct explored with negative result and drained. The patient made a good operative recovery, was treated for pernicious anemia, and died two years later (before the days of liver therapy). The second patient was a markedly anemic, jaundiced woman of twenty-eight with a spleen whose lower pole was below the umbilicus and across the midline. There were definite attacks of biliary colic. At operation under ether anesthesia, a left paramedian incision was made, the very large adherent spleen removed, a small contracted gall bladder containing a soft calculus and buried in adhesions, excised, and a considerably dilated duct explored with negative findings. In spite of a red count of 2,800,000 no transfusion was necessary, the patient made an excellent recovery and reported herself as perfectly well eighteen months later. The third patient was a thirty-eight year old jaundiced woman with compensated double mitral disease, marked splenomegaly and moderate anemia. There was little complaint of gall stone symptomatology, but x-rays showed suggestive shadows. Under ether anesthesia, through a left paramedian incision a spleen of three times normal size was removed, the gall bladder containing calculi excised, and the common duct opened and relieved of several small calculi. She made an excellent recovery, and eight months after the operation was delivered of a ten pound boy, so that it appears that she may have been pregnant at the time of operation. The ducts were opened in these cases with little evidence of the presence of possible calculi, because it was determined to clear up the responsibility for the jaundice. In only one case were calculi found, and it seems unlikely that they were responsible, although to leave them would have invited further trouble.

Table VII presents the end-results in this series so far as known at present. They are taken from the Hospital records and represent the gleanings from the regular two-year follow-up system, supplemented in many instances, especially private patients, by reports covering many years. They confirm the impression which all surgeons have that the results of surgery on the biliary passages are extremely satisfactory. As is usually the case, it is easy to find explanations and excuses for many in the "not relieved" column. Two patients from whom gall bladders containing calculi were removed (normal common duct),—proved to be psychotic, continued

their food strikes, and died months afterward from inanition without biliary tract symptoms, three patients with non-calculous chronically inflamed gall bladders got little relief from their removal, as is well known frequently to be the case, two patients were re-operated on later and previously overlooked common duct calculi removed, in two patients the symptoms strongly

TABLE VII  
426 OPERATIONS ON THE BILIARY TRACT  
PERSONAL CASES, PETER BENT BRIGHAM HOSPITAL  
1913-1935

	Well Relieved		Not Relieved	No Report
Primary Cholecystectomy only	104	17	5	41
Cholecystectomy, with Exploration of the Common Duct	93	11	6	23
Secondary Cholecystectomy following Cholecystostomy	20	3	3	5
Cholecystectomy, for acute cholecystitis	34	4	0	7
Cholecystostomy, only	8	6	0	3
Choledochostomy, only	6	4	1	0
Of the 325 patients followed up				
81.5% are well				
13.8% are relieved				
4.6% not relieved				

suggested overlooked calculi but for various reasons no re-operation was done, five patients who were operated on for organic biliary tract disease, subsequent events proved to be suffering also from other abdominal visceral conditions.

A statement of the causes of death in the fourteen fatal cases appropriately closes the statistical part of this report, as follows:

Hemorrhage—1  
Myocarditis and renal insufficiency—2  
Shock—1  
Myocarditis and asthma—1  
Angina pectoris—1  
Pulmonary embolism—1  
Peritonitis—2  
Sepsis, cholangitis—2  
Cholemia, uremia, hepatic insufficiency—1  
Acute yellow atrophy—1  
Unexplained—1

The single known death from hemorrhage was most interesting on account of its unusual cause. It concerned a forty-eight year old jaundiced man with an icteric index of fifty to seventy-nine, a bleeding time of two minutes and clotting time of two minutes, forty-five seconds. A tensely distended adherent gall bladder full of calculi and a huge common duct containing

fourteen of the largest calculi in my experience created some difficulties but the usual technique was carried out including closure of the gall bladder fossa with sutures of 00 chromic gut, the field was left dry and the patient came off the table in supposedly fair condition. Four hours later he was suddenly noted to be shocked, and death occurred seven hours after operation. There was no bleeding from the drainage tract. A very careful autopsy showed that an anomalous right hepatic artery derived from the superior mesenteric entered the liver and ran for some distance just beneath the capsule of Glisson in the liver bed, it had been pricked by the needle in closing the latter and had leaked into the peritoneal cavity. The instance

TABLE VIII

PERSONAL CASES, BILIARY TRACT DISEASE  
PETER BENT BRIGHAM HOSPITAL, 1913-14

## Causes of Death in 14 fatal cases

Hemorrhage	1
Myocarditis, renal insufficiency	2
Shock	1
Myocarditis, asthma	1
Angina Pectoris	1
Pulmonary Embolism	1
Peritonitis	2
Sepsis, Cholangitis	2
Cholemia, Uremia hepatic insufficiency	1
Acute Yellow Atrophy	1
Unexplained	1

of unexplained death was an easy cholecystectomy for chronic cholecystitis and cholelithiasis in a thirty-seven year old woman, not jaundiced. She came out of her ether anesthesia, talked, and was thought to be in satisfactory condition. Seven hours after operation she rather suddenly became weak, restless, anxious and sweaty. Examination of the drainage tract showed no evidence of hemorrhage so she was not transfused, and other measures failed to prevent her death eleven hours after operation. Autopsy was refused, but again examination through the wound showed no bleeding. The cause of death remains a mystery, it may have been embolism, but no pulmonary pathological condition was noted.

I am frankly puzzled as to the existence of a somewhat mysterious "liver death", as described by Heyd and discussed by others to which persons operated on for biliary tract disease are peculiarly liable to succumb. This is supposed to be of three types—first, a patient with simple cholecystitis without jaundice, fails to recover consciousness or lapses at once into coma, the pulse rate and temperature rise rapidly and death occurs in thirty-six hours, secondly, a patient on whom a choledochostomy is done for obstructive jaundice who progresses favorably for a few days and then develops successively excitement, delirium, stupor and coma while the bile becomes less in amount

and more watery in character, thirdly, a patient with cholangitis and pancreatic disease but without jaundice progresses well for twenty-four hours only to lapse into a condition resembling a delayed shock with falling blood pressure, cold extremities, urinary suppression and death. It does not appear that any of the deaths in this series conform to these groups, and since the observed lesions in most of the fourteen fatalities among 426 operations on the biliary passages amply account for the issue, scarcely anything seems to remain to be puzzled about. Perhaps S No 10527 is an example of the second type. He was a man aged twenty-four, upon whom five and a half months previously a cholecystectomy for chronic cholecystitis and cholelithiasis had been done, the duct having been explored with failure to secure a calculus which slipped up into the hepatic ducts. He was well for five and a half months and then was readmitted with epigastric pain, jaundice and clay-colored stools of eleven days' duration. At operation the common duct was explored in the usual manner, with failure of instrumental passage through the papilla the duodenum was mobilized and the ampulla of Vater opened through the edge of the pancreas and a calculus removed. There followed profuse discharge of bile and a breaking down of the wound suggesting the agency of pancreatic secretion, though of this there was no real evidence and the wound granulated well. Biliary discharge continued, and some bile appeared in the stools, but the patient vomited occasionally, became unreasonable and unruly, insisting on smoking and getting out of bed. The abdomen remained soft and not distended the bowels moved satisfactorily and there was no fever. He died of exhaustion on the twentieth day, no autopsy could be obtained. This occurred sixteen years ago and some of the measures and laboratory work which would be routine now do not appear upon the records. Perhaps this was a "liver death", but to my mind there was no more evidence of liver insufficiency than of other visceral failure.

Adequate liver function is necessary for life, and if degeneration of liver parenchyma occurs from any cause to a degree reducing its functional efficiency below a certain level, death will ensue. Such a degeneration occurs as a part of the pathological picture in numerous diseases. Inasmuch as gall stone disease is so commonly associated with jaundice and cholangitis, conditions which have a directly harmful effect on the liver cells, which may be suffering also from blood borne toxins and poisons it is only reasonable to believe that diseases of the biliary tract must be peculiarly liable to a fatal issue due to hepatic insufficiency. That over and above this there is a peculiar type of "liver death" I am extremely skeptical if there is, it seems remarkable that no definite

instance has appeared in this series of 426 operations

Some years ago I called attention to the practice of purposeful dilatation of the papilla of Vater in the course of exploration, evacuation and drainage of the bile duct, to favor more free natural drainage and the passage of overlooked calculi and débris into the duodenum. Objection has been raised to this on various grounds, but chiefly on account of the obvious possibility of the reflux of activated pancreatic enzymes and duodenal contents with consequent digestion of the wound and duodenal fistula, well known to be a very fatal complication. It is timely now to state that I have carried out this procedure consistently, when possible, in every case of common duct exploration without experiencing a single clear instance of unfortunate sequelae. The one instance where duodenal and pancreatic reflux was suspected, was in the case noted above where the ampulla had to be opened by retro-duodenal approach, affording ample opportunity for direct leakage. An important paper by Allen and Wallace on this subject, from the Massachusetts General Hospital, soon to appear, is strongly confirmatory of this point of view. I am convinced that the relative freedom of the patients in this series from symptoms of persistent or recurrent calculi in the ducts is in some measure due to dilatation of the papilla.

One of the underlying concepts mentioned at the beginning of this paper was that surgical deprivation of the gall bladder, in the vast majority of cases, caused no digestive disturbances or had other regrettable sequelae, and the end results in this series seem fully to justify this belief. The ill effect most frequently attributed to cholecystectomy is diarrhea, alleged to be due to the constant pouring of unconcentrated bile into the duodenum, when it is not actually needed for digestion. The firmly held belief of some internists in this result has led

me to make particular inquiry about it. In the 325 patients with a follow-up record, there is mention of diarrhea in just one instance, and in that it was a feature of chronic intestinal indigestion long prior to the operation. Particular personal inquiries among private patients have never brought a complaint about diarrhea, and I believe that as a sequel to cholecystectomy it is a myth.

Such a communication as this could not end without the usual plea that patients with disease of the biliary passages be brought to the surgeon early rather than late. No surgeon claims that his art is preferable, if more natural and equally effective means of cure are at hand. Unfortunate incidents and results may attend surgery. In this series, in two instances there was serious operative injury to the ducts, successfully repaired for the time, at least, and there are seven known cases of postoperative hernia. But almost uniformly the unfortunate incidents are in neglected cases, where operative risks are greatly enhanced by complications. It is the old story, education of the profession and the public to a realization of the evils of delay will place the surgery of the biliary system in the same category of efficiency and safety as appendicitis.

CHAIRMAN FRENCH: The next paper will be read by Dr. Fuller Albright. His paper is "Hyperparathyroidism."\*

\*The paper by Dr. Albright is being retained until further studies on the subject have been completed.

CHAIRMAN FRENCH: The Nominating Committee has brought in for you two names for officers of this Section for next year. For Chairman, Dr. E. P. Hayden, Boston, and for Secretary, Dr. Frederick S. Hopkins of Springfield. Are there any other nominations? If not, I will ask for an expression of your opinion. All those in favor of these two names will say Aye, those opposed No, so voted.

The next paper will be read by Dr. Oliver Cope. Its title is "The Surgery of Subtotal Parathyroidectomy."

## THE SURGERY OF SUBTOTAL PARATHYROIDECTOMY\*

BY OLIVER COPE, M.D.†

### 1 INTRODUCTION

**H**YPERPARATHYROIDISM can no longer be considered a rare disease. Since the surgery of the parathyroid glands is in so many respects unique in the field of endocrine surgery, the problems of treatment of hyperparathyroidism merit separate consideration.

At the Massachusetts General Hospital there have been twenty-seven cases of proved hyperparathyroidism. Eleven of these have been re-

\*From the Surgical Services of the Massachusetts General Hospital.

Read at the Annual Meeting of the Massachusetts Medical Society, Section of Surgery, June 4, 1935.

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ferred from clinics near Boston where several of the doctors have taken an active part in the study of this disease. Through the imagination and unceasing interest of Dr. Albright and the active cooperation of the entire staff of many departments, sixteen of the cases have been found in our hospital clinics. It is thus apparent that this large series of cases has not been collected from far afield, but that a considerable proportion have been found in the routine run of patients appearing at the Massachusetts General Hospital. In order to facilitate the investigation of the problems of parathyroid surgery, the Surgical Staff assigned to Dr. Churchill the surgical management of these

cases. This assignment Dr Churchill has very generously allowed me to share with him and I am indebted to him and to the Surgical Staff for being able to report this work.

Dr Albright has discussed aspects of the diagnosis of hyperparathyroidism I shall therefore, not concern myself with the difficulties and problems of diagnosis but shall limit this paper to the treatment of the disease.

The treatment of hyperparathyroidism may be divided into three parts. The first or medical treatment, as the result of the experience of our early cases, is now known to be dangerous. Of the three patients in this series who have subsequently died, death can be directly attributed to the renal complications of the disease. In two of these three patients although prior to operation clinical improvement was obtained with a high calcium diet, deposition of calcium phosphate occurred in the kidney during the period of observation. Two of the three deaths were primarily due to the impairment of renal function, the third to abscesses in both kidneys following the removal of a stone from one.

The second possible form of treatment is by radiation. We have tried this, are trying it at the present time, and so far have been unable to demonstrate any success. The reports in the literature of benefit by x ray treatment in hyperparathyroidism unfortunately cannot be accepted since the data furnished are insufficient for proper evaluation.

Surgery is then left as the third and recommended form of treatment, although the ultimate success remains to be determined as time advances. To date the results have been excellent in the group of single tumor cases with out severe renal complications. In those cases with generalized hyperplasia of all parathyroid glands, the result of operation is not yet established although immediate improvement occurs.

## 2 DISSIMILARITY TO THYROID SURGERY

The surgery of the parathyroid glands is based upon the same principles as the surgery of any endocrine gland. It involves the removal of overfunctioning parathyroid tissue. If potentially normal functioning parathyroid glands are present, the surgery is limited to the removal of one or more adenomatous glands. If all of the parathyroid tissue present is over active, sufficient of this tissue must be removed so that the remaining hyperactive tissue brings the parathyroid activity within normal limits. In this sense it is similar to the surgery of the thyroid, adrenal, pancreas or other endocrine gland.

In the case of the thyroid gland, the surgical treatment has reached a high plane. The indications for operation are becoming daily clearer. The surgical technique has been ably demonstrated and the pitfalls carefully described by a large number of workers. There

are two things which have aided the accomplishment of this. First, the thyroid gland is anatomically accessible. Secondly, if too much thyroid tissue is removed in the operation so that the thyroid activity is brought below normal requirements a replacement therapy is readily available. A patient in whom partial myxedema is produced by over zealous removal of thyroid tissue may not thank you for condemning him to take dried thyroid or thyroxin but at least his life has not been endangered. In hypothyroidism thyroid medication produces normal health. Thyroid extract is an adequate replacement therapy.

In the case of the parathyroid glands, however, there is no such adequate replacement therapy. The use of parathormone in hypoparathyroidism or tetany of parathyroid origin is not comparable to the use of thyroid in myxedema. The parathyroid hormone as it is available at present does not have a constant effect. A so-called immunity develops following its administration which in a short time prevents its constant use in large doses over a long period of time. In mild tetany calcium by mouth may be adequate to control the symptoms. In severer tetany, Viosterol in relatively large doses is the drug from which most benefit can be derived. Let me emphasize, however, that the removal of too much parathyroid tissue may condemn the patient not only to tetany, its disagreeable neurological symptoms and to cataract but also if the tetany is severe, to a possible fatal outcome. In two of our patients who died, tetany was a contributing cause of death.

The treatment of chronic tetany by grafts of parathyroid tissue is still in the experimental stage. The reports of Stone and others of the success of human parathyroid grafts remain to be established. Stone's method of grafts spans in one step, at least, three major biological difficulties of tissue culture and grafting. Much work must be done before these reports can be accepted.

Surgery of the parathyroid glands involves naturally many of the same anatomical considerations common to thyroid surgery. The identification of parathyroid tissue is, however, so much more difficult, that although the anatomical considerations may be the same the surgical technique must be considerably different. In our series of twenty-seven cases, there are four patients who were operated upon previously by other hands without exposing the parathyroid tumor. At a subsequent operation at the Massachusetts General Hospital, a tumor was found in each case. It has become apparent that the previous failures were due to an attempt to apply the technique of thyroid surgery to the problem of the parathyroid glands.

The search for parathyroid tissue must be carried to far greater distances than the area immediately surrounding the thyroid gland. It has been found that the parathyroid bodies may

occur over a wide area. The embryological descent of parathyroid tissue from the pharynx into the neck determines this area. In this series parathyroid glands have been found from above the level of the upper poles of the thyroid to the second interspace in the anterior mediastinum and also in the posterior mediastinum. Theoretically they may occur from the pharynx down to the lowest expected level of thymus tissue.

The recognition of parathyroid tissue even when exposed may be difficult. Great care must be taken to avoid traumatizing the parathyroid tissue which has no supporting stroma similar to that of the thyroid. The slightest trauma causes the rapid spread of hematomata in the parathyroid tissue which destroys the characteristic light brown color with the smooth glistening surface changing it to a redder, rougher tissue, easily mistaken for normal thyroid or a hemolymph gland. In one of our recent patients, I spent over an hour finding the fourth parathyroid gland because in the original exposure of the left thyroid lobe I had traumatized the only exposed portion of this gland as it lay in the sulcus of the thyroid lobe. It was necessary to search every other possible location for this gland before opening into the thyroid gland. Complete exposure of it proved it to be a tumor almost completely buried in the thyroid.

Every surgeon versed in thyroid surgery realizes the difficulty of recognizing parathyroid tissue. It is one thing, however, to avoid the removal of parathyroid tissue in performing a thyroidectomy and quite another to expose and identify all of the parathyroid tissue present. From the technical point of view this cannot be too strongly emphasized. The surgical method ordinarily applicable to thyroid surgery may be inadequate or insufficient when applied to the parathyroid glands. Infinite care, a bloodless technique, time and patience are required to solve satisfactorily the problems of parathyroid surgery.

### 3 HYPERPARATHYROIDISM ASSOCIATED WITH ADENOMAS

All the operative cases of hyperparathyroidism reported in the literature, other than those from our clinic, have been associated with distinctly localized adenomas of one or rarely two parathyroid glands. Hyperfunctioning adenomatous tissue is the common cause of the disease. Twenty-one of our cases fall in this group. The treatment in these cases once the adenomas have been isolated is either total or subtotal removal. In the majority of cases the whole adenoma is excised. If two adenomas are found, both will be removed.

On the other hand there are, we believe, definite indications for a subtotal removal of these parathyroid adenomas. If a previous operation

has been performed, in an attempt to find a tumor, two things may have occurred which will alter subsequent procedure. If the surgeon was not familiar with the appearance of normal parathyroid tissue he may have removed one or more normal parathyroids thinking they might be tumors. This occurred in all of the four cases which had been operated upon elsewhere. This is an unwise procedure since it does nothing to cure the disease and only jeopardizes the patient's life when the tumor is finally found. In addition, rough handling of normal parathyroid glands or their vascular pedicles with consequent scar tissue formation and impaired blood supply may reduce the amount of available normal parathyroid tissue. Either or both of these conditions are definite indications for subtotal removal of the parathyroid tumor when it is found at a secondary operation.

The third indication for subtotal removal of a parathyroid adenoma is active bone disease with a preoperative high blood phosphatase value. The blood phosphatase, I believe, is an indication of the rapidity of resorption and deposition of calcium phosphate in the bones. The drop in blood calcium following an operation is apparently to a certain degree carried into tetanic levels by bones hungry for calcium. It has thus become our plan to leave a portion of a single tumor when a previous operation has been performed and we cannot be certain of the amount of remaining normal parathyroid tissue or in the case of patients with active bone disease with high phosphatase levels.

It is unfortunate that the size of the tumor may give an erroneous indication of the degree of hyperactivity. The largest tumor of the series weighed 53.2 grams and measured 6.5 by 5 by 3.5 centimeters and was unaccompanied by tetany following the removal of the whole tumor. The smallest tumor which measured 10 by 5 by 4 millimeters, very little larger than a normal gland, was accompanied by marked osteoporosis, severe skeletal changes with incapacitating spine deformities. The removal of this small tumor has presented perhaps the most dramatic cure of our series. Before this patient was operated upon in January, 1932, she had been practically bedridden for two years. Six months after operation she was up and about, well, and looking for work. To the present time she has remained cured.

In our series of twenty-one cases of parathyroid adenomas, subtotal removal has been carried out in seven. Four of these were in patients who had had previous operations and two of these have subsequently died, one died six weeks after operation from renal insufficiency and tetany, the other two years after operation from kidney infection. The third remains well after two and one-half years. The fourth has been operated upon only recently.

Of the three who had had no previous operation, two are well with normal parathyroid function for over a year, the third had the remainder of her tumor removed in a second operation which has resulted in complete relief of her symptoms for more than a year and a half. We believe that subtotal removal should be done recognizing that at a later operation it may be necessary to remove the remainder of the adenoma. It is much better to have to perform a second or third operation than to subject the patient to the tortures of tetany or to possible death.

I should also like to point out that tetany is increased by sepsis or other infections. The presence of infection may therefore be another indication for subtotal parathyroidectomy.

#### 4 HYPERPARATHYROIDISM ASSOCIATED WITH HYPERPLASIA OF ALL PARATHYROID TISSUE

One year ago Drs. Albright, Churchill and Castleman reported from our clinic three cases of hyperparathyroidism associated with hyperplasia of all the parathyroid glands. Each of the glands in its entirety showed a similar type of hyperplastic tissue microscopically distinct from the adenomas. Since that time Dr. Churchill has operated on one more case and I have had two cases. The occurrence of these six cases in our series of twenty-seven which is in the approximate ratio of one to five is so significant that they warrant special consideration. In other words in cases of hyperparathyroidism more than one in every five cases may be expected to be of this type. Clinically we have found nothing to differentiate these cases and the adenoma group. The surgeon who attempts operation upon a patient with hyperparathyroidism must be prepared not only to uncover and recognize a parathyroid adenoma but also to differentiate hyperplastic tissue and if this is present to uncover all the parathyroid tissue.

This diffuse hyperplasia of all the parathyroid tissue is transforming the surgical problem of hyperparathyroidism from mainly a "hide-and-go-seek" game to one of considerably greater difficulty. Subtotal parathyroidectomy must be the rule in all these cases and since no normal parathyroid tissue is present, the difficulty of determining how much tissue to leave behind is greatly enhanced. It should be pointed out that until a safe replacement therapy is available we are not sure that in these cases surgery will prove to be the best method of treatment.

I should like to present briefly the history of two of these six patients.

The first is a man of thirty-nine years whose symptomatology was mainly directed to his renal complication. He had had a series of attacks of renal colic which sent him to our hospital for study. He had also had for two years a mild generalized weakness. Investigation showed an elevated blood calcium, lowered blood phosphorus and a normal

blood phosphatase. X-rays of the entire skeleton showed no obvious bone disease. On exploring his neck, a parathyroid tumor was uncovered on the right side which from previous experience was recognized grossly as hyperplasia. It was more irregular and of a darker brown hue than adenomatous tissue. Further exploration revealed enlargement of all four parathyroid glands. It was in this case that nearly half the operative time was spent finding the fourth gland. To have been satisfied with three tumors would have done the patient no good. The finding of hyperplasia in one gland necessitates the uncovering of all the parathyroid tissue in order to evaluate how much gland is to be left and how much to be resected. Great care must be used in exposing the tissue since it is necessary to preserve the blood supply intact and to avoid the formation of hematoma in the portion of the tissue which you may want to leave behind.

After all four glands had been isolated and the position of the delicate pedicles determined, three in toto and all but a small portion of the fourth were resected. The unresected portion was the tissue surrounding the hilum of the gland. Measured at operation with calipers it was 7 by 4 by 3.5 millimeters, which is slightly larger than the average normal parathyroid. It was estimated that this residual tissue weighed but forty milligrams. If we take the ratio of the tissue left behind to that excised it is 1 to 170 (table 1). This is of an order

TABLE 1

W P. ♂ Aged 39 No. 240457

## Parathyroid Hyperplasia

Weight of parathyroid tissue excised

Lft. upper	4.96 grams
Rt. upper	1.03 grams
Lft. lower	0.11 grams
Rt. lower (subtotal)	0.10 grams

Total excised 6.80 grams

Weight (estimated) tissue not excised

Rt. lower 40 grams

Ratio remaining to excised

$$= 4/680 = 1/170$$

of subtotal excision of glandular tissue not ordinarily encountered in thyroid surgery. Ever since his operation in October 1934 he has remained well. Repeated check of his calcium and phosphorus blood levels, since operation show that his parathyroid function has remained within normal limits (table 2).

TABLE 2

W P. ♂ Aged 39 No. 340457

## Parathyroid Hyperplasia.

## Blood Levels

	Calcium	Phosphorus	Phosphatase
10/ 5/34	13.17	2.53	
10/ 8/34	11.30	2.35	
10/24/34	13.91	2.96	3.67
10/27/34			
10/29/34	9.43	1.34	3.87
11/ 5/34	9.19	3.33	
11/31/34	8.82	3.20	
1*/19/34	8.58	3.16	
2/27/35	11.03	2.98	3.63
3/13/35	9.74	3.4	

The second patient was an older person a woman of fifty-seven years. Her major complaints were also built around the renal complications but she had

also lost considerable weight, suffered from marked generalized weakness and had had diffuse bone pain. Four years before she came to us she had had one kidney removed. She was referred to our hospital because of colic in her remaining kidney. A routine x-ray plate taken of her kidney showed bone changes in the pelvis characteristic of hyperparathyroidism. Her blood studies showed the typical elevation of blood calcium and lowered blood phosphorus. Her blood phosphatase was, however, normal. Upon exploring her neck, a large left upper parathyroid tumor was uncovered. Again grossly, a diagnosis of hyperplasia was made. This was immediately checked with a frozen section by Dr. Castleman. Once more it became necessary to isolate all possible parathyroid tissue. Four tumors were identified without difficulty, two large upper and two smaller lower ones, and all except a portion of the left lower were excised.

As with the other patient the problem after exposure of all the tissue was the question of how much to leave behind. Let me summarize the points which were weighed in making this decision. First, the total amount of tumor tissue present was larger than in the case of the man. Secondly, the woman was sicker than the man and would in all probability withstand less well the shift to tetany. Thirdly, although the phosphatase was normal, obvious bone disease was present, which would increase the likelihood of tetany. Fourthly, kidney damage may make it difficult to treat tetany since acidosis occurs more readily. These four points are all in favor of leaving more rather than less parathyroid tissue. On the other hand, one kidney gone and the remaining one partially damaged demanded as rapid a cure of the disease as possible in order to prevent further renal impairment. The existing kidney damage was therefore also a definite indication for reasonably radical resection.

Approximately 200 to 250 milligrams of tissue was left behind. The weight of that which was excised was 11.2 grams. The ratio of remaining to excised was 1 to 49 (table 3). Her operation was on Feb-

TABLE 3

A	T	♀	Aged 57	No 342884
Weight of parathyroid tissue excised				
Lft upper				6.00 grams
Rt upper				3.75 grams
Lft lower (subtotal)				0.86 grams
Rt. lower				0.59 grams
Total excised				11.20 grams
Weight (estimated) tissue not excised.				
Lft lower				225 grams
Ratio remaining to excised				
= 225/11.20=1/49				

ruary 10, 1935, following which she has shown marked improvement, gaining weight and strength with gradual disappearance of her skeletal pains. Her calcium and blood phosphorus have to date remained within normal limits (table 4).

Both of these patients represent an almost lucky removal of sufficient parathyroid tissue, or perhaps an even more lucky removal of not too much tissue. It is impossible to state what would have happened if twice the amount had been left. The disease might have been equally well cured. Likewise if but half as much had

been left it cannot be definitely stated that last- ing tetany would have occurred though it is probable. We have not as yet had sufficient experience. No subtotal parathyroidectomies have been reported from any other clinic. We are by no means on such a sure footing as in surgery of the thyroid.

These two patients had very mild tetany post-operatively which is a thing we like to see. This

TABLE 4

A	T	♀	Aged 57	No 342884	
Parathyroid Hyperplasia					
Blood Levels					
			Calcium	Phosphorus	Phosphatase
1/25/35			15.62	2.49	
2/ 6/35			16.38	2.66	
2/ 8/35				2.91	4.84
2/ 9/35			Parathyroidectomy		
2/11/35			11.06	2.21	
3/ 9/35			11.8	3.11	2.56
4/16/35			10.24	3.66	
5/16/35			9.35	3.43	4.32

tetany very promptly disappeared but it gave us an indication that we had brought about a shift in parathyroid function. Mild tetany of this sort which disappears at the end of a week may be due to a shift, later compensated for, in the blood calcium partition. It may be due to a temporary subnormal parathyroid activity which is quickly corrected either by re-activation or regeneration of the normal or hyperplastic parathyroid tissue left behind.

The difficulty of the operative procedure lies in the evaluation of how much tissue to leave behind. No set rule can be stated as to how many milligrams should be left. In the fatal case with the severest tetany in which subtotal removal of an adenoma was done, far more tissue was left behind than in either of the two cases I have just reported or in two of the other subtotal removals. All of the features of each case must be evaluated and it is essential for the surgeon to understand not only the anatomy and surgical technique of the operation but also the metabolic physiology of the parathyroid glands.

Let me repeat that hyperparathyroidism is a more common disease than usually suspected, that its treatment is surgery, that to accomplish surgical results the problem is not only one of exposing parathyroid tissue but equally one of knowing how much to remove. Subtotal resection may be indicated in the adenoma as well as the hyperplasia group. Overzealous removal of too much tissue may end in graver disabilities than the disease itself.

CHAIRMAN FRENCH: The last paper will be read by Dr. Frank Lahey. His paper is entitled "The Reduction of the Mortality in Hyperthyroidism."

## THE REDUCTION OF THE MORTALITY IN HYPERTHYROIDISM\*

BY FRANK H. LAHEY, M.D.†

**I**N discussing the mortality rate of hyperthyroidism, one must appreciate that it can be influenced by a variety of factors not the least of which is the stage in the disease at which the physician sends the patient to the surgeon.

Nearly all physicians today are in agreement with our attitude, that when one can make the clinical diagnosis of hyperthyroidism with certainty, the indication is for surgery. There are, however, some physicians, and I saw this with out implied criticism and with complete respect for their opinion, who prefer to treat patients with this disease expectantly by rest or by radium or x ray therapy. To these men I would urge if, in spite of these measures there is an increase in the pulse rate, an increasing weight loss and increasing myasthenia or any

on patients who had been operated on for hyperthyroidism five years or over and everyone of whom were seen, examined and a basal metabolism done and have established the fact that 94.8 per cent of these cases were entirely free from all symptoms of hyperthyroidism.

If, as the result of my own personal experience in seeing a large number of patients with hyperthyroidism, I were asked to state what is the most important single feature related to the mortality of the surgery of hyperthyroidism, I believe I would say that it is the preoperative decision as to how severe the thyroid intoxication is and as to whether the patient will probably require multiple stage procedures. I have often stated and, as the result of this extensive experience, more than ever believe it

### MULTIPLE STAGE OPERATIONS

	Total Cases	One	Two	Three	Four	Five	Six	Total Operations	Deaths	Case Mortality	Operative Mortality
<i>Toxic</i>											
Primary											
Hyperthyroidism	4521	8220	1517	15	3*	5	2	6427	41	.90	63
Recurrent											
Hyperthyroidism	407	369	41					448	3	.74	67
Adenomatous Goutre with Secondary Hyperthyroidism	1417	1185	216	1*	2	3		1671	28	1.9	1.07
	6345	4774	1774	164	34	7	2	8546	72	1.1	.84

other signs of an increasing intensity of the disease, that they be promptly turned over to the surgeon for subtotal thyroidectomy. I urge them further, even if they remain stationary but do not show prompt and definite improvement under these measures that they be turned over to the surgeon for subtotal thyroidectomy. If the physician in charge of a patient with hyperthyroidism permits her to get into a severe state of intoxication before sending her to a surgeon he is directly responsible for the increase in the chances of a fatality which, if the disease is advanced, in all probability she must eventually face. The longer patients have hyperthyroidism, the greater the operative risk. It must be admitted as I will show in the slides, that subtotal thyroidectomy today in the hands of an organized thyroid clinic can and does cure patients of hyperthyroidism within a few weeks of its application and with an extremely low mortality rate.

We have published elsewhere follow up figures

to be true that the time to make one's decision concerning the probable risk of operative procedures on patients with hyperthyroidism is when they are first seen. This is the time when patients with this disease are at their worst, most apprehensive, often having journeyed some distance to consult us, frequently uninfluenced by the employment of iodine and emotionally upset from facing the ordeal of a possible surgical procedure. If the decision as to the degree of thyroid intoxication is made at this time and recorded on the patient's record as to the probability of multiple stage operations and their number, it will be done under conditions which will be on the side of safety. If, on the other hand a decision as to multiple stage operations be deferred until such a patient has been resting a day or two in the hospital, if she is seen in bed at rest under rodnization, after being quieted by hypnosis after forcing fluids and after having adjusted herself to her new surroundings, one may readily be misled into believing that such a patient will withstand a one stage complete subtotal thyroidectomy with safety. Likewise, under these conditions, it is easily possible to forget

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For record and address of author see "This Week's Issue"  
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how impressively toxic the same patient appeared two or three days previously when first seen at the office or in the clinic at the time of the first examination. We believe, therefore, that one of the outstanding requirements to diminish the mortality in the surgery of hyperthyroidism, is that a decision as to the degree of toxicity and the necessity of multiple stage operations be made when the patient is first seen at his or her worst.

The preparation of patients for the surgery of hyperthyroidism plays a considerable part in lowering the surgical mortality of this disease and it is important to have quite clearly in mind what one aims to do and desires to accomplish by this preparation. I have often stated that it is much better to think of hyperthyroidism rather in terms of hypercombustion than in terms of intoxication, since if one does this, one can appreciate that the purposes of all methods of preparation are one, to diminish the activity of the thyroid, the hypersecretion of which stimulates excessive combustion, and two, during this time to combat the destructive effect of excessive combustion by providing a substitute for the excessively stimulated organism to burn in order that it may not consume itself.

While I cannot undeniably establish the fact that the deaths associated with excessive hyperthyroidism are largely liver deaths, I have personally for a number of years been convinced of this fact and with widening experience, am more and more sure of it. As I have watched patients who have come to us in advanced stages of thyroid intoxication and who have died unoperated in extreme thyroid crises and as I have critically observed severe postoperative thyroid reactions, the probability of the previous explanation of a thyroid fatality seems more and more convincing to me, some of the evidence concerning which I submit.

It is not at all uncommon for unoperated patients who die in extreme states of hyperthyroidism to show jaundice in the terminal stage of their intoxication and in the entire absence of any evidence of gall-bladder or liver infection. This jaundice is of the hepatogenous and not the hematogenous type. Patients with severe and fatal hyperthyroidism as in those with liver damage, usually die with high and unexplained temperatures (105-106°) unassociated with operative procedures and unassociated with any evidences of infection. Patients with excessively and dangerously severe hyperthyroidism are strikingly benefited by the measures which prove so useful in patients with liver damage such as glucose, fluids and blood transfusion and finally, it has been definitely demonstrated that in the presence of a severe hyperthyroidism, there is a diminution in the glycogen reserve in the liver, a factor

which is so constantly valuable in protecting that organ against damage.

One may lessen the undesirable effects of excessive metabolic activity by rest in bed, thus lightening the metabolic load upon the organism, created by the demands of up and about activity. For this reason, we place all patients with hyperthyroidism in bed at rest for an average period of eight days before operation. During this time Lugol's solution, ten minims three times a day, is given, because Dr R. B. Cattell working in this Clinic in nineteen twenty-four on the effect of iodine upon the histology of the thyroid, demonstrated that in ninety per cent of the cases involution of the hyperplasia associated with hyperthyroidism would occur in these cases treated with Lugol's within this period of time. During this period of bedrest, patients are allowed to be up and about one hour in the morning and one hour in the afternoon in order that they may retain some of their muscular and vascular balance. They are placed upon a high carbohydrate diet in order to increase their glycogen reserve as much as possible and the endeavor is made to maintain a food intake which will not only keep them from losing weight but if possible, cause them to gain weight during this time. It is obvious that the arbitrary selection of eight days must often be extended to meet the needs of individual cases. In the average case, however, eight days will suffice to prepare these patients for operative procedures safely. In the very serious cases it frequently becomes desirable to augment such measures by the additional employment of constant intravenous fluids, concentrated glucose solution and intravenous iodine for two or three days previous to the operative date.

Nothing, in my opinion, is more important in reducing the mortality in the surgery of hyperthyroidism than the anesthesia, and the anesthesiologist. Ether is a distinctly undesirable anesthetic for patients with hyperthyroidism and I believe that the two chief reasons why ether is so undesirable at this time are as follows. One, the degree of excitation associated with its induction and two, the amount of postoperative vomiting which is associated with it. One must always be conscious of the fact that vomiting is a bad and at times fatal complication of hyperthyroidism, pre- or postoperatively or in a patient who is never to be operated upon. Vomiting unbalances metabolism since the overstimulated combustion associated with hyperthyroidism goes progressively on while the ability to take in fluids and fuel, and thus at least in some measure to offset the ravaging effects of hypercombustion, is lost. For these reasons, ether should never be used in patients with hyperthyroidism.

There have been many and ardent advocates of local anesthesia in patients with hyperthy-

roidism, an attitude with which I have never been in accord. Patients with hyperthyroidism are apprehensive and are emotionally sensitive. Their pulse rates during operation as the result of this apprehension and emotional ordeal are abnormally stimulated, thus distorting practically the sole guide we have during the operative procedure as to the degree of dangerous reaction. As with spinal anesthesia, because patients are awake and conscious, we are often wrongly misled into a false impression that such patients are safer by being protected from the undesirable effects of a general anesthetic. Just as with spinal anesthesia, this is in a measure true, but they are likewise often suffering doubly undesirable other effects. Local anesthesia in our opinion gained its greatest popularity as a substitute for ether and of the two, there is no doubt as to the superiority of local anesthesia but since we have had other general anesthetics which do not have the disadvantage of ether, local anesthesia producing as it does an emotional ordeal for the patient and in some measure likewise for the surgeon, has little or no place in subtotal thyroidectomy for hyperthyroidism.

Nitrous oxide is superior as an anesthetic to either of the two previously mentioned anesthetics, and up to the time that we had better gas anesthetics, it was the best of all the methods of anesthetizing these patients. Its greatest disadvantage is that a nitrous oxide mixture sufficient to maintain a satisfactory anesthetic depth contains only approximately nine per cent oxygen. If there is one thing that patients with excessive thyroid secretion and so excessive metabolic activity demand, it is sufficient oxygen. Nitrous oxide anesthesia with its considerable degree of anoxemia is far from a desirable anesthetic for patients with this disease and when compared with the other anesthetic to be mentioned later, with higher oxygen mixtures it will in severe cases not infrequently unbalance the scale on the side of a fatality.

Ethylene has been one of the greatest anesthetic advances in surgery and particularly as relates to anesthesia in the surgery of hyperthyroidism. It is a powerful anesthetic making control of these activated patients relatively easy. It has an oxygen mixture of approximately fifteen per cent and patients can be maintained under it without anoxemia. We have given it in several thousand cases without a semblance or suggestion of an explosion and if proper precautions are taken this danger is no greater than with other anesthetics as they are usually given.

We come now to one of the greatest advances, I believe, in the gas anesthetics and particularly in relation to the anesthesia for patients with severe hyperthyroidism, that is, cyclopropane. Cyclopropane is a hydrocarbon gas anesthetic  $C_3H_6$  which is very similar to ethy-

lene. It is slightly more explosive than ethylene, it is much more powerful than ethylene but it has the great advantage of maintaining an oxygen mixture of approximately eighty-five per cent. When one realizes how necessary oxygen is to these patients with markedly increased metabolic processes, it is evident that when one can employ an anesthetic with this high percentage of oxygen it is an extremely desirable one. We have now employed cyclopropane since October, nineteen thirty-three, in something over a thousand cases. We are using it more and more frequently for patients with intense hyperthyroidism who are extremely ill and it will, I prophesy in spite of its added cost as compared with ethylene and nitrous oxide, prove to be the anesthesia of choice for the surgery of patients with hyperthyroidism.

There is no place in surgery where expert and thyroid experienced anesthetists play a part in reducing mortality more than in the surgery of hyperthyroidism. Once the anesthetic is started, the surgeon is dependent on the anesthetist's decision as to how well the patient is standing the operation and whether it should be limited to a hemithyroidectomy or a subtotal thyroidectomy. There is no place in surgery where clinical judgment and experience on the part of the anesthetist are needed more than in the management of the anesthesia and patient during a subtotal thyroidectomy on a patient with severe hyperthyroidism.

Several times in our experience, patients' lives have been saved by our experienced anesthetists, by the immediate introduction with the laryngoscope of an intratracheal catheter through the vocal cords necessitated by spasm of the larynx or tracheal obstruction. Furthermore, anyone who has done many serious thyroid operations must be extremely conscious as I often have been, of the fact that the decision as to whether a tracheotomy must be done, must be almost entirely in the hands of the anesthetist. It is he who must finally say "This patient is not getting enough air. She must have a tracheotomy." If it is true, as everyone must admit, that to maintain a low mortality rate in thyroid surgery demands organized effort, then an all important element in that organized effort is undoubtedly an anesthetist experienced with thyroid conditions.

Some of the features immediately observable during the operation which are an indication of danger, a possible mortality and should lead the surgeon to limit the operative procedure are recorded here. If surgery be persisted with and complete subtotal thyroidectomies done in the face of progressively rising pulse rates while on the operating table there will be a distressingly high mortality rate. If surgery be persisted with in the presence of a persistently widening pulse pressure, there will be a high

mortality rate An indication of danger during the operation also is an increasing demand for oxygen on the part of the patient and an increasing difficulty in maintaining depth of anesthesia.

There are certain generalizations as to preoperative indications for multiple stage operations such as the youthful stand hyperthyroidism and the surgery for it better than do the middle-aged and old

Patients who show marked improvement and weight gain under iodine are better operative risks and better prospects of successfully withstanding one-stage operations than are patients who do not show improvement and who show weight loss

Patients who have been vomiting or who as the result of the disease have had recent diarrhea are notably bad risks

Children with hyperthyroidism are uncertain risks, largely because of one's inability to settle what is really reaction to thyroid intoxication and what is the children's capacity to react unduly to any intoxication In children, therefore, I have always maintained that because of this uncertainty it is safest particularly in the severe cases, to do two-stage operations

Weight loss in spite of a good appetite is an indication of the effect of a severe hyperthyroidism

Everyone who has dealt with hyperthyroidism appreciates that while it can exist for a long time and after subtotal thyroidectomy patients are apparently as well as they were before they had it, nevertheless, patients who have had hyperthyroidism for a long time stand operative procedures less well than do those who have had it for a short time

Age and its associated infirmities and damaged organs undoubtedly play a considerable part in the mortality of patients submitted to subtotal thyroidectomy for hyperthyroidism The mortality in patients past middle age is distinctly higher than in the lower age group, a fact which compels two-stage procedures in this group in spite of any apparent seriousness of risk

As may be seen by the operative figures, one does well to remember in foreseeing possible multiple stage operations that the mortality of patients with toxic adenomata has always been at least twice that of patients with apparently more severe and undoubtedly less dangerous primary hyperthyroidism or exophthalmic goitre

One should recall always the group of cases which I described under the term apathetic hyperthyroidism and appreciate that this is the group of cases in which no warning as to a possible fatality is given by the usual danger signs, excitation, activation, increased pulse rate and

impressive elevations of metabolism This is the type of case in which it must be realized that the patient is suffering from apathetic hyperthyroidism, and two-stage operations in such cases must be done not because of any striking danger signals but as a precautionary measure since we have learned and preached now for some time that it is in this type of case, not apparently very toxic, that stands the immediate operative procedure quite well that the latent unanticipated postoperative fatality occurs It is in the apathetic type of hyperthyroidism that we unhesitatingly do two-stage procedures, regardless of how well they appear or how well they are enduring the operation

There are certain technical necessities which have to do with mortality rates in subtotal thyroidectomy for hyperthyroidism While thyroid operations do not need to be rushed, we know from our experience with them that patients with hyperthyroidism do not satisfactorily withstand prolonged operative procedures One, therefore, needs to be expeditious in the surgery of hyperthyroidism Likewise, patients with hyperthyroidism do not stand blood loss well It is, therefore, important that bleeding be accurately controlled While on the subject of bleeding, it is extremely important to state that the avoidance of postoperative hemorrhages is directly related to the care with which vessels in the thyroid are caught and ligated and likewise distinctly influences mortality rates It is not usually appreciated how serious it is to have a postoperative hemorrhage in a patient with severe hyperthyroidism This complication is not only undesirable from the point of view of blood loss, but it is doubly undesirable from the fact that it tends to occur at a time when the patient is in a state of postoperative reaction, thus intensifying his already severe hyperthyroidism, that this must be further intensified by either an anesthesia in bed or a visit to the operating room and another anesthesia If there are many postoperative hemorrhages in patients with severe hyperthyroidism, there will be an unduly high mortality rate associated with these cases It is for this reason that we have never been interested in controlling hemorrhages in thyroid glands by suture, preferring to avoid postoperative hemorrhage by accurate ligation of each vessel With these precautions in our experience, we practically do not have to deal with the matter of postoperative thyroid bleeding

No patient who has been submitted to subtotal thyroidectomy should ever leave the operating table with any doubt as to whether that patient is breathing well If there be respiratory obstruction, the operating team should remain sterile, the patient be kept draped upon the table and unless within a reasonable time with the anesthetic off and no oxygen provided

the patient breathes freely and clearly, the anesthesia should be resumed, the wound reopened, the trachea exposed, the cause of obstruction demonstrated and removed and the patient sent back to bed breathing freely. If this cannot be done and interference with respiration persists, then a temporary tracheotomy should be done. As has already been stated, there is no better way to bring about a fatality in patients submitted to subtotal thyroidectomy for hyperthyroidism than to permit them to return to bed suboxygenated, cyanotic and anoxicemic. When such patients finally convince the surgeon that they are not breathing satisfactorily and are then submitted to a tracheotomy they frequently never regain consciousness and in spite of all measures, ultimately die. If there is a dependable maxim as relates to respiratory obstruction following surgery for thyroid disease, it is that patients must leave the table breathing well and if there is doubt due to partial tracheal obstruction as to whether a tracheotomy is necessary, then the tracheotomy is necessary. It is infinitely better to do a temporary tracheotomy which is properly placed and will close uneventfully than to wait until one is convinced of its need but find it then too late.

In discussing the proper location for tracheotomy, we have learned from Dr. W. B. Hoover of the Laryngological Department in the Clinic that the best place for a tracheotomy is not the place where it is most easy to do it. The tendency for inexperienced tracheotomists is to make the tracheotomy high where the trachea is readily reached. As Dr. Hoover has demonstrated to us, this is the point where the trachea is narrowest, this is the point where stricture is most apt to occur. When we do them, we place them low in the trachea as he has taught us to do where the tube may remain temporarily without discomfort and where the trachea will close readily without constriction after the removal of the tube.

The postoperative care of patients submitted to surgery for severe hyperthyroidism undoubtedly plays a very large part in the control of mortality. If patients are vomiting postoperatively, they need fluid, not in the form of fluid at intervals but they need fluids and fuel constantly. This is best given by tying an intravenous Henderson needle in the long saphenous vein just above the ankle and by running into the vein five per cent glucose in salt solution at the rate of thirty to sixty drops per minute during the entire twenty-four hours. Into this

may be introduced fifty minims of Lugol's solution which we demonstrated several years ago could be given intravenously with impunity, supplying thus even in patients who are vomiting the much needed postoperative iodine. During postoperative reactions, no matter what anesthetic is employed, particularly in patients with severe hyperthyroidism, there is a tendency to vomit, cutting off thus the natural source of intake of fluids and fuel. One must realize that during this stage the height of the excessive combustion is either constant or upward and that if fluids and fuel are introduced only at intervals there will be periods when the individual will be burning himself. If on the other hand fluid and fuel are introduced constantly by the intravenous drip, then the patient is at least in some measure being protected against the excessive combustion process until the effect of the subtotal thyroidectomy becomes active, lessens the output of thyroxin and lowers the metabolism.

#### CONCLUSIONS

These warnings and measures aimed toward helping others maintain low mortality rates in the surgery of hyperthyroidism, are the result of a number of years' experience and contact with a large number of patients suffering from this dangerous disease. They represent practical deductions based upon distressing and worrisome actual experience with patients in these serious states. They represent my own and the combined efforts of an organized group to accomplish, maintain and progressively lower mortality rates in the surgery of this serious, uncertain and fickle disease. From our earliest experience with it, I have been of the opinion have frequently stated and have become more and more convinced that the surgery particularly of hyperthyroidism differs considerably from that of other lesions and that it must be dealt with differently, and that to keep the mortality rate low it requires an organized effort on the part of several different individuals representing different branches of medicine. When it is dealt with casually by individuals as with appendicitis, hernia, fibroids, and so forth, the mortality will be distressingly high but when it is dealt with by an organized group dealing with these cases in numbers the mortality rate will be surprisingly low, the complications agreeably rare and the end results as gratifying as those following any operation in surgery.

[Meeting adjourned.]

## MEDICAL PROGRESS

## THE PROGRESS OF NUTRITION

BY FRANCIS LOWELL BURNETT, M D \*

## DEFICIENCY DISEASES, ARTHRITIS AND HEALTH

"IT is difficult to implant the idea of disease as due to deficiency. Disease is so generally associated with positive agents, the parasite, the toxin, the materies morbi—that the thought of the pathologist turns naturally to such positive associations and seems to believe with difficulty in causation prefixed by a minus sign. Even when Eijkmann had clearly established that beri-beri arose during the consumption of decorticated rice he was led to suggest not the simple view that the cortical substance was of direct use to the body but rather that it was necessary to neutralize the otherwise deleterious effect of a diet over rich in starch. The mental bias in every case has certainly been to delay the recognition of deficiency diseases" (Report on the Present State of Knowledge concerning Accessory Food Factors. His Majesty's Stationery Office, London, 1919, pp 2-3).

Since this opinion was expressed, many deficiency diseases have become recognized, and among them are two, rickets and osteomalacia, which are essentially diseases of the bones. Is it possible that a continued mental bias prevents the recognition of arthritis, another chronic disease of the bones, as a deficiency disease and one due to malnutrition? Some time ago Nichols, E H, and Richardson, F L (*J Med Research* 16 149, 1909) in their classical study of the disease suggested this point of view by the assertion that it was due to "faulty metabolism." Recently, such an assertion has been confirmed experimentally by Rinehart, J F, Connor, C L, and Mettler, S R (*J Exper Med* 59 97, 1934) through the production of arthritic lesions in guinea pigs from a scorbutic diet. And from the clinical standpoint, Minot, G R (*New Eng J Med* 208 1285 [June 22] 1933) has written "little is known concerning the difficulties of absorption and utilization of food products from the digestive tract and regarding what particular food factors may improve gastrointestinal function. It is probable that significant degrees of such disturbances may arise in arthritis and be overcome by well-chosen diets."

The most fundamental disorder perhaps, in the development of deficiency diseases, is the failure of normal nutrient substances to unite with the protoplasm of cells, to maintain them in a healthy state. Such a disorder is often man-

ifested by diametrically opposite structural changes in the tissues. In the most common, as shown in most deficiently fed animals and observed in the skin of patients with pellagra by Denton, James (*Am J Path* 4 341, 1928) is a general atrophy of the cells. But in the other, as shown in vitamin A deficiency in many animals and observed in the bone marrow of patients with pernicious anemia by Peabody, F W (*Am J Path* 3 179, 1927) is a hyperplasia of abnormal cells. Although these structural changes are undoubtedly an indication of faulty metabolism, their exact significance at present is beyond comprehension. Oddly enough, some what similar kinds of structural changes occur in the atrophic and hypertrophic types of arthritis, and thus the deficiency origin of this disease is pertinently suggested. As a consequence, if the cause of deficiency diseases is eliminated by the ingestion of complete food, the cause of arthritis may be also removed by "the selection of well-chosen diets" to improve nutrition.

Such a point of view has been taken by Burnett, F L, and Ober, F R (*Am J Med Sc* 188 93, 1934) and described in principles of treatment for this disease. On this theory, the construction and maintenance of cells in anabolic or normal nutrition, must be regarded as a complex and delicately adjusted process, which is brought about by the complete digestion and absorption of food, from the operations of a perfect nutritive apparatus. Under these circumstances, erroneous ways of eating and living must be corrected and controlled to produce the normal indices of absorption: the entirely segmented feces and normal intestinal rates, and thus create a previously unrecognized and improved state of health to cure disease. Thus, the well-chosen diet is made subservient to a normal function of the colon, and in amount, completeness, proportion, and preparation for digestion, must be about right for the construction of cells, or else it is rapidly propelled onward by an abnormal function of the colon that resembles vomiting by the stomach. In this way abnormal feces and rapid intestinal rates are an indication of malabsorption, by which nourishment goes through instead of into the body, and the cells of the bone do not receive the normal nutrient substances they require to be healthy. In the practice of these principles, it was not surprising to find from an analysis of the answers given by thirty arthritic patients, that all had one or more erroneous ways of eat-

\*Burnett Francis L.—Director of Health Class for Psoriasis, Massachusetts General Hospital. For record and address of author see This Week's Issue page 499.

ing or living to correct to become better nourished and healthier. For nineteen were found who ate too fast and too much, seventeen took laxatives, oil, or enema regularly, nineteen were physicked by too much fruit, especially oranges and grapefruit, ten were accustomed to eat candy, cakes, crackers, or fruit between meals, eight consumed an excess of bread, cake, macaroni, and other acid cereal food, six ingested too much meat and fish, and five were too fond of fat food. In the treatment of the disease however, an attempt was made to educate 241 patients, but as months and sometimes years are often required to become better nourished and healthier, intelligence, coöperation and perseverance are necessary, if these chronic invalids are to learn the normal action of the nutritive apparatus from the correction of erroneous ways of eating to become relieved of disease. These perquisites were not generally obtained, therefore subtracting eighty nine who could not understand the principles, and thirty four who would not coöperate and carry out the requirements, leaves 118 patients, on whom the results of treatment are based. Of this number forty three became healthy, and some of them have continued so by reporting to the health class or office with a record, once in a while, then, seventy five became greatly improved, and some of them would have become healthy if they had carried on treatment long enough, and finally, seven tried once failed and became worse, then took up treatment again, and have improved.

Unlike others, in these principles of treatment as an exact state of health are evidently taken into account to cure disease, it is obvious that former patients must subsequently control anabolic or normal nutrition, if this improved state of well being is to be maintained. Consequently patients must not only be taught how and what to eat to create anabolic nutrition and relieve the disease, but they must also be supervised afterward to be sure that they carry out the requirements of this complex and delicately adjusted process, to prevent a recurrence by the control of health.

#### FOOD, HEALTH, AND NUTRITIVE DISORDERS

A report by the Minister of Health (His Majesty's Stationery Office, London, 1934) on the food requirements of the English people, recommended 3,000 calories for the average man a day but a man doing heavy work might need 4,000, and an inactive one might get along on 2,600. Women required less food, but growing boys and girls from ten to eighteen years old needed 2,300 to 3,400 calories. The protein requirement was set at 80-100 Gm., of which one third must be of animal origin, and the need of foods containing the vitamins was emphasized. An International Conference on vitamin

standardization met in London last year (*J. A. M. A.* 103:353 [Aug. 4] 1934), and the following recommendations were adopted: For vitamin A optically inactive beta-carotene, which has a melting point of 184 degrees Centigrade has replaced impure carotene, for vitamin B, the adsorbate on acid clay has not been changed, for vitamin C, L ascorbic acid as defined by physical constants has been substituted for lemon juice, and for vitamin D, the old standard of viosterol in olive oil had been continued.

In many of the English colonies, health officers have studied and reported on the health of the people (*Nutrit. Abs. & Rev.* 4:150, 1934). In Nigeria, the staple food of guinea corn has been supplemented by cassava and sweet potatoes, and thus the diet has been made more complete and better proportioned. In Bechuanaland, 33 per cent of the natives examined were rejected for work in the gold mines on account of poor physique. Inquiries of the food consumed by eighty of the children, revealed that sixty had had no food for eighteen hours previous to the examination and ten had had no milk for three months. Maize porridge was the staple diet, except in the summer months when they got a little milk, wild spinach, and pumpkin. In Swaziland, tuberculosis was prevalent, and was ascribed due to a diet low in protein and deficient in vitamins, because when patients with incipient tuberculosis of the glands or the joints were admitted to the hospital and were given complete and well proportioned meals, they rapidly recovered.

A comparison of the stature of young English children of the professional and artisan classes, has been made by Spence, J. C. (*Nutrit. Abs. & Rev.* 4:375, 1934), and in examinations those of the former were found taller and heavier. In those of the latter, only 33 per cent were in good, 20 per cent were in poor, and the remainder were in mediocre condition. And in tests of blood from these children 20 per cent had a hemoglobin of more than 75 per cent, 23 per cent had less than 65 per cent and the remainder had blood values between these percentages. The cause of such deficiencies in the artisan children was thought due to inadequate diets and previous infectious diseases. In a study of the eating habits of rural school children in relation to their condition by Brown (*Utah Agr. Exper. Stat. Bull.* No. 246, 1934), 82 per cent were found to drink milk regularly, 73 per cent to eat raw vegetables daily, and 58 per cent were accustomed to eat raw fruit and 48 per cent to eat bread and jam, between meals. Dental caries, gingivitis and abscessed teeth were prevalent, and defective vision, diseased tonsils, enlarged thyroids, and poor skeletal development were some of the other defects found in the children. Many too were found underweight, and these had had a poor diet compared with those up to or above the Bald

win-Wood standards From clinical and experimental evidence presented by Schiff (*Arch Pediat* 51:769, 1934) diarrhea in infants was not thought due to the fermentation of carbohydrates, but an excess of fat foods obviously irritated the colon For the disorder a mixture composed of 300 cc of Ringer's solution, 600 Gm of 10 per cent rice jelly, and 50 to 60 Gm of pure glucose was advocated, and the amount given was made proportionate to the child's weight After improvement began a buttermilk mixture was cautiously added to the food

An analysis of the dinners served in a student's mess, in a public kitchen, and in an army kitchen, of Germany has been made by Remy, Edward (*Arch f Hyg u Bacteriol* 113 143, 1934) The average amount of food served at these meals was 1338, 1056, and 1569 calories, in the order given, and the amount of protein was 37.4, 27.3, and 48.5 Gm, and that of fat was 84.3, 35.1, and 36.9 Gm The Ca, Fe, and Cu were found adequate in all of the meals, but the K was found sufficient only in those of the public kitchen, and the P was adequate only in the army rations Voigt, J M (*Pflüger's Arch Physiol* 234 570, 1934) has studied the utilization of food in man, and found that meat added to the vegetarian diet reduced the loss of nitrogen in the feces And also, that the retardation in the passage of food through the intestines increased its utilization The effect of acid ash and alkaline ash foods on the acid-base balance of man has been reported by Bischoff, F, et al (*J Nutrition* 7 51, 1934) Sodium citrate was used to make the food basic, and 30 Gm of this salt had to be ingested daily for some time before a change occurred in the reaction of the blood drawn before breakfast The ingestion of 240, 204, and 93 Gm of protein on three consecutive days, and 200 cc N acid equivalent of ash daily, were required before a slight shift was perceptible in the alkalinity of the blood The consumption of a quart of milk, or of orange juice, or a pound of bananas, did not change the plasma pH or the reserve of alkali, but the ingestion of a pound of steak had a slight effect on the plasma bicarbonate in one out of four persons tested

The food consumed by native South Africans has been studied by Cluver, E H (*South African M J* 8 19, 1934) and found deficient in vitamins and excessive in carbohydrates Mealie meal was the principal article eaten, and frequently laborers arrived at the mines in a pre-scorbutic condition The companies however added meat and vegetables to the food of their laborers, so that after working a year the men became much healthier The race of Bantus were commonly found suffering from pellagra, and many of the natives from Zululand and Transkei were in a sub-pellagrous condition In Manchuria, the food of the Chinese has been

found complete and well proportioned by Lu, T H (*J Orient Med* 20 22, 1934) Little sugar and fruits were eaten by the middle and lower classes, but the amount and variety of cereals, vegetables, and germinated seeds consumed furnished an adequate supply of vitamins B and C especially In China deficiency diseases were found prevalent and to prevent them Wu and Wan (*Nat M J China* 20 29, 1934) have composed and tried vegetarian diets on some Chinese subjects One diet composed of thirty-five parts of roasted peanuts, thirty-six of whole wheat, ten of millet, ten of roasted soya beans, five of wheat bran, and four of a salt mixture, and green vegetables ad libitum, produced good growth, but was insufficient for reproduction and lactation The addition of animal food made this diet adequate Another diet composed of twenty-five parts of soya beans, fifty of millet, ten of corn, four of roasted soya beans, ten of whole wheat, and one of salt mixture, which was similar to the food by the people of Northern China, was not even adequate for the growth of children, unless two eggs or 34 Gm of beef or pork were added each day Le Méhauté, P J, and Tcherniakofsky (*Bull Soc scient d'hyg aliment* 22 4, 1934) have published an interesting report on the food of the Eskimos These people eat all parts of the seal, whale, musk ox, and polar hare with the exception of the gall-bladder, also some Arctic birds, their eggs, salmon, and cod, varied with the other animal food And the contents of animals' stomachs, algae, bill berries, juniper, dwarf willow, sorrel, and dandelions, furnished most of the vegetable food The amount of food consumed could not be estimated, as they always ate irregularly Scurvy was not evident but a few patients with rickets were seen

In a review of the pathogenesis of deficiency diseases, Strauss (*J A M A* 103 1, [July 7] 1934) has pointed out that they frequently develop in spite of an adequate diet, and apparently on account of a disorder of the gastrointestinal tract A similar observation has been made by Goudsmit, J (*Nederl tijdschr v geneesk* 78 3123, 1934) by which patients may develop pellagra or beri-beri after long periods of gastrointestinal disorders Under these circumstances, the deficiency diseases may not be caused so much from a deficient diet, but from a failure to absorb the vitamins The features of Gee's disease have been described by Bennett (*Lancet* 227 739, [Oct 6] 1934) Diarrhea was the outstanding disorder, but also anemias of different types, acute or latent tetany, and infantilism with changes in the bones that resembled osteomalacia, were found Such disorders were considered due to malabsorption rather than to fat indigestion, and therefore in treatment patients were put on a low fat diet, given large doses of iron and daily doses of calcium lactate, and vitamin B and liver as indicated Ohly, A (*Arch f Verdauungskr*

55 254, 1934) has described the sequelae that occur in patients after bacillary dysentery. As a result of the disorder the gastrointestinal tract is in a very unstable state and slight indiscretions often cause relapses. On this account after an attack patients were advised to eat protein extracts of animals only or raw milk diluted with lime water, later finely divided carbohydrates were allowed, and finally after weeks of treatment, foods containing cellulose were given. Interesting observations have been made by Handelsman, M. B., Golden, L. A., and Pratt, J. H. (*J. Nutrition* 83 479, 1934) on the effects of various diets on the absorption of depancreatized dogs. The absorption of the animals immediately after the operation was not very abnormal, but later an enormous amount of food was required to maintain body weight.

#### VITAMIN A, EYE DISORDERS, AND INFECTION

An elaborate review of the clinical effects of vitamin A deficiency in children has been made by Mackay (*Arch. Dis. Child.* 9 65, 1934). In it the geographical distribution, the season and age incidence, the dietary cause, and the period of development of xerophthalmia and keratomalacia, were described. A study was also made by this investigator (*Ibid.* 9 133, 1934) of the effect of a large amount of vitamin A on the health of children. The control group ingesting vitamin A normally, showed no difference in the rate of growth, in general health, or in freedom from respiratory infections, specific fevers or metabolic skin diseases, but experienced double the incidence of minor infective skin diseases. The incidence of vitamin A deficiency in Ceylonese school children, factory workers and patients in an asylum, has been analyzed by Nicholls, L. (*Indian M. Gaz.* 69 241, 1934) and phrynoderma was the most, and sore mouth the next most common symptom, observed. Keratomalacia, neuritis, and diarrhea, often accompanied the other symptoms. The food consumed contained very little of the fat soluble vitamins, and consisted mostly of rice and dried fish, very little meat and only a few vegetables during the season, were eaten, and highly stimulating condiments were universally used. Cutaneous manifestations of vitamin A deficiency in a young boy have been described by Goodwin, G. P. (*Brit. M. J.* 2 113, 1934). The skin was found dry and generally covered with a papular eruption. The patient also had pyorrhea and the sclerae were of a yellow tint, but xerosis or night blindness was not evident. A good general diet, including meat and vegetables which it had lacked before, and substantial doses of cod liver oil, brought about a rapid recovery.

Visual tests with a Birch-Hirschfeld photometer, have been used by Jeans and Zentmire (*J. A. M. A.* 102 892 [March 24] 1934) to de-

termine moderate degrees of vitamin A deficiency in children. Out of 213 patients examined, forty five were found to have incipient night blindness, but, after a diet rich in vitamin A for a few weeks, signs of this disorder had entirely disappeared. Franssen (*Hospitalstid.* 77 42, 1934) has applied hemeralopia as a sign of vitamin A deficiency and has found it in forty six out of sixty five apparently healthy school children. The disorder was also found in twenty-one out of twenty six supposedly healthy adults, and in seventy of seventy two private patients who complained of eye trouble. The Ca and P in all of these patients too, were diminished and by the use of haliver oil for several weeks the hemeralopia disappeared, and Ca and P of the blood became increased. A patient with night blindness has been reported by Wilbur, D. L., and Eusterman, G. B. (*J. I. M. A.* 102 364, 1934). The ocular disorder became apparent after the patient had had diarrhea for a year as a result of a gastrocolic fistula. The short circuit of the bowel was an operative measure to relieve a duodenal ulcer. The food consumed had contained liberal amounts of vitamin A, but on account of the malabsorption the vitamin went through instead of into the body.

From the available clinical and laboratory evidence Mackay, H. M. M. (*Lancet* 2 1462, 1934) has noted the relation between dietetic deficiencies and the susceptibility to infection in children, and has arrived at the following conclusions. A deficiency of vitamin D lowered the vital resistance especially to respiratory infections and one of iron produced an anemia, and made the children susceptible to common types of infection. A severe deficiency of vitamin A was often associated with a high morbidity, while a mild one generally resulted in skin infections, and one of vitamin B was frequently followed by infections of the respiratory or gastrointestinal tracts. Observations on the use of vitamin A to prevent colds, have been described by Shibley, G. S., and Spies, T. D. (*J. A. M. A.* 103 2021, 1934). In this experiment 200,000 international units of vitamin A and 4,000 units of vitamin D were given weekly to 241 young adults, and examinations made at intervals afterward. The results were somewhat disappointing, for the measures apparently had no effect on the incidence or severity of common colds but may have reduced the time some of the colds lasted during the winter months. A somewhat similar study has been made by Gardner, E. L., and Gardner, F. W. (*Am. J. Dis. Child.* 47 1261, 1934) but with more encouraging results. Three groups of children of about the same age of equal sexes, and of about the same general condition were observed. To one, 10,000 units of vitamin A in the form of haliver oil were given daily, to another a diet was given which contained a similar amount of the vita-



min, and to a control group, only a good general diet was prescribed. In contrast with the previous observations, the specially treated groups showed a marked decrease in the incidence and severity of the colds, and also made more of an increase in weight and an improvement in health.

#### BERI-BERI, PELLAGRA, AND NERVE DISORDERS

In an analysis of the incidence and symptoms of beri-beri from a study of 109 patients Yang, C S, and Huang, K K (*Chinese M J* 48 20, 1934) found the disease in only four women, and seventy of the men were in the third decade. Then of the total number, sixty-one presented neuritic only, nineteen had neuritic and edematous, and twenty-nine cardiac symptoms, and in the edematous patients the serum protein was not diminished. Some of the patients developed the diseases after a febrile attack, and especially malaria, but the majority of those consuming inadequate food developed it as a result of excessive physical exertion. These authors (*Ibid* 48 701, 1934) too have reported an outbreak of pellagra in some young Chinese soldiers. Of the thirty patients diagnosed, all of them had the typical dermatitis, many had glossitis and also night blindness, and some had colitis. The gastric juice, and especially the HCl, was found reduced. The diet consisted of rice, wheat flour, greens, vegetables, and pork, there was an absence of maize and a low protein content. The conclusions arrived at from the study were that the disease was a symptom complex and not due to the deprivation of a single food factor.

Several patients that developed beri-beri as a result of gastrointestinal disorders have been reported. Among them Riesman, D, and Davidson, H S (*J A M A* 102 2000, 1934) have described the case of an old man, who on account of gastric pain and discomfort for some time had eaten very little food. After being fed with a tube for several days, the symptoms disappeared and his appetite returned, so that subsequently he consumed a liberal diet, and the edema of the legs and the disease were relieved. They also described the case of a young woman, who on account of obesity lived for some time on a very restricted diet. She developed edema and shortness of breath but when informed of the cause of her complaint, she consumed more food and was promptly relieved of the symptoms and the disease. Similarly, Urmey, T V, et al (*New Eng J Med* 210 251, 1934) described a patient, who on account of a surgical operation had a short circuit of the gut and developed beri-beri. He was able to eat sufficient and complete food, and thus the disease was the result of a failure of absorption. Treatment with a concentrate of yeast was of some value, but it was not until the digestive

system was made more normal by another operation that the disease was relieved.

Many of the Jews of Constantinople have become pellagious, according to the opinion of Sinai I (*Ann d'ig* 44 245, 1934) who thought the disease due to the excessive consumption of unleavened bread for a long time after the Passover. A disease, which Coikill, N L (*Lancet* 1 1387, 1934) has called pellagra was found prevalent among the Arabian women of Anglo-Egyptian Sudan. The characteristic dermatitis was not observed, but instead the sebaceous glands of the face were hypertrophied, and there was also a glossitis with pigmentation. Besides, the patients had diarrhea, epigastric distress, general weakness, vertigo, and a mental disorder. The disease appeared during the dry season when the food of these people consisted largely of whole millet, and this fact, combined with a failure to eat protein and foods containing vitamins A and D, and cholesterol, was considered responsible for the development of the disease. From a study of psychiatric problems in pellagra, Teglbjaerg, H P (*Acta psychiat et neurol* 9 195, 1934) believed the diets of the patients to be adequate, but on account of malabsorption from gastrointestinal disorders, the essential vitamin passed through the body. Treatment with a plant preparation, which contained most of the vitamins, brought about a prompt recovery. In patients with chronic diarrhea, Andie (*Wisconsin M J* 33 581, 1934) has pointed out the importance of considering pellagra. Of several patients with this disorder that came under his observation, one developed the disease as a result of an attempt to live on cheap staple food for some time, another as a result of substituting food for drink, and a third as a result of attempting to lose weight from the consumption of a very restricted diet.

In the treatment of pellagra, Wheeler, G A, and Hunt, D J (*Pub Health Rep* 49 732, 1934) have tried the effects of various foods on patients with this disease. On the basal diet persons developed pellagra in three to six months, but by the addition of 502 Gm of canned green onions or 516 Gm of canned green lettuce, daily, the appearance of the disease was delayed until eight to nine months, and by supplementary feedings of 200 Gm of lean pork or of peanut meal daily proved more effective, and the disease did not develop in twelve months. The treatment of pellagra with preparations of liver has been tried by Ruffin, J M, and Smith, D T (*Am J M Sc* 187 512, 1934). The patients were given a complete diet, except for vitamin G, and the skin lesions of few disappeared, but when exposed to the sunlight they recurred. Supplementary feedings of 90 ml of aqueous liver extract or of the powdered extract taken daily by mouth brought about a prompt recovery, but 5 ml of liver extract injected daily into the muscles proved valueless. In the treat-

ment of the disease, Spies, T D (*J Clin Investigation* 13 807, 1934) has tried feeding patients 250 to 800 Gm. of antoclaved liver daily, and without any other food found the mouth lesions were relieved in a few days. Other groups of patients have been kept on a pellagra producing diet after entering a hospital were then given 750 to 1000 Gm. of "ventriculin", orally or 80 ml of liver extract intravenously, and rapidly recovered.

A few patients with peripheral neuritis about the time of parturition have been observed by Sze, T S (*Chinese M J* 48 651, 1934). The cause of the disease was evidently the result of a custom carried on by mothers at this time by which vegetables are not consumed because the disorder was readily relieved by supplementary food rich in vitamin B. The effect of the ketogenic diet on institutionalized patients with epilepsy has been studied by Notkin, J (*Arch Neurol & Psychiat* 31 787, 1934) and found valueless. Of the twenty patients to try the treatment, only two had fewer convulsions while in all of the others the number and severity of the convulsions were increased.

#### SOURVY AND SKIN DISEASES

The history of scurvy in the 17th and 18th Centuries has been compiled by Laddell E G T (*Nature* 133 67, 1934) and even in some of the earliest records of treatment the use of citrus fruit juices was described. Some of the lesions of scurvy in a few patients have been reported by Scheer, M., and Keil H (*Arch Dermat & Syph* 30 177, 1934). In these patients follicular lesions of the skin appeared but the small interstitial hemorrhages which sometimes formed dull red papules were more typical of perifollicular petechiae of scurvy. If these lesions were not evident in some parts of the skin, they were artificially produced by the use of a tourniquet but when treatment had been successful petechiae could not be artificially made. The necessity of observing the food consumed by insane patients to prevent deficiency diseases, has been pointed out by Barton W E and Freeman W (*New Eng J Med* 210 529, 1934). A patient is reported, who when not observed ate only meat and potatoes, and scurvy developed. The disease was relieved by the use of a more liberal diet, but again when not watched he ate as before, had an epicardial hemorrhage, and died. To test the efficacy of certain foods in the treatment of scurvy, Bon durant, W W Jr (*Texas State J Med* 29 565, 1934) kept a patient on a scorbutic diet for twenty two days, then he was given 300 Gm of grapefruit, four oranges, and four lemons daily. The immediate effect of this food was to produce a marked diuresis, then the relief of the edema, and finally the reduction of the temperature to normal. The symptoms disappeared rapidly and the disease was relieved in a short time.

Observations on capillary resistance to determine a prescorbutic condition in children, have been applied by Greene, D (*J A M A* 103 4, 1934). Of twenty three young children tested, five were found positive but of sixty five older children only six were found positive. Subsequent tests on these prescorbutic patients were variable, because in some of the children petechiae could be produced by a tourniquet on one arm but not on the other. Szent-Gyorgia (*Deutsche med Wchnschr* 60 556, 1934) has described the prescorbutic state in children, and maintained that scurvy should be prevented. The use of 25 mg of ascorbic acid daily by infants was recommended. The titration of human serum with dichlorophenolindophenol to determine its vitamin C content has been carried out by Gabbe, E (*Klin Wchnschr* 13 1389, 1934). In ninety unselected patients the amount of vitamin C was found to be from 0.14 to 1.21 mg per cent, but in seriously ill patients it ranged from 0.50 to 0.69, and in others it was generally proportionate to the vitamin C content of the diet. This was demonstrated experimentally, for in a few patients the use of a vitamin C free diet for a week caused a lowering of the serum values that of a vitamin C rich diet produced high values while the administration of 90 mg of ascorbic acid daily for ten days, brought about a marked rise in the vitamin C content of the serum.

New principles of dietary treatment for psoriasis have been recommended by Grütz (*Deutsche med Wchnschr* 60 1039, 1934). In this treatment a disorder of fat metabolism was thought to cause the disease, and the restriction of 10 to 20 Gm of fat a day to sixteen severe psoriatics brought about relief after a month. An increase of fat in the diet above 20 Gm often caused a recurrence of the disease in these patients. A relation between the incidence of tropical ulcer and the food consumed by patients in New Guinea has been pointed out by Clements, F W (*M J Australia* 1 520, 1934). The incidence was found high in those that consumed food almost entirely composed of carbohydrate and with few vitamins it was intermediate in those that ate moderately of cereal food but some protein and vitamins, and the disease was not found in any that ate complete and well proportioned meals. The inferences drawn were that poor diets produced malnutrition of the skin and lowered vital resistance, as a result of which organisms entered the body to cause the ulcers. Pfister F F (*J A M A* 102 533, 1934) has reported the development of a skin rash in a few infants from the excessive use of viosterol and to prove this assertion the oil was omitted and the rash disappeared, then it was resumed again and the rash returned. Longitudinal ridging and transverse depressions of the finger nails have been observed by White, C (*J A M A* 102 2176, 1934) in a group of women who ad

hered rigidly to a reducing diet. And the administration of a liberal and complete diet, haliver oil, or viosterol, brought about a more normal condition of the nails after some time.

#### PICKETS, OSTEOMALACIA, AND DENTAL DECAY

In a search for patients with rickets in Porto Rico by Ehot (Bull No 217, U S Dept Labor, Child Bureau, 1933) only a few were found, and in spite of the fact that the people generally consumed food lacking in vegetables and milk. Many patients with osteoporosis however were found, and this was evidently the result of gross general inadequacies, and especially of a deficiency of calcium, in the food. The rarity of rickets was ascribed to the therapeutic effects of the continual and intense sunshine. The severer forms of rickets have become less common of late in comparison with the period before the general administration of vitamin D, according to the report of Mader and Eckhard (*Arch f Hyg* 111 362, 1934). The prevention of such extreme malnutrition has had other beneficial results, inasmuch as the fatal complications of whooping cough or measles which often followed this condition have been averted. Other factors may serve to enhance the value of vitamin D in the treatment of rickets in children. At all events, Wieland, E (*Ztschr f Kinderh* 56 19, 1934) has observed that healing began in a patient with active rickets, then ceased in spite of the continued use of irradiated milk and a high blood calcium. Whereupon, the diet was changed from one largely composed of cereal food and milk to one of vegetables and fruit. With the change of food healing began again, and continued without the use of the antirachitic measures. In a comparison of the various methods of treating rickets in children, Hay, J R W (*Lancet* 1 1390, 1934) has found, that a daily exposure to the carbon arc lamp produced healing in four to eight weeks, that a drachm of cod-liver oil brought about the same result in six weeks, but two commercial preparations of ergosterol were almost ineffective in five to eight weeks of treatment. Degkwitz, R (*Klin Wchnsch* 13 201, 1934) has expounded a theory on the pathogenesis of rickets, by which vitamin D mobilizes the phosphorus from the tissues into the blood stream, and also regulates Ca and P metabolism by facilitating the formation of compounds of these elements and their deposition in growing cartilage.

The symptoms of hypervitaminosis D have been described by Reed, C I (*J A M A* 102 1745, 1934). Several hundred patients with asthma, parathyroid tetany, and hay fever, were given excessive doses of viosterol. Frequent micturition was found to be the commonest initial symptom, then loss of appetite, nausea, vomiting, diarrhea, muscular weakness, disturbed equilibrium, and loss of weight, were some of the other symptoms produced. The

amount of viosterol that could be taken by a patient daily, and for an indefinite period, was estimated at 150,000 international units. In a somewhat similar study, Hansman, F S (*M J Australia* 1 81, 1934) has observed the effects of large doses of vitamin D on a few patients with combined hyperthyroidism and hyperparathyroidism. The results obtained were that the symptoms of the latter disorder rapidly disappeared, but there was little change in the amounts of Ca and P, and only a slight improvement in their balance, in the blood. On this account, vitamin D was believed to act by making Ca available for tissue metabolism. From a study of hypervitaminosis D in rats, Ham, A. W., and Lewis, M D (*Brit J Exper Path* 15 228, 1934) observed that rachitic lesions were still apparent in the long bones of these animals after three weeks of treatment. The conclusion reached was that large amounts of vitamin D inhibited the normal process of calcification in bone.

An authoritative and comprehensive account of "Osteomalacia and Diet" has been written by Maxwell, J P (*Nutrit Abs & Rev* 4 1, 1934). The disease was found to be most prevalent in China and India, and generally afflicted the women of these countries. The food of the Chinese was not only inadequate, with an average of 1188 cal, of which 39.3 Gm were protein, 22 Gm were fat, and 212 Gm were carbohydrate per man per day, but also very low in foods containing the vitamins, calcium, and phosphorus. The food of the East Indians was not very different, inasmuch as cereal food was largely consumed, and only a little meat, eggs, and milk were added, and few vegetables and fruits partaken of. Here too, the seclusion of the women indoors was a factor in the development of the disease, for when they were allowed fresh air and sunshine, a good diet, cod-liver oil, and calcium, a rapid cure was effected. In a postmortem examination of a patient dying of osteomalacia, Gunn, F D, and Nadler, W H (*Arch Int Med* 54 145, 1934) not only found typical skeletal defects, but also a hypertrophy and hyperplasia of the parathyroid gland, hypertrophy of the hypophysis, and calcareous deposits in the kidneys. A patient with intestinal disturbances, which evidently caused osteoporosis and spontaneous fractures, has been reported by Wendt, H (*Med Klin* 30 187, 1934). The patient, a woman of thirty-nine years, was found to have normal biliary and pancreatic secretions, but the resorption of proteins, fats, and carbohydrates, was greatly reduced, and the calcium and phosphorus in the blood were diminished.

A comparison between the incidence of dental decay and malnutrition in uncivilized and semi-civilized peoples of the Alaskan peninsula has been made by Price (*J Dent Res* 14 227, 1934). The amount of decay found in the Eskimos of W Alaska was only 0.09 per cent,

that of isolated Indians was 0.16 per cent, whereas that of the natives living in the more populated districts, was 13.0 and 21.5 per cent. The difference in the diets was a marked increase in the amount of food consumed in proportion to the mineral matter, and a marked decrease in the amount of the fat soluble vitamins, for those in contact with civilization. On a basis of 3000 cal a day, the Eskimo or the Indian consumed 2.14 Gm of Ca, 5.7 of P, 0.1 of Fe, 1.27 of Mg, 0.0312 of Cu, and 0.000131 of I, whereas the native eating many foods of white flour and sugar, consumed only 0.39 Gm of Ca, 1.14 of P, 0.067 of Fe, 0.16 of Mg, 0.0167 of Cu, and 0.00000276 of I. In a comparison of the incidence of dental hypoplasia and caries and of rickets, Eliot, M. M., et al (*Am J Dis Child* 48 713, 1934) have found some interesting correlations. These investigators had an opportunity to make dental examination on a group of 450 children, whom they had examined four years earlier for rickets, and found that 15 per cent had hypoplasia of the enamel and especially in those who had severe rickets previously, and 53 per cent had caries, which however was not related in any way to the previous deficiency disease. A valuable study of dental decay, as an indication of malnutrition, has been made by Larsen, N. P., et al (*Am J Dis Child* 48 1228, 1934). In this study, groups of young children were fed for a period of a year or more on (1) milk from rice eating mothers and rice, (2) cow's milk, rice, and a few eggs and vegetables, and (3) milk with poi, potatoes, and other vegetables. The composition of the diets was much the same, the chief difference being in the reaction, for the first was neutral the second 6 to 10 ml basic, while the third was 40 to 45 ml basic. At the end of the period of observation, the children given the third diet were found to average two pounds heavier and one inch taller than those consuming the other diets. A more striking correlation however was found in the incidence of dental decay, for those on the predominantly basic diet had only 7 per cent, whereas those on the slightly basic diet had 50 per cent, and those on the neutral diet had 46 per cent, of carious teeth. A low incidence of caries was found in children living in an institution, by Koehne, M., and Bunting, R. W. (*J Nutrition* 7 657, 1934). On the presumption that the food consumed was responsible, it was analyzed and found to be of a low caloric value, and with little Ca and P, but the meals were regular, generally uniform in composition, and contained little sweet stuff, and these were the factors that contributed to good nutrition and health.

In "Dental Health a Problem of Nutrition", Garland Joseph (*New Eng J Med* 210 563 1934) has maintained that adherence to a sin-

gle cause of dental caries in children may be misleading, and that consideration should be given to the consumption of foods for the construction of tissue, the production of energy, and the preservation of health. A basic diet, consisting of a quart of milk, eight ounces of orange juice, a pound of vegetables, one or more eggs and a little meat, were recommended for daily consumption by a growing child. The assertion has been made by Fox, F. W. (*South African M J* 8 517, 1934) that races living on food rich in minerals have sound teeth but that the food of civilized races was generally low in these essential substances. Diets high in minerals have been found valuable in arresting caries, and while Ca and P retention may be reduced in patients with this disorder, other changes in the mineral metabolism were not apparent.

#### ANEMIA AND THE METABOLISM OF PROTEIN

The anemia of premature infants has been studied by Thoenes, F. (*Klin Wochenschr* 13 658, 1934) and called physiological, for comparatively large doses of iron or liver given these patients were found valueless. On this account, the disorder was considered due to a faulty fetal metabolism, which might be prevented or corrected only under interuterine conditions. In observations on the anemias of children Hawksley, J. C. et al (*Arch Dis Child* 9 359, 1934) often found achlorhydria, and this continued to be present in a few of these patients for a year or more after the anemia had been cured by iron. Then too they frequently found hypochromic anemia in children who had severe intestinal disorders, such as ulcerative colitis, celiac disease, or polyps of the intestine, which generally caused a small but constant loss of blood. Mettler, S. R. and Kellogg, F. (*J Clin Investigation* 13 715, 1934) have made a comparison between the use of inorganic iron and predigested meals, in the treatment of patients with hypochromic anemia. The meals composed of beef eggs and spinach, were predigested with pepsin and HCl, and were of the same pH value but only one half the iron content as the ferrous salts. The meals alone were found to have a curative effect on the anemia. The anemia of pregnancy has been studied by Strauss, M. B. (*J A M A* 102 281, 1934). Of the thirty patients with the hypochromic type observed the majority had consumed food of a low iron content for years and in examinations of the gastric contents, only two were found to have normal hydrochloric acid. Treatment with iron brought prompt relief. And of ten patients with the pernicious type half had none, and the remainder, little hydrochloric acid, thus, the disease was considered due to the temporary loss of the intrinsic factor in the gastric secretion.

and treatment with liver brought about prompt regeneration of the blood

Interesting and significant structural changes found in the tissues of 151 patients who had had pernicious anemia, have been described by Brown, M. R. (*New Eng J Med* 210 473, 1934) from postmortem examinations. Of this number, eighty-two showed gross lesions of the gastrointestinal tract, and forty-two histological preparations of the stomach all but one showed a chronic gastritis, and all but four the absence of acidophilic cells. The deductions drawn were that "interference with the normal motility of the gastrointestinal tract over a long period of time may give rise first, to inadequate digestion, and secondly to atrophic gastritis and inadequate gastric juice." The racial factor in the development of pernicious anemia has been described by Friedlander, R. D. (*Am J M Sc* 187 634, 1934) from a study of 500 patients, and in those living in temperate zones and of fair complexion, the disease was found to occur most frequently. Stub, O. (*Acta med Scandinav* 81 535, 1934) has analyzed the mortality statistics of pernicious anemia in the fishing districts of Norway, and reported a very low rate. The result was ascribed to the very general consumption of cod livers and cod-liver oil, by the people living in these districts. Several peculiar observations on the action of the gastric glands in patients with pernicious anemia have been reported recently. In one Lassen, H. C. A. (*Acta med Scandinav* 82 588, 1934) described a woman of sixty-one who became free of the disease and had kept well for nine years, although examinations of the gastric contents only once revealed the presence of free hydrochloric acid. In another Alsted, G. (*Acta med Scandinav* 82 288, 1934) wrote of a woman of sixty-seven who had the disease and achlorhydria, but with liver therapy the blood became normal, and several months afterward gastric analyses revealed the presence of free hydrochloric acid.

The best and cheapest method to treat patients with pernicious anemia, according to the observations of Franke, Y. (*Klin Wchnsch* 13 127, 1934) was by the use of liver juice acted on by gastric juice *in vitro*, and administered through a duodenal tube. And to prevent relapses, the injection of 5 to 10 ml of liver extract with 3 Gm of reduced iron daily, was recommended. A somewhat similar preparation for the treatment of this disease has been described by Reimann, F., and Fritsch, F. (*Klin Wchnsch* 13 951, 1934) and was made by incubating liver with normal gastric juice or an extract of the gastric mucosa of the pig, and hydrochloric acid. This preparation was found very potent, as 10 to 20 Gm produced the same regeneration of corpuscles as 250 to 300 Gm of raw liver, in the treatment of the

disease. A marked variation in the digestion and hydrolysis of beef protein in the human stomach has been reported by Maltby, E. J. (*J Clin Investigation* 13 193, 1934). Variations were not only found in the hydrolysis of this food in the stomach of healthy persons from time to time, but also in the same person at different times, and in the stomach of patients with pernicious anemia, little or no hydrolysis occurred. In the gastric contents of these patients too, pepsin as well as hydrochloric acid was generally absent. In the treatment of the disease by liver acted on by the gastric juice Conner, H. M. (*M Clin North America* 18 385, 1934) has obtained beneficial results, but not any more so than other kinds of liver therapy. The new form of liver treatment, however, was found valueless in patients with sprue.

From a study of tropical sprue, Fairley, N. H. (*Brit M J* 2 1192, 1934) believed the disease to originate from a failure in the functions of the gastrointestinal tract. As a result, thirty-three patients were required to rest and were given a high protein but low fat and carbohydrate diet, and liver extract as indicated for the anemia. Beneficial results were generally obtained, but the very rapid regeneration of corpuscles some times produced a hypochromic anemia which required treatment with iron. The potency of preparations of liver from various domestic animals, to cure experimental anemia in dogs, has been estimated by Robschert-Robbins, F. S., and Whipple, G. H. (*Am J Physiol* 108 279, 1934). On the assumption that pig's liver was 100 per cent potent, beef liver was found to be 70, rabbit 80, reindeer 90, and horse and fetal calf 124 per cent. The potency of livers from lactating animals for this purpose was reduced. In other observations by the authors (*Ibid* 108 270, 1934), the liver of a horse made anemic by bleeding was as potent to regenerate corpuscles, as a normal horse's liver, but one from a horse made anemic by injections of a toxin was very impotent, and the iron content of both livers was much reduced. As gastrectomized dogs do not develop pernicious anemia, Ivy, A. C., et al. (*Am J Digest Dis & Nutrition* 1 116, 1934) have tried the effect of preparations of dog's stomach on patients with pernicious anemia. These preparations however proved of little value, for they were found to be half as potent in the treatment of the disease as those of hog's stomach. And an extract of liver from the dog had only one fourth the potency of that from the hog, steer, or horse, but when canine liver was administered orally it proved to be one half the potency of bovine liver. The results suggested, that the "intrinsic factor" of Castle is present in the intestine as well as the stomach, or that the dog, pig, and rat, are so constituted that they cannot develop pernicious anemia, or that factors besides the "intrinsic factor" are involved in the genesis of the disease.

DIABETES MELLITUS, OBESITY, AND THE  
METABOLISM OF FAT

A detailed description of the treatment of severe diabetes in children has been given by Cole, L (*Lancet*, 1 947, 1934). In the treatment the chief consideration was the allowance of food to provide for the growth of the child as well as fulfill the energy requirements. For this purpose about 100 Gm of carbohydrate was allowed daily in severe cases and up to 200 Gm if the disease was mild. Insulin was administered to keep the sugar in the blood within normal limits generally. Satisfactory growth, activity, and mental and sexual development, were brought about by this treatment. On the other hand Soderling (*Nord med tidsskr* 8 1021, 1934) has recommended the free choice of food for diabetic children because the restricted diet had a psychic effect on the patients, and was likely to disturb carbohydrate metabolism. In practice this principle worked well, for only in the period of readjustment was there a slight and temporary overindulgence in carbohydrate food and only in a few instances was the amount of insulin increased. A diet for diabetic children from two to ten advocated by Stewart (*J Amer Dietetic Assn* 10 238, 1934) consisted of 5.1 Gm. of carbohydrate, 2.9 Gm of protein and 4.1 Gm of fat, daily, per kg of body weight. Calcium and the vitamins were supplied in 600 cc of milk, 30 Gm. of cheese and 450 to 600 Gm. of vegetables and fruit given daily to these patients.

The complete diets now used in the treatment of adult diabetics, according to Nixon, J. A. (*Practitioner* 132 25, 1934) may require the administration of more insulin, but the psychological effect produced in the patients by the more liberal selection of food, more than offset the effects of increased medication in the successful treatment of the disease. Test meals of the same sugar content and consisting of 600

Gm. of apples, of a mixture of dextrose, levulose, and saccharose, of dextrose, and of levulose have been given patients with diabetes obesity, and liver disease, by Deindl, A. (*Deutsches Arch f Klin Med* 176 311, 1934). The blood sugar curves produced in all of the patients were very similar, and thus proved the similarity between these diseases. Then, as the curve of the apple meal was not so high, and also was slower to return to normal compared with those of the pure sugars, it demonstrated the unfavorable influence the ingestion of fruit had on diabetes and similar diseases.

From a study of obesity in childhood Ellis, R. W. B., and Tallerman, K. H. (*Lancet* 2 615, 1934) recommended that dietetic restrictions should be carried out only when the disease gave rise to symptoms, and even then should not be severe and interfere with normal growth and development. Ambulatory obese patients were put on a daily diet of 680 cal, of which 85 Gm were protein, and 40 Gm each of fat and carbohydrate, and observed by Beck, E. C., and Hubbard, R. S. (*Am J Digest Dis & Nutrition* 1 250, 1934). The food consisted largely of meat, eggs, cheese, broths, and green vegetables, and was selected on account of its satiety value. The diet brought about an average loss of almost two pounds a week for the first two months and about one pound a week afterward, and the original symptoms of dyspnea, inertia, edema and hypertension were generally relieved, but dizziness was unaffected. The relation between the composition of the fat consumed and that excreted by man, has been studied by Krakower, A. (*Am J Physiol* 107 49, 1934). In meals which contained a large, and in those which contained a small amount of fat, a significant change was not found in the feces, therefore, an excess of fat in the feces may be due to the discharge of this substance from the blood into the intestines, rather than to the ingestion of a large amount of fat food.

# CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C CABOT, M.D

TRACY B MALLORY, M.D., *Editor*

CASE 21361

## PRESENTATION OF CASE

*First Admission* A thirty-five year old American housewife entered complaining of epigastric pain

Approximately seventeen years before entry, while convalescing from an operation at which a cervical rib was removed, she had an attack of severe boring epigastric pain which was accompanied by nausea and vomiting. The pain slowly disappeared in about two days but the region was tender for about a week. These attacks recurred, at first about every two years and more recently about once every month, with or without jaundice. Three years before entry a gall bladder filled with many small stones was removed at another hospital. She felt well for six months following the operation and then began having attacks of chills and fever, associated with indigestion. At first there was no pain but after two or three attacks the pain was the same as had been present previous to operation—a dull, heavy, boring epigastric pain which radiated to the shoulder. She was treated with a duodenal tube for sixteen months without relief. The pain often required a hypodermic injection of morphin and often lasted several hours. Between attacks she felt quite well. During each attack she became jaundiced, her urine was very dark and her stools, which were always light colored, frequently became clay colored. Her appetite was always good and she had gained about five or six pounds since the operation.

Her family, marital and past histories are non-contributory.

Physical examination showed a well-developed and nourished woman with slightly icteric skin. The heart and lungs were negative. The abdomen was negative except for a right rectus splitting upper abdominal scar. No masses were felt. There was no tenderness.

The temperature was 98°, the pulse 85. The respirations were 20.

The urine was amber colored and gave a one plus bile test. Examination of the blood showed a red cell count of 3,500,000, with a hemoglobin of 80 per cent. The white cell count was 8,200. An icteric index was 15. The bleeding

time was two minutes, the clotting time ten minutes.

Exploration of the common bile duct, with drainage, was performed. At operation a lymph gland approximately 1.5 by 1 by 1 centimeter was found lying on top of the common duct. This gland and two smaller ones were removed and it was felt that these might be causing the constriction of the duct. The duct was opened and a probe passed easily down into the duodenum. It went upward only as far as the level of the cystic duct. Little or no bile came out of the duct when it was opened. She did well postoperatively and was discharged approximately three weeks after operation.

*Second Admission*, approximately seven years later

Ten weeks after discharge, because of return of the same symptoms, she entered another hospital where a choledochoduodenostomy was performed. She did fairly well postoperatively for about a year and then had recurrence of her former attacks of chills, fever, sweating, jaundice and occasional right upper quadrant pain. About a year and a half after the anastomosis another operation was performed, at which time the hepatic duct as it opened into the duodenum was dilated. Shortly after the operation her symptoms recurred and she had right upper quadrant pain similar to that which preceded her first operation. There was also severe itching of the skin and jaundice.

Physical examination showed a somewhat undernourished, jaundiced woman. The heart and lungs were negative and, except for the operative scar, the abdomen was also negative.

The urine was dark amber colored and had a specific gravity of 1.012 to 1.024, a slight trace of albumin and a plus one test for bile. The blood showed a red cell count of 3,460,000, with a hemoglobin of 60 per cent. The white cell count was 25,000, 91 per cent polymorphonuclears. The icteric index was 35. The bleeding time was two and a half minutes, the clotting time eight minutes.

The temperature was 102°, the pulse 95. The respirations were 22.

On the third day an exploratory laparotomy was performed. She did poorly following operation and developed chills and fever, 104°. She received several transfusions.

X-ray examination of the chest on the fourteenth postoperative day showed numerous fairly sharply outlined, irregular areas of mottled dullness in both lungs.

She gradually failed and died on the eighteenth postoperative day.

## DIFFERENTIAL DIAGNOSIS

DR. GEORGE A. LELAND. The only comment we would make about the opening sentence is that one should not have in mind a thirty-five year old patient, one should have in mind a

forty two year old patient because the second admission is seven years later

It appears that the patient had a cervical rib removed when she was eighteen years old. It does not say which side the rib was on. If we can assume that it was on the right side and was removed for pain in the right shoulder possibly the pain was due to biliary disease, with irritation of the diaphragm. It is of some significance that she began to have this boring pain very shortly after the operation on the cervical rib. Whether or not the rib was removed on account of pain from biliary disease the fact remains that these attacks which from her eighteenth year up to the time she was thirty five occurred every two years, came on with or without jaundice. Then she had a second operation when she was about thirty two years of age. At that time a gall bladder filled with many small stones was removed at another hospital.

"She felt well for six months following the operation and then began to have attacks of chills and fever associated with indigestion." That story would seem to indicate several possibilities. If we can assume that she had been having biliary tract disease for a number of years before her gall bladder was removed she probably had by this time developed a damaged liver, with some degree of biliary cirrhosis. And then having had more trouble six months after operation might mean that she had some stones present in the common duct or the hepatic ducts that were overlooked at the time of the first operation or it might mean that she was beginning to develop a stricture in her common duct. Stricture from cicatricial contraction not infrequently comes along about six months after removal of the gall bladder. I mean by that if a stricture is forming symptoms may not occur until five months have elapsed. Such a stricture may be due to trauma at the time of operation to actual ligation of the common duct with the cystic duct and perhaps in some instances to interference of the blood supply when the cystic artery is clamped or when the dissection is being made around the stump of the cystic duct. We cannot tell up to this point whether her recent attacks were due to cicatricial stricture or to stones.

"The recurrence of the boring epigastric pain radiating to the shoulder" brings us back to the question of why the cervical rib was removed.

The pain was relieved by morphia. Pain that requires morphia, severe pain, suggests a colicky type of pain and suggests a common duct type of colic which might be an endeavor to push along a stone or to get bile through a stricture.

These attacks showed definite obstruction jaundice, changes in the urine and stools. In spite of these many attacks, however she gained

a little weight. That is because she was in the upswing of life—she was going up to thirty five years and had the resilience of youth that carried her along in spite of the attacks of indigestion.

The rest of the laboratory tests suggest biliary obstruction, a one plus bile test, an icteric index of 15, bleeding time of two minutes and clotting time of ten minutes. The blood picture is reasonably satisfactory, 3 500 000 red cells, with a hemoglobin of 80 per cent, and shows no evidence of infection at this time, the white count being 8 000. This story is so consistent with obstruction of the common duct that it was quite reasonable that an exploration with endeavor to free up or promote drainage through the common duct was apparently advised and undertaken. Here is the third operation the patient has had. She is only thirty five years of age.

It was apparently felt at this operation that these lymph nodes were playing a part in constricting the duct. That would indicate by inference that she did have a constricted and not a dilated duct in its lower portion. The record does not state that these lymph nodes were hard. They are not described as being suggestive of malignant disease in that respect. I think it is debatable as to whether lymph nodes in that region can really seriously constrict the duct unless they are involved in some malignant or acutely inflamed process. Their presence would be more indicative perhaps of some chronic inflammatory condition in that vicinity. Dr Deaver used to talk about pancreatic lymphangitis and was known to make that diagnosis when he found enlarged lymph nodes in the absence of other definite pathology in that region. I do not know whether that diagnosis is of importance here but these lymph glands when found usually do mean some evidence of chronic inflammation.

The level of the cystic duct is about the place one would expect to find stricture following cholecystectomy and about the place one would expect to find primary malignancy of the bile duct if one was anticipating that possibility. The record does not indicate whether there was any so-called white bile or mucus. It only intimates that there was a constriction at the level of the cystic duct.

It does not say whether there was any bile coming out of the abdomen during the three weeks after operation. It rather suggests that perhaps there was not. Three weeks is the approximate time for a patient to go home following a cholecystectomy. If the case has a draining biliary sinus of consequence following a choledochostomy three weeks would be a fairly short time.

DR TRACEY B. MALLORY. There was drain age of five to eight ounces for the first week.



DR. LELAND The patient went home with the hope that the removal of the glands might be of consequence in relieving this constriction of the duct. There is no intimation from the record that any attempt was made to explore the constriction or to relieve it except by removal of the lymph nodes. There is also no note made to indicate that there was any dilatation of the common or hepatic ducts above the constriction.

Then we jump to the second admission approximately seven years later, when she was forty-two, but you will note that ten weeks after discharge from the hospital following the lymph node operation because of return of the same symptoms she entered another hospital where operation was performed. When she was operated on at her first admission she was thirty-five, that is when the lymph nodes were removed. Just ten weeks after discharge she was operated on at another hospital. At that operation anastomosis was done between the common duct and the duodenum. That would seem to indicate that perhaps the common duct was found to be dilated at this other hospital. She did well for a year and then had recurrence of former attacks. We would interpret that as meaning that the stump between the common duct and the duodenum was beginning to contract and that a stricture was forming in the stoma. This is a very frequent possibility and should be provided against by making a very wide opening in the duodenum, wider than the diameter of the duct. Sometimes the operation is performed close to the liver and hepatic ducts, the so-called Mayo hepatico-duodenostomy.

"About a year and half after the anastomosis another operation was performed." That makes the fifth operation, fourth on the biliary system, and brings her to about the age of thirty-six or thirty-seven. Dilatation through the duodenum of such a stoma cannot be expected to be of very permanent value. One should anticipate the likelihood of its closing down again. The stricture is not similar to a urethral stricture in which dilatation may be of value over some period of time.

We now arrive after this long past history at the physical examination at her second admission. It is to be noted that at the age of forty-two she is a somewhat undernourished jaundiced woman as compared to "well developed and nourished woman" at the first admission. The heart and lungs are still negative. Except for the operative scar the abdomen is still negative.

This presents quite a different picture from her first entry. We know that she has had up to this moment four operations on her biliary tract. We know that she had stones and we know that she has a constricted common duct. The constriction can be perfectly well account-

ed for by adhesions, an inflammatory reaction, and we do not have to go into the realm of malignant disease to account for this constriction. It seems unreasonable to suppose that she would have malignant disease over this period of time. Certainly the start of her trouble was inflammatory and not malignant. I can well imagine the hopeless feeling the surgeon must have had, confronted with such a problem as this. Here was an individual who in spite of repeated operations on her biliary tract was showing more and more insufficiency of liver function, more and more damage by her repeated attacks, and she finally reached the point where chills and fever were recurring. Her blood showed loss of hemoglobin, anemia, and high icteric index. I should imagine that the surgeon would have thought that he was going in with the hope of opening up some dilated portion of the bile ducts in an effort to give external drainage through a sinus with some temporary relief from her immediate acute symptoms, and with perhaps a background of hope that later on that sinus might be retransplanted to make a new duct. On the other hand he may have felt that during this course of time there was more than inflammatory reaction and some degree of malignancy had intervened. I should think that unlikely, however.

"On the third day an exploratory operation was performed." That makes the sixth operation this patient has had, fifth on the biliary tract. We can understand the chills and fever—undoubtedly infection throughout the liver with pyelophlebitis. We might reasonably well expect that. The transfusion may have been indicated by some degree of local hemorrhage, with the increased clotting time and high icteric index, perhaps that is why the surgeon was unable to give her a satisfactory vent for her biliary drainage.

It would seem that with an x-ray taken at this time they were hardly looking for malignant disease. She must have had some pulmonary complication. Although it is difficult to visualize an x-ray from a written description we should think that probably the irregular areas of mottled dullness were septic infarcts.

#### X-RAY INTERPRETATION

DR. GEORGE W. HOLMES These are films taken at the bedside and give a rather different impression from what one gets on reading the note. They are not at all characteristic of the nodules one would expect to see in metastatic carcinoma or metastatic tumor of any kind. The process seems to be largely confined to the left lower lobe. There is an indefinite area of dullness which occupies the periphery of that region and there are areas of increased density, sharp and distinct, which look more like infarcts, thrombosis or even metastatic abscesses than like tumor. The diaphragm is high on both sides and the heart is a little enlarged. I

am rather surprised that no search was made earlier for possible stones in some part of the biliary tract.

#### DIFFERENTIAL DIAGNOSIS CONTINUED

DR. LELAND That leaves us with a chest picture which corroborates the idea that we have a definite infection in the liver with a biliary cirrhosis. I do not think we would expect to find, with pyelephlebitis and benign stricture of the bile ducts, that there are stones lurking up in the liver or bile ducts. We have no way of knowing. There may be sand, there may be some stones. Stones, if found, probably had been left behind at the original operation and added to in the course of time rather than having been actually formed there. I do not think we have to depend on stones for the picture. I think this patient died from cicatricial stricture of the common duct starting well back at the time of the first operation when she was thirty-two years of age.

#### CLINICAL DISCUSSION

DR. DANIEL FISKE JONES Dr. Leland was quite right when he said we were disturbed about this patient. Here is a patient operated upon for gall stones and a cholecystectomy done. Six months later she began to have attacks of chills, fever and jaundice. It may be well to note here that stricture of the common duct occasionally follows cholecystectomy and that stricture may cause the same symptoms as a stone in the common duct. Another point to be noted is that pain in the shoulder such as this patient had is much more frequently noted with distention of the liver due to obstruction in the common duct than with distention of the gall bladder. This was demonstrated in a patient with multiple abscesses of the liver, operated upon under local anesthesia. The only discomfort the patient had during the operation was at the time the finger was put into the liver to break up an abscess. At that time the patient complained bitterly of pain in the right shoulder blade.

At the second operation, which was in this hospital, two moderately enlarged inflammatory glands were found in close contact with the duct, but no stones were found. A probe could not be passed upward above the region of the cystic duct. It was thought that the glands might be the cause of shutting off the common duct. In regard to this I may say that I have never seen any gland or mass other than malignant disease shutting off the common duct. I should like to ask Dr. Mallory if he has ever seen anything outside the duct other than malignant disease causing obstruction to the common duct.

DR. THOMAS B. MALLORY It has been reported with tuberculosis

DR. JONES It must be very rare as I have never seen obstruction due to anything outside the duct, other than malignant disease, in about two thousand cases. This does not mean that it does not occur but it must be very rare.

The stricture found at the second operation, for which nothing was done, did not cause symptoms for nearly six months after the first operation, a little late, but of course, as Dr. Leland says, the stricture would naturally contract for some time after the injury to the duct. We could not say, therefore, that the symptoms could not be due to the stricture.

At the third operation, ten weeks after the second, again no stones were found, but there was a stricture in the region of the cystic duct, the usual location of a stricture due to injury to the duct at the time of operation, and the duct above was dilated. The common duct was cut off above the stricture and the stump sutured to the duodenum by a method recommended by William Mayo. The posterior edge of the duct was sutured to the posterior edge of the opening in the duodenum. The anterior edge of the opening in the duodenum was then sutured to the surface of the liver about the duct. This leaves the anterior edge of the duct free and, as Dr. Leland has said, this edge may contract and cause a stricture.

As the symptoms recurred about a year after the third operation, a fourth operation was done because of the fear of a stricture of the duct. Again no stones were found and only a moderate narrowing of the duct was found.

The patient then went from January 1929 with infrequent attacks of chills fever and jaundice until April 1935, when she had a series of attacks extending over a period of two weeks. During this period of nearly six and a half years she had gained weight and had done very well in spite of the history which says that she was undernourished.

Again the duodenum was opened and the anastomosis found to be over one quarter of an inch in diameter. A probe was easily put into both the right and left hepatic ducts. The anastomosis was dilated to a number nine dilator, that is, nearly three eighths of an inch in diameter. Long forceps were introduced and a considerable quantity of fragments of stone, detritus and pus was withdrawn. This was continued for some time and then the duct gently washed through a small catheter until the water came back clear. As there was no way of draining the ducts except through a tube through the opening in the duodenum, it was decided to close the duodenum.

After the operation the chills, fever and jaundice continued until death. I do not agree with the record presented which says that she did poorly following the operation and developed chills and fever, for she had them when she came in and continued to have them after the operation.

This brings up the question as to what could have been done at the time of operation to give better drainage to the biliary system. With a wide open anastomosis between the common duct and the duodenum and no way of draining the common duct above the anastomosis without fear of leakage of duodenal contents, nothing seemed possible and nothing was done.

Medically nothing seemed feasible. Dr. Chester Jones saw her and suggested decholin but no effect was noted.

The question is as to what can be done for such a case. We know she had a stricture with infection of the biliary system above it for several years. We also know that she had an anastomosis between the upper end of the common duct and the duodenum without any sphincter such as the sphincter of Oddi. We believed that the repeated chills, fever and jaundice after the relief of the stricture were due to the backing up of duodenal contents into the biliary system and that I believe is the cause of the condition found at the last operation. At least this has been found to be the cause in experimental work on animals.

After the operation I began to consider what might be done to relieve this condition. It seemed possible that closure of the pylorus and a gastro-enterostomy might be of some value, but as the patient failed rapidly nothing could be done.

#### CLINICAL DIAGNOSIS

Cholangitis with biliary cirrhosis

#### DR. GEORGE A. LELAND'S DIAGNOSES

Stricture of the common duct  
Biliary cirrhosis of the liver  
Pylephlebitis  
Septic infarcts of both lungs

#### ANATOMIC DIAGNOSES

Stricture of common bile duct  
Cholangitis, acute and chronic  
Biliary cirrhosis  
Intrahepatic pylephlebitis, right lobe of liver  
Pulmonary infarcts, septic  
Operative wounds. Cholecystectomy, choledochoduodenostomy

#### PATHOLOGIC DISCUSSION

DR. MALLORY: Some of the questions raised by Dr. Leland and Dr. Jones can be easily answered. Others are much more difficult, and we were not helped at all by the restrictions of the autopsy which only permitted us to reopen the surgical incision and did not allow us to remove the organs.

The common bile duct was readily traced upward from the papilla of Vater for a distance of 3.5 cm. There it became completely ob-

structed by a dense fibrous scar, confirming Dr. Jones' presumption that the obstruction which followed the first operation was due to stricture rather than the pressure of any neighboring lymph nodes. The anastomosis of the remnants of the hepatic duct to the duodenum appeared to be in good condition and the stomach, as Dr. Jones found in his last exploration, was of adequate size. A large probe could easily be passed up into each hepatic duct without meeting any obstruction. To pass it into the right duct, however, it was necessary to go around an angle, whereas the left hepatic duct drained directly into the duodenum without angulation. Obstruction, if present at all, cannot have been of any great degree.

There was, however, a marked difference in the condition of the two lobes of the liver. The left was normal in size, very finely granular, slightly greenish and tougher than normal, the bile ducts slightly dilated—in other words the typical appearance of the mild biliary cirrhosis which seven years of intermittent bile-duct obstruction would lead us to expect. The right lobe, by contrast, appeared swollen, was soft and friable, and in fact ruptured during manipulation. On section the ducts were distinctly more dilated, containing frank pus, but no large abscesses were found. It appeared to be a typical enough diffuse cholangitis.

Microscopic examination did not entirely confirm this impression. There is an underlying diffuse biliary cirrhosis, evidently a long-standing process. Then there are more acute infectious lesions in the larger portal areas, but few of these involve the bile ducts, whereas many of them certainly lie in or about the radicles of the portal vein. In other words we have an intrahepatic pylephlebitis limited to one lobe of the liver. I have twice before been completely fooled by the gross examination, as we were this time, into believing that we were dealing with a pure cholangitis. Under the circumstances no amount of drainage of the biliary tree could have been effective.

The final complication was the development of several septic infarcts in the base of each lung which were well on their way to abscess formation.

#### CASE 21362

#### PRESENTATION OF CASE

The patient, a seven year old native born boy, was admitted to the hospital complaining of difficulty in swallowing.

One week before entry the boy was walking over an uneven sidewalk and lost his balance, falling over backward and striking the back of his head on a stone without losing consciousness. The following morning he complained

of pain over his eyes and soreness of the legs. He was drowsy, had no appetite and was apathetic. He vomited that night. For the next two days the child felt well. Three days before entry he awoke complaining of a severe headache and "weakness" of the legs. A physician saw the boy that night and found his neck to be slightly stiff. The patient took liquids but felt unable to swallow solids. The next day his condition was the same. On the day before admission he had greater difficulty in swallowing and liquids were taken only with considerable effort. There was a distinct change in the quality of his speech. He was very restless and feverish. The next morning he was more restless and seemed more seriously ill and was therefore brought to the Emergency Ward.

The child was delivered normally at term. His development was normal. His health had been satisfactory although he was considered "the delicate child of the family." He had had mumps and chickenpox. He had been subject to frequent colds and had had a tonsillectomy and adenoidectomy in 1927. His activity was less than that of his siblings. He had been vaccinated and was Schick negative following three doses of diphtheria toxin antitoxin.

There were four siblings, all living and well. There was a definite history of tuberculosis in the mother's family with some contact. The father had a mild diabetes.

Physical examination showed a well developed and nourished boy who was acutely ill, restless when disturbed and drowsy when left alone. His cheeks were flushed, his eyes bright. His skin and mucous membranes were moderately dehydrated. He talked with a nasal twang which was difficult to understand. The pharynx was injected. The right side of the palate was paralyzed. There was no respiratory difficulty. The heart, lungs and abdomen were negative. No muscle paralysis or weakness was noted. All reflexes were present and hyperactive. The neck was definitely stiff. The spine was stiff. Both Kernigs were slightly positive. The tache cérébrale was markedly positive.

The temperature was 102.5°, the pulse 160. The respirations were 52.

Examination of the urine was negative. The blood showed a red cell count of 5,800,000. The white cell count was 19,000, 74 per cent polymorphonuclears. On lumbar puncture 10 cubic centimeters of fluid was obtained with an initial pressure of 90. There were 100 cells, 60 of which were lymphocytes. There was a trace of globulin. The total protein was 60 milligrams. The gold curve was 0001112100. No bacteria were seen in the smear.

The boy was given 40 cubic centimeters of human poliomyelitis convalescent serum intravenously. He was given sedatives and was fed by gavage. Lumbar puncture the day after admission showed 84 cells, all lymphocytes, and

a trace of globulin. The initial pressure was 120 millimeters. The child seemed better for forty-eight hours and then began to have great difficulty because of mucus. There was no further development of paralysis. Six days after admission he was rational and cooperative and could expel the mucus from his throat. Respirations were shallow, largely diaphragmatic but the patient could inflate the lungs fully. The temperature was 99.6°, the pulse 112 and the respirations were 20. The white blood cell count was 21,000. He vomited much of the fluid given by gavage. Ten days after admission he became cyanotic due to mucus in his throat which he could not dislodge. The lungs were resonant throughout but the breath sounds were not coming through clearly. He could inflate the lungs feebly when requested to take a deep breath. Use of the respirator was deemed inadvisable. Breathing was accompanied by retraction of the suprasternal hollow. Oxygen was given by nasal catheter. Suction was used to remove mucus from the throat. The child died at 4 o'clock that afternoon.

#### DIFFERENTIAL DIAGNOSIS

DR. F. DENNETTE ADAMS. The first part of the history in this case naturally suggests trauma and one would have been justified on the second day, when the boy was drowsy, had pain over the eyes and vomited, in assuming that he was developing the symptoms of slow bleeding based on fracture. There are usually, however, some symptoms due to concussion at the time of the injury in any case experiencing a blow sufficient to cause fracture, and pain in the legs could not be a likely symptom. The fact that he was presumably well again in another day but again sick two days later excludes injury as the chief cause of symptoms, and when by the next day he showed headache, weakness of the legs, difficulty in swallowing and stiffness of the neck it becomes apparent that there is something else seriously wrong. On this evidence alone one would think immediately of acute anterior poliomyelitis, particularly in the summer or fall and in the presence of an epidemic one would have been on the alert on the day after the fall when he first showed pain over the eyes, drowsiness, pain in the legs and vomiting.

When was this boy admitted to the hospital?

DR. TRACY B. MALLORY. In September four years ago.

DR. ADAMS. The time of the year when poliomyelitis is most apt to occur.

The remainder of the history prior to admission is certainly entirely consistent with the bulbar type of poliomyelitis but one should bear in mind the possibility of meningitis—tuberculous rather than epidemic. In any case of presumed palatal paralysis, diphtheria—nasal or pharyngeal—should be thought of, but there

is nothing in this history to suggest it and the Schick test is negative

Physical findings are consistent with infantile paralysis of the bulbar type, although meningitis could give practically an identical picture. The rapid pulse is to be expected in acute poliomyelitis, and the increase in respiratory rate would suggest beginning involvement of the respiratory mechanism. Excluding palatal signs, one could get a somewhat similar clinical picture with severe pneumonia of the central type complicated by meningismus.

The high red cell count was due doubtless to dehydration. The leukocyte count is more consistent with acute poliomyelitis than with the tuberculous meningitis.

The spinal puncture rules out fracture. The pressure of the spinal fluid is low considering the degree of meningeal irritation which seems to be present, but the remainder of the findings are consistent with either poliomyelitis, tuberculous meningitis or the usual types of encephalitis. I suppose that tubercle bacilli were looked for in the smear and not found, but it must be remembered that one negative smear would not exclude tuberculosis. It would also be helpful to know whether sugar was present, as it is usually diminished or absent in tuberculous meningitis or pyogenic infection of the central nervous system.

The course of the disease is quite typical of the progressive case of bulbar poliomyelitis. Whether or not he obtained some relief from the convalescent serum is a matter of conjecture. One wonders why no further doses were given. Possibly it was thought that his apparent improvement after the single dose indicated beginning recovery and that when symptoms recurred it was too late for serum.

I believe the diagnosis in this case is acute anterior poliomyelitis. The history, particularly of mild symptoms with headache and vomiting for a day, then improvement and recrudescence forty-eight hours later, coming on in September, is absolutely typical of this disease. Physical examination, laboratory findings and the course are characteristic of the fatal case of bulbar poliomyelitis with central respiratory failure. Respiratory failure may be the result of involvement of the respiratory center or of the muscles of respiration (diaphragm of intercostals). In most of the latter type (which result from cord involvement) there is usually paralysis of both arms.

Of particular interest is the relationship of the fall to the disease. Did the fall, with possible slight concussion, make more fertile the ground for the infection? Did the fall come as a result of disease already under way or was it purely incidental? We so often find patients blaming falls or other types of trauma for various illnesses that it makes one wonder if previ-

ous injury might not at least contribute by in some way making the patient more susceptible to disease.

A PHYSICIAN Would we not expect in infantile paralysis to find the polymorphonuclears in the blood being replaced by lymphocytes later on?

DR ADAMS This change occurs in the spinal fluid. There is no characteristic blood picture in poliomyelitis, the reaction being similar to that encountered in mild respiratory infections.

A PHYSICIAN The history states there were 100 cells, 60 of which were lymphocytes, in the spinal fluid. At a lumbar puncture there were 84 cells, all lymphocytes.

DR ADAMS Early in the disease the spinal fluid shows polymorphonuclears predominating, but as the disease progresses these are replaced by lymphocytes.

A PHYSICIAN Would that pulse rate four days before death be inconsistent with meningitis?

DR ADAMS No.

A PHYSICIAN In meningitis is the rate usually slow until the last few days before death?

DR ADAMS Unless there is marked intracranial pressure the pulse rate in meningitis is usually in proportion to the temperature.

A PHYSICIAN I wonder why they did not take an x-ray of the skull.

DR ADAMS The physical examination as well as the spinal fluid findings were doubtless thought to be sufficient to exclude head injury. It would be unwise to take an infectious case of this type through the corridors and expose many patients in the x-ray department and elsewhere, unless it was quite necessary for diagnosis.

#### CLINICAL DIAGNOSES

Poliomyelitis  
Pneumonia?

DR F. DENNETTE ADAMS' DIAGNOSIS

Acute anterior poliomyelitis, bulbar type

#### ANATOMIC DIAGNOSES

Acute anterior poliomyelitis, bulbar type  
Acute bronchitis  
Bronchopneumonia  
Congenital anomaly—variation in size of kidneys

#### PATHOLOGIC DISCUSSION

DR MALLORY The autopsy showed very little in gross. There was no sign of skull fracture. The meninges were congested but not definitely cloudy. The gray matter in parts of the medulla was distinctly red and abnor-

mal looking. In the body we found an acute bronchitis, a very faint trace of bronchopneumonia and some lymphoid hyperplasia which would be diagnostically of no importance but is perfectly consistent with poliomyelitis. Microscopic sections show a slight lymphocytic infiltration of the meninges and a certain amount of ganglion cell degeneration, not very much, but enough to be diagnostic. Dr. Kubik felt that there was no question it was a case of poliomyelitis.

We have had a rather unusual proportion of bulbar poliomyelitis cases in the last four years; in fact the majority that have come to autopsy have shown very little peripheral paralysis. I do not think it represents any change in the character of the disease in this region but rather that this hospital, which was one of the first to put in a respirator, has been advertised in this regard all over New England. Every case with a question of poliomyelitis with a tendency

toward respiratory paralysis is rushed here. The results of the respirator treatment on these cases have not been very brilliant. One of the chief difficulties has been exactly the one shown by this child—paralysis of swallowing results in an inability to keep the throat clear. No matter how careful the nurse is it is almost impossible to remove the secretions in many of these cases. Respiratory infection occurs and the children develop pneumonia and die. We have had a large number of cases with that series of events. Sometimes it does not occur at once. They are put in the respirator and the acute stage of the disease passes but frequently there is never sufficient recovery of the respiratory muscles and the patient is condemned to a respirator life for months before pneumonia mercifully intervenes. A very rare case is carried through respiratory paralysis, recovers adequate strength in the muscles and we are able to point to a dramatic cure.

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## PATENTS

PATENTS on medicinal and biological agents and on the processes involved in their manufacture may be necessary, but they are not a necessary evil. From what we know of Federal laws concerning inventions and discoveries, it would appear that an inventor or discoverer, if he wishes to uphold his name and reputation and if he is to be free to experiment with or develop his own creation, may be obliged to seek the protection offered by a patent. He may have to do this in order to prevent being estopped by some unscrupulous person who may filch his idea and fraudulently secure a patent of his own. There can, of course, be no objection to gaining such protection. In the case of medicinal agents possessing dangerous possibilities if not properly prepared, and of products that are not controlled by state or federal regulations, a patent is not only desirable but may be necessary. An example is insulin. Here is an organic substance fatal if too weak, because it may fail to relieve the coma of dia-

betes, and equally fatal if too strong, because of the shock it may induce. Insulin, contrary to a general impression, does not fall in the category of biologic products so rigidly supervised by the National Institute of Health of the United Public Health Service. Insulin, and the processes of its manufacture, quite properly required the safeguards afforded by the patent law, not only for the repute of its discoverers but for the safety of diabetics.

Other examples might be quoted, but the one suffices for the present purpose.

It is not a patent *per se* that causes discord, acrimony or other evils. These may lie in the manner in which a particular patent is administered. It is an unwritten law that an inventor or discoverer, supported by public funds whether academic, philanthropic or governmental, should in no way benefit financially from the fruit of his labors. When royalties are applied to research in diseases or subjects not directly connected with the disease to which the taxed remedy directly applies, it may not be impertinent to point out that the royalty is actually paid by an already burdened sufferer, and that it may be unjust to require such a sufferer to contribute to investigations that are of no immediate concern or value to him. This feature of patent administration merits more discussion than has been accorded it.

Then there is the objection—and to us it seems a cogent one—that the holder of a patent may hinder or wholly prevent qualified investigators from studying or improving the product or process covered by the patent. Feeling, as we do, that the experimental sciences should be open to all those whose inclinations, talents and education fit them for serious research without let or hindrance, we entertain no sympathy for such exclusive, mandatory prohibitions.

We do not desire to hold up any patent as an example of personal avarice or of ill-advised or wrongful administration; we do, however, wish to emphasize the fact that the more or less general misconception of our national patent laws, coupled with the misunderstandings, controversies and the ill-feeling they engender, demand the serious, impartial and dispassionate consideration of medical men in general and of the higher councils of our medical and scientific societies in particular.

The Massachusetts Medical Society is, therefore, to be commended for its resolve to request an inquiry into this neglected and threatening question.

RESOLUTION ADOPTED BY THE COUNCIL OF  
THE MASSACHUSETTS MEDICAL SOCIETY, JUNE 4, 1935

That the Massachusetts Medical Society is opposed to the existence of the so-called Dick Scarlet Fever patent and the control of this patent by the Scarlet Fever Commission, and, furthermore, that the dele-

gates to the House of Delegates of the American Medical Association be instructed to bring this resolution before the American Medical Association

### THE EDUCATION OF THE INTERN

If it be true that the physician should be a student all his life and that his education should be co-terminous with his existence the period of internship should receive more attention from medical educators whether in or out of formal schools. It is for the neophyte a period of especial susceptibility. As an undergraduate he has been seeing patients for some time, yet has had slight responsibility for their care. In the hospital, where perhaps for twenty-four hours a day (on some days) he is continuously dealing with patients, there is opened to him an opportunity for acquiring methods of approach and procedure such as he is likely never to have again. It is a critical period in his development, somewhat like the breaking in of a colt. If it is not well done, he may be spoiled permanently. Its importance is in some respects greater than the clinical years in the medical school because there is the added personal responsibility for what he does which stamps into him indelibly sometimes with a hot brand the results of his experience. Here it is that he has the opportunity to acquire the habit of scientific method the value of which he may have seen exemplified by his teachers in the medical school.

There are at least two points of view as to the justification for his existence: benefit to the hospital, and benefit to the intern. Outwardly the second good has received the greater emphasis; perhaps the first has, however, been the dominating element in the situation. It is of great benefit to the hospital staff to have the young physicians ready and eager to perform all sorts of ordinary medical tasks for the sake of their own experience. The exploitation of interns has been widespread. Now the intern has become more self-conscious and the possible educational value of the internship is becoming realized. Some medical schools are requiring a year's internship before conferring the doctorate in medicine and some states are requiring a year's internship before admitting to the examination for licensure. Which of these is the wiser procedure time alone will tell, but since the internship should be regarded as part of the education of the physician, the school should have the immediate control in the administration.

The internship has been an important element in changing the atmosphere of the hospitals in the United States. Analogously to the training of the nurse, changing from the exploitation to the education of the nurse, the emphasis in internship is shifting from the use of the intern as a mere means of getting some routine

hospital work done, to the continuation of the education of members of the medical profession.

In all hospitals connected with medical schools the education of students necessarily overflows into some education of interns. But too often it is casual instead of purposeful, systematic and thorough. As the usefulness of internships has been realized and the more urgent competition by hospitals has made it more difficult to secure good candidates, some of the non-teaching hospitals have offered modest honoraria distinctly less than the salary of a well-trained laboratory technician. This merely shifts the emphasis and defers the proper solution.

It has become the duty of every hospital which offers an internship to see to it that the experience is as far as possible for the education of the intern. In this there will be involved some, and occasionally, considerable effort on the part of the medical staff.

In the recent discussion of Internships in Massachusetts Hospitals which appeared in the *Journal*\* it was suggested that the medical schools, the hospitals, the Massachusetts Medical Society, as well as the interns themselves might form an organization for the consideration and solution of these problems. At present only the interns are unorganized.

As we watch these organizations straining at the leash, so to speak, we wonder in which one eagerness for accomplishment will produce leadership in this movement.

New Eng J Med 813: 11 (July 4) 1936

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

MORRISON, WILLIAM R. A.B. M.D. Harvard University Medical School 1913. F.A.C.S. Associate Professor of Surgery, Boston University School of Medicine. Senior Visiting Surgeon, Boston City Hospital. Second Surgical Service. His subject is "Two Hundred Acute Perforated Ulcers of the Stomach and Duodenum from the Boston City Hospital." Page 447. Address: 520 Commonwealth Avenue Boston.

EDWARDS, EDWARD A. M.D. Tufts College Medical School 1928. Assistant in Surgery and Member of the Circulatory Clinic, Boston City Hospital. Assistant in Surgery Tufts College Medical School. His subject is "The Treatment of the Recurrent Varicose Ulcer." Page 450. Address: 1571 Beacon Street Brookline.

PRATHER, GEORGE C. M.D. Harvard University Medical School 1924. F.A.C.S. Assistant Urologist, Beth Israel Hospital Boston and Bos



ton Lyng-In Hospital, Boston Urologist Newton Hospital, Newton Consultant Urologist, Heywood Memorial Hospital Norwood Assistant in Anatomy, Harvard Medical School Address 99 Commonwealth Avenue, Boston Associated with him is

BRODNY, M L M D Tufts College Medical School 1929 Assistant Urologist, Beth Israel Hospital, Boston Address 371 Commonwealth Avenue, Boston Their subject is "X-Ray and Autopsy Study of Anatomical Changes of the Upper Urinary Tract in Patients with Obstructing Prostates" Page 457

QUINBY, WILLIAM C A B, M D Harvard University Medical School 1902 F A C S Clinical Professor, Genito-Urinary Surgery, Harvard University Medical School Urologic Surgeon, Peter Bent Brigham Hospital His subject is "Some Aspects of the Treatment of Carcinoma of the Bladder" Page 460 Address Peter Bent Brigham Hospital Boston

CHEEVER, DAVID A B, M D Harvard University Medical School 1901 F A C S Associate Professor of Surgery, Harvard University Medical School Surgeon, Peter Bent Brigham Hospital His subject is "Methods and Results in

the Surgical Treatment of Diseases of the Biliary Passages" Page 463 Address Peter Bent Brigham Hospital, Boston.

COPE, OLIVER B A, M D Harvard University Medical School 1928 Instructor in Surgery, Harvard University Medical School Assistant in Surgery, Massachusetts General Hospital His subject is "The Surgery of Subtotal Parathyroidectomy" Page 470 Address Massachusetts General Hospital, Boston

LAHEY, FRANK H M D Harvard University Medical School 1904 F A C S Surgeon-in-Chief, New England Baptist Hospital Surgeon, New England Deaconess Hospital Director of Surgery, The Lahey Clinic His subject is "The Reduction of the Mortality in Hyperthyroidism" Page 475 Address 605 Commonwealth Avenue, Boston

BURNETT, FRANCIS L S B, M D Harvard University Medical School 1906 Director of Health Class for Psoriasis, Massachusetts General Hospital Director of Health Class for Arthritis, Peter Bent Brigham Hospital His subject is "The Progress of Nutrition" Page 480 Address 205 Beacon Street, Boston

## MISCELLANY

### ANTERIOR POLIOMYELITIS CASES FOR 1935

City or Town	Jan May	June	July	August 1 24	August 26 31	Total to Date For Year
Attleboro	0	0	0	0	1	1
Brewster	0	0	0	1	1	2
Fall River	0	0	6	44	23	73
Falmouth	0	0	0	0	1	1
New Bedford	0	0	0	1	3	4
Plymouth	0	0	0	1	0	1
Somerset	0	0	0	1	2	3
Swansea	0	0	0	0	1	1
Truro	0	0	0	0	1	1
Wareham	0	0	0	0	1	1
Westport	0	0	0	1	2	3
Braintree	0	0	0	1	0	1
Brockton	0	0	0	5	0	5
Dedham	0	0	0	2	0	2
Hopkinton	0	0	0	1	0	1
Millis	0	0	0	0	1	1
Quincy	0	0	0	3	1	4
Scituate	0	0	0	0	4	4
Weymouth	1	0	1	2	1	5
Arlington	0	0	0	2	0	2
Belmont	0	0	0	2	0	2
Boston	0	1	19	131	44	195
Brookline	0	0	0	2	0	2
Cambridge	1	0	1	8	11	21
Chelsea	0	0	0	7	4	11
Concord	0	0	0	1	0	1
Everett	0	1	1	7	2	11

City or Town	Jan May	June	July	August 1-24	August 26-31	Total to Date For Year
Lexington	0	0	0	0	1	1
Malden	1	0	0	3	3	7
Medford	0	0	0	3	5	8
Melrose	0	0	0	2	1	3
Newton	0	0	0	1	2	3
Revere	0	0	0	2	0	2
Somerville	0	0	0	5	6	11
Waltham	1	0	2	7	2	12
Watertown	0	0	1	5	2	8
Winthrop	0	0	0	4	1	5
Amesbury	0	0	0	3	0	3
Andover	0	0	1	1	0	2
Beverly	0	0	1	7	4	12
Billerica	0	0	0	2	1	3
Danvers	0	0	0	2	0	2
Gloucester	1	0	0	2	1	4
Haverhill	0	0	1	14	4	19
Ipswich	0	0	0	1	2	3
Lawrence	0	1	3	0	1	5
Lowell	0	0	3	12	4	19
Lynn	0	0	2	4	1	7
Manchester	0	1	0	0	2	3
Marblehead	0	0	1	0	0	1
Middleton	0	0	0	0	1	1
Newburyport	0	0	0	1	2	3
North Andover	0	0	0	2	2	4
Peabody	0	0	0	1	0	1
Salem	0	0	0	1	0	1
Saugus	0	0	0	1	1	2
Swampscott	0	1	0	1	0	2
Wakefield	0	0	0	0	1	1
Westford	0	0	0	1	0	1
Blackstone	0	0	0	0	1	1
Fitchburg	0	0	0	2	4	6
Marlboro	0	0	0	1	0	1
Millbury	1	0	0	0	0	1
Northbridge	0	0	0	1	0	1
Shrewsbury	2	0	0	0	0	2
Templeton	0	0	0	0	1	1
Uxbridge	0	0	0	0	3	3
Westboro	0	0	0	2	0	2
Worcester	0	0	1	2	2	5
Chicopee	0	1	0	0	0	1
Northampton	0	0	1	0	0	1
Springfield	0	0	1	2	0	3
Greenfield	0	0	0	1	0	1
Pittsfield	0	0	0	1	0	1
Becket	0	0	0	0	1	1
Total	8	6	46	323	166	549

#### CONFERENCES REGARDING BLINDNESS AND TUBERCULOSIS

Dr. Alix Churchill, associate secretary general of the International Association for Prevention of Blindness and executive secretary of the International Union Against Tuberculosis, arrived recently at New York aboard the SS "President Roosevelt" for a series of conferences throughout the United States regarding policies and procedures in

the world wide fight against blindness and tuberculosis. She is here as the guest of the National Society for the Prevention of Blindness and the National Tuberculosis Association.

The International Association for Prevention of Blindness, whose headquarters are in Paris, is a clearing house for information on scientific and educational activities for the conservation of vision in thirty-six countries including the United States.

Americans were largely responsible for the establishment of the Association at a conference at The Hague in 1929. The next annual meeting will be in Paris in the spring of 1936.

The International Union Against Tuberculosis is a conference body composed of forty-four nations, including the United States, whose headquarters are also in Paris. Its objective is to promote the world wide campaign against tuberculosis by furnishing a clearing house and forum for the scientific and administrative problems involved. Biennial meetings are held in the member countries. The next international conference will be held in Lisbon, Portugal, in September, 1936.

In addition to conferences with the executives of health agencies in New York City and Washington, D. C., Dr. Churchill will observe the activities for prevention of blindness and tuberculosis in the following cities which she is scheduled to visit: Buffalo, Chicago, Denver, St. Louis, Philadelphia, Washington, Baltimore, Boston and Toronto.

The blind population of the world is estimated to be about five or six millions, according to Dr. Churchill. Most of the causes of blindness are preventable, she said. There is a steadily growing interest among European educators in the use of "sight saving classes" as a means of educating children with seriously defective vision, and one of these special classes was started in Paris last year. The movement has grown more rapidly in America than anywhere in the world; there are now 462 sight saving classes in 144 communities throughout the United States.

## RECENT DEATHS

**LEONARD**—WILLIAM E. LEONARD, M.D., a retired physician of Hadley, Massachusetts, died August 28 while visiting with relatives in Minneapolis. Dr. Leonard was born in 1855 in Minneapolis and received his M.D. degree from the Hahnemann Medical College and Hospital of Philadelphia. He had practiced in Minneapolis for more than fifty years and retired to make his home in Hadley with his daughter in 1929.

He was active in town affairs in Hadley and a member of several local organizations.

**BUCKLEY**—CORNELIUS J. BUCKLEY, M.D., for several years a member of the Staff of the United States Veterans' Hospital and also formerly of Springfield, Massachusetts, died at the home of his brother, in Pittsfield, Massachusetts, September 1, 1935.

Dr. Buckley was born in Stockbridge, March 8, 1876, the son of Patrick J. and Johanna (Broderick) Buckley. He graduated from the Albany Medical College and served several years at the Bedford Hospital.

He is survived by his widow, Mrs. Cora B. (Van Ness) Buckley, and a brother, Richard Buckley.

**BIXBY**—JOSIAH P. BIXBY, M.D., of 20 West Street, North Woburn, Massachusetts, died September 2, 1935. He was born at Norridgewock, Maine, in 1854 and, after preliminary education at Andover, studied medicine at the Bowdoin Medical School, graduating in 1876. He settled in Woburn in 1884 and, after having been a member of the Massachusetts Medical Society for many years, retired in 1923.

Dr. Bixby is survived by two sons, William P. Bixby of Woburn, Frederick Bixby of Tampa, Florida, and a daughter, Mrs. Elizabeth Siegfried of Glen Ridge, New Jersey.

## NOTICE

### ANNOUNCEMENT

MOSES J. KONIKOW, M.D., has opened an office at 636 Beacon Street, Boston. Telephone Kenmore 9600.

## SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, SEPTEMBER 9, 1935

Wednesday, September 11—  
112 M. Clinico-Pathological Conference. Children's Hospital.

Saturday, September 14—  
10-12 Staff rounds at the Peter Bent Brigham Hospital.

\*Open to the medical profession  
†Open to Fellows of the Massachusetts Medical Society

September 17, 18, 19—Eleventh Clinical Congress of the Connecticut State Medical Society. For details address Dr. Creighton Barker, 129 Whitney Avenue, New Haven, Conn.

September 30—October 12—International Medical Post-Graduate Courses in Berlin. For further information apply to the Geschäftsstelle der Berliner Akademie für ärztliche Fortbildung, Robert Koch-Platz 7 (Kaiserin Friedrich Haus), Berlin N. W. 7.

October 6-20—Seventh Annual Training Course for Medical Reservists at the Mayo Clinic. See page 441, issue of August 29.

October 7-10—American Public Health Association will meet in Milwaukee, Wisconsin. For information address the American Public Health Association, 50 West 50th Street, New York City.

October 21—November 2—1935 Graduate Fortnight of the New York Academy of Medicine. See page 898, issue of May 9.

October 28—November 1—The Twenty-Fifth Clinical Congress of the American College of Surgeons. See page 1065, issue of May 30.

## BOOK REVIEWS

Clinical Management of Syphilis. Alvin Russell Harnes. 71 pp. New York: The Macmillan Company. \$1.50.

While the book is attractive in appearance, and its purpose—"to offer courses of therapy for the management of syphilis at whatever stage it may present itself to the general practitioner"—praiseworthy, the contents fall far short of one's expectations. The statement on the jacket that "This book is unique in that the author has outlined the treatment of the various forms of syphilis giving the day by day and week by week tables of medication for a period of three years" disregards the

fact that J F Moore in his *The Modern Treatment of Syphilis* published in 1933 and J H Stokes in the second edition of his *Modern Clinical Syphilology* in 1934 did just this

The book not only fails to present anything new but it fails to take note of much of the advance in the subject of the last five years as shown in the fact that twenty per cent of the chapter on Syphilis of the Central Nervous System is devoted to the once-valuable Swift-Ellis technic. While mercury still holds its place in treatment few specialists are using mercury injections with their excessive painfulness and danger when they now have a safer and more active weapon in the form of bismuth, yet this author recommends bichloride of mercury injections in early syphilis a stage of the disease when most syphilologists feel that time is too precious to waste on so ineffective a drug. Every one of course insists on the treatment of the pregnant woman during her first pregnancy in which syphilis is discovered, but instead of recommending subsequent treatment as far as possible in the intervals of her childbearing the author recommends treatment during each and every pregnancy regardless of blood tests or the amount of previous treatment.

The directions for personal hygiene contain the amazing statement that bathtub and toilet seat must be washed with an antiseptic. The reviewer is not aware that the bath-tub has ever been blamed for a case of syphilis and it is well known that toilet seat infections are so rare as to amount only to alibi. Insistence on delaying marriage "until eighteen months after the blood and spinal fluid serology is (are) permanently negative" takes us back to the days of mercury. Inasmuch as it can never be known when a person reaches the point of permanent negativity such a requirement is equivalent to refusing the privilege throughout life. Modern thought is strongly tending toward what Stokes calls "protected marriage" rather early and under medical supervision. In the treatment of cardiovascular syphilis we read that "treatment of these patients must of necessity be carried on with extreme measures of precaution" and on the next page we see the suggested course of treatment which is hardly cautious and lacks little of being classifiable as intensive. In the chapter on Congenital Syphilis we learn that since the mother is receiving treatment, the child must be given mother's milk from some other source or placed on whole cow's milk formula.

The book is replete with careless spellings and abbreviations: nitroid for nitritoid, Tr pallidum and Tr pallida used interchangeably for T pallidum, Bloch for (Iwan) Bloch and many others. Of the fifteen references in the bibliography about one-half are to good but minor articles by the able leaders of the author's city. It is to be hoped that failure to mention J E Moore and P C Jeans and J V Cooke does not mean that their writings are not familiar. The index is well done.

**Diagnosis and Treatment of Skin Diseases** Including the care of the normal skin Jacob Hyams Swartz and Margaret Gilson Reilly 316 pp New York The Macmillan Company \$3.50

This book is essentially a practical one in the treatment of skin diseases. The directions for the application of therapeutic measures are detailed and explicit, and they are combined with sufficient data concerning a given disease for the nurse or medical student.

The chapters on the care of the baby's skin and on the care of the abnormal skin together with the chapter on syphilis should be extremely valuable for every nurse and medical student. The curriculum outlined for nurses is an ambitious one fully capable of being carried out in a large hospital, and it should provide a valuable experience in this field for nurses.

The classification of diseases by regions entails numerous references to other chapters but is convenient for teaching purposes. The photographs are excellent. There are numerous tables of differential diagnosis as well as many lists of articles needed in a specific procedure. The formulary contains prescriptions tested and found worthy during many years in a large and varied skin clinic.

This book should prove to be of extreme usefulness to nurses and medical students and there are many valuable suggestions for the general practitioner in carrying out the treatment of common skin diseases.

**Hertzer's Monographs on Surgical Pathology** Surgical Pathology of the Peritoneum Arthur E. Hertzer 304 pp Philadelphia Montreal and London J B Lippincott Co

This interesting monograph is much more than an article on the pathology of the peritoneum. It covers also anatomy, physiology and surgery and contains much material on diseases and conditions that only affect the peritoneum in a secondary manner. Parts of it are very good, other parts only fair and there are some surprising omissions. On the whole it should be read and studied by all those doing abdominal surgery, especially if their results are not what they should be. It is never dull.

Samples of good paragraphs follow:

"Tympany is purposive in some cases. It aids in localizing infections by quarantining the area and it slows absorption of the peritoneal exudates by increasing the intra-abdominal pressure. Therefore distention per se is not always an evil and as a matter of fact the measures to combat it are often more injurious to the patient than the condition itself.

"Death from intestinal paresis as I used to see it in my pathology days was something like this: A day or so after a slow operation punctuated by profuse conversation and zealous pawing of guts the patient became distended. At once this distention was persistently and vigorously combated by

enemas and other means until the patient foolishly c.c.u. If the term 'paralysis' is applicable to such cases it must denote the attempts at stimulating peristalsis at a time when the intestines are protecting an irritated area and refuse to be stimulated into action. An interesting observation from the pathologist's point of view is that some surgeons are constantly plagued by this disaster while others never experience it."

One example of what is, in the reviewer's mind, poor advice is that gauze packs are always advised for drains, rather than rubber tubes or cigarettes. It is only fair to state, however, that the author is insistent on the proper placing of drains so that I am sure that gauze packs used by him are much safer than other drains used by certain others.

A surprising omission is the leaving out of all consideration of that numerous and very troublesome group of cases of combined ileus and obstruction seen following operations for appendicitis with general peritonitis.

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**Textbook of Attendant Nursing** Katharine Shepard and Charles H. Lawrence 433 pp New York The Macmillan Company \$3.00

The names of the authors give assurance of good judgment in the preparation of this book. If any further commendation is sought by readers, the list of contributors and reviewers will be an added endorsement.

In the early chapters, a description of the elementary structure and gross anatomy of the human body, together with brief references to the diseases to which each organ is subject, will prepare those who are responsible for the care of illness and maintenance of health to give adequate and intelligent service.

The sections given to household problems including the selections and preparation of foods are followed by dietary rules for invalids and children all of which are of greater importance than is generally recognized.

The second half of the volume is especially directed to nursing fields and, if carefully studied, will qualify the nurse for practically all of her duties.

This very excellent book will interest the doctor, medical student, hospital administrator, and all ambitious nurses. It is a useful book of reference for the family library.

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**Anaesthesia and Analgesia in Labour** Katharine G. Lloyd Williams 96 pp Baltimore William Wood & Company \$2.00

This little book describes in detail the use of anesthetics and analgesics in England. The methods that the author suggests have not appealed to American obstetricians, and it is not a book that can be of much service in this country.

**Female Sex Perversion** The sexually aberrated woman as she is Maurice Chideckel 352 pp New York Eugenics Publishing Company \$6.00

Dr Chideckel's book on female sex perversion is a semi-popular presentation of the subject. The author's experience with such cases seems to have been fairly extensive, as he quotes numerous examples well within his practice. These illustrations, together with other cases abstracted from the literature, serve to present to the reader, in concrete form, examples of the major forms of sex perversions in women.

In the main, the book consists of descriptions of the various types of perversion. The author has evidently read widely in the literature dealing with this subject, and accepts the teachings of Freud as regards the causation of these abnormalities. Some of his statements appear rather overemphatic, as for example "Masturbation, therefore, must be regarded as an important factor in the causation of mental diseases." He states definitely that this effect is brought about not by the practice itself, but by the fear of insanity which is aroused in the woman by what she reads or hears about the results of masturbation. Even so, his statement appears rather sensational.

Another startling pronouncement is that "Nudism is exhibitionism. The nudist is a sexual pervert." This opinion would seem somewhat extreme. Dr Chideckel's reference to sodium bicarbonate as an "alkaloid" (p. 275) is hardly consistent with the nomenclature of modern chemistry.

Taken as a whole, the book does not leave one with the feeling that it is a really scientific presentation of the subject. It is an attenuated echo of the more profound works of such authors as Havelock Ellis, Krafft-Ebing, Moll and Freud, served with a dash of sensationalism to whet the appetite of the superficial reader.

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**Modern Motherhood** A book of information on complete maternity care Prenatal—Delivery—Aftercare Claude E. Heaton 271 pp New York Farrar & Rinehart, Inc. \$2.00

Modern Motherhood is a book of some 270 pages. It contains much that is of value to the mother, but it also has a great deal of material that is totally unnecessary in any book that is written primarily for the instruction of mothers. The author states that a special diet is unnecessary and then goes into a twenty-page discussion of diet, with tables of calories and a consideration of the vitamins. His discussion of anesthesia and analgesia is entirely too detailed. The book contains a bibliography of articles and books that would be of no help to mothers in going through a pregnancy.

If the book were cut to half the size of the present volume it would be most welcome and readable, and could well be given to mothers for their use. In its present form, however, it is not acceptable for such a purpose.

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## The Massachusetts Medical Society

### SECTION OF RADIOLOGY AND PHYSIOTHERAPY

Ball Room Assembly, Hotel Statler, Boston, Monday, June 3, 1935, 2 30 P.M.

#### PRESIDING

Franklin P. Lowry, Newton, Chairman  
Philip H. Cook, Worcester, Secretary

**CHAIRMAN LOWRY:** The Section will please come to order. Is there any business to be transacted at this time?

Your committee has worked for nearly a year on subjects that we thought would be interesting for both the roentgenologists and the physical therapists. We have three interesting papers this afternoon.

We are sorry that Dr. Vogt, about a week ago, was called to his home in Iowa because of sickness of his mother and has been unable to return. Dr. Green could not conduct the discussion because it was necessary that Dr. Vogt start the papers with x-ray slides which Dr. Green was to discuss later. With your consent I am going to ask the secretary to write Dr. Vogt and Dr. Green, telling them of our sorrow in the sickness of his family and that we are much disappointed in not hearing the papers. Does that meet with your approval?

(The meeting so indicated.)

**CHAIRMAN LOWRY:** In the field of physical therapy there are a great many new types of apparatus being brought out almost continuously. The Council on Physical Therapy has tried to select the good ones and to eliminate the bad ones and in some instances has been successful. One of these pieces of apparatus which is before the general practitioner at the present time is the so-called short wave high frequency machine or "short wave diathermy" or radiotherm. In order that we may find out more about it and use it more intelligently we have asked a physicist to come and tell us what is inside and a clinician to tell us what happens outside the box as we use this particular machine.

We are very fortunate in having Dr. Chaffee, professor of physics at Harvard University, who has gladly consented to speak to us on the physics of high frequency machines. His particular subject is "The Physics of the High Frequency Currents as Used in Medicine"—and there are three of them—"Diathermy, Radiothermy, and the Electric Knife." Dr. Chaffee!

### THE PHYSICS OF HIGH FREQUENCY CURRENTS AS USED IN MEDICINE—DIATHERMY, RADIOTHERMY, AND THE ELECTRIC KNIFE\*

BY E. L. CHAFFEE, PH.D.†

**T**he modern medical man makes use of a great many agencies and devices which have come directly from the physicist's laboratory. Such agencies as x-rays, radium, ultraviolet light and devices such as the electrocardiograph have been invaluable in the medical world. An understanding of the scientific principles underlying these physical agencies is highly desirable as a guide in the medical applications, as a guard against wrong and dangerous usages, and as a defense against extravagant and unwarranted claims. Often reticence in accepting new and useful devices is fostered by ignorance, while on the other hand ignorance often leads to abuse and tragic misuse of valuable agencies.

During the last few years there has been a rapidly increasing use of high frequency currents of electricity in diathermy and in surgi-

cal cutting. One hears of short waves of damped and undamped waves of conduction and capacity currents, and a host of other scientific terms. The object of this talk is to explain the meaning of some of these terms and briefly to explain how the currents are generated and applied.

First, why are high frequency currents used in preference to low frequency currents? When a current which alternates in direction a small number of times per second, say sixty or one hundred times per second is passed through living tissue, the electrolytic ions move to and fro with the alternations. As a consequence, polarization of the cells, electrolysis, nerve stimulation and muscular contraction take place, and a very small amount of heat is produced. If the frequency is increased into the tens of thousands of alternations per second, the ions have less time to move and all effects except heat rapidly disappear. With frequencies of hundreds of thousands of alternations per sec-

Read at the Annual Meeting of the Massachusetts Medical Society, Section of Radiology and Physiotherapy, June 7, 1935.

\*Chaffee, E. L.—Gordon McKay Professor of Physics and Communication Engineering, Harvard University. For record and address of author see "This Week's Issue," page 644.

and the only effect remaining is heat and the absence of nerve stimulation and destructive electrolysis permits large currents to be passed without harm through the body with the consequent increase in the heating effect.

I feel quite sure of my position in stating that no specific effect of any particular frequency has been proved to exist, nor is there any reason to expect any specific effect because the highest frequencies used are far too low to elicit any specific molecular activities. If this statement stands the test of time, the only effect used in diathermy is the heating effect.

The rate of production of heat at any point in the body depends upon the square of the current density and the specific resistance of the tissue. The so-called "skin effect", which means the tendency of a high-frequency current to travel mostly in the surface of a conductor, is negligible when the body is the conductor. It is fairly well established, however, that the surface of the body is more intensely heated than the interior, but this uneven heating can only be due to the greater resistance of the subcutaneous tissue and to the higher current density at the electrodes, especially when small electrodes are used. The circulation of the blood is a powerful agency toward equalizing the temperature throughout the body.

Some diathermy machines generate currents of the order of a million alternations per second, while the so-called "short wave" machines apply currents having frequencies from about ten to one hundred million alternations per second. The term radiotherapy has been suggested to imply the use of very high-frequency currents. All machines produce heat in the body, the principal difference between the use of the high and the ultra-high-frequency machine lies in the mode of causing the currents to pass through the body. This will be explained later.

What is the difference between damped and undamped currents and how are these two types of currents generated? Everyone who has taken a course in elementary physics is taught that when a condenser or Leyden jar discharges through a spark gap and a few turns of wire, the current surges back and forth like the oscillations of a pendulum which has been pulled aside and released. The oscillations die down, that is, they are damped. The condenser may be repeatedly charged and allowed to discharge, producing a series of damped trains of oscillations. This was the method of generating the oscillations used in early radio telegraphy, and it was natural that the same artifice should be used in the first "spark gap" diathermy machines. The currents produced by these machines consist of separated groups of oscillations, each group consisting of from ten to one hundred oscillations of diminishing amplitude.

Generally there are relatively very long intervals of time between trains or groups when no current flows.

The invention of the thermionic vacuum tube provided means for exciting continuous oscillations in a circuit in much the same way as a clock mechanism maintains a pendulum in continuous oscillation by giving it a gentle push each swing. The vacuum tube rapidly supplanted the "spark gap" radio transmitter, and so the vacuum-tube diathermy machine has practically made obsolete the "spark gap" diathermy machine.

Let us contrast the two types of current. Both types of current, the damped and the undamped, produce heat, but for the same amount of heat the damped current must rise to very much higher instantaneous values because of the long pauses when no current flows. As a consequence, for the same degree of heat, the damped currents produce much higher instantaneous voltages and these higher voltages favor the production of sparks and burns. The undamped current, on the other hand, is smooth, steady and continuous, and has the minimum tendency toward sparking.

A few other points are relevant concerning the generators of damped and undamped currents. Every diathermy machine consists essentially of an oscillatory circuit comprising a condenser and an inductance, which is caused to oscillate either by repeatedly charging the condenser and allowing it to discharge through spark gaps, or by exciting the circuit by vacuum tubes. The size of the condenser and inductance determines the frequency. Power is drawn off from this storage circuit by various means, either by capacitive or inductive connection. The spark gaps are troublesome things requiring cleaning, and they are irregular in action and require frequent adjustment. On the other hand, the vacuum-tube generator works with the steadiness and regularity of a good watch and the currents it generates are steady and easily adjusted and controlled. The early "spark gap" radio transmitters caused a great deal of interference in radio reception and are hence not tolerated today except for sending SOS signals. So, too, the spark-gap diathermy machine produces a great deal of radio interference, and is hence a nuisance to radio enthusiasts.

There are several ways of causing the high frequency currents to pass through the patient. At the lower frequencies of a million cycles, the most effective way of applying the heating currents is by direct connection of the patient to the machine. Moistened pads or metallic electrodes are fixed to two places on the patient's body and these electrodes are connected by wires to the machine. The high-frequency currents pass through the patient as a part of an electric circuit. Because the current is con-

ducted to the patient by wires, the current is often called a *conduction current*.

When the frequency is very high, currents can be caused to surge in the body without actual contact. To explain this, imagine a conducting body situated between two metal plates and separated from them by air spaces. If the plates are charged, one positively and the other negatively, induced charges appear on the surfaces of the body opposite the two plates. These induced charges arise from a momentary flow of electricity within the body. If now, the charges on the plates are reversed the induced charges on the body reverse and this reversal is brought about by another surge of electricity through the body in the opposite direction. If the plates are alternately charged first one way and then the other, electricity surges back and forth in the body to supply the induced charges on the surface of the body. The greater the number of reversals per second the greater the number of surges of electricity through the interior of the body and the greater the rate of production of heat. It is evident that currents in the body produced in this way increase with the frequency and only at the frequencies of from ten to one hundred million alternations per second are these currents sufficiently intense to produce a practical amount of heat. The currents which surge to the plates from the machine and those which surge in the body are sometimes called *capacity currents* but it is to be emphasized that capacity and conduction currents are qualitatively identical.

There are undoubtedly certain advantages in the capacity method of connection between the patient and the machine. The metallic electrodes are generally imbedded in rubber or some other insulating substance so that there is no direct connection from the machine to the patient. This considerably diminishes the danger of any low frequency currents passing through the body incident to any accidental breakdown in the machine. Furthermore, the insulation diminishes the danger from burns due to sparks and arcs.

A third method of applying high frequency currents is that suggested by Dr. W. R. Whitney of the General Electric Company. A heavily insulated wire carrying high frequency currents is wound several times around the portion of the body to be heated. Currents are induced in the tissues through the action of the magnetic field instead of through the electrostatic effect. The induced currents circulate in paths which follow more or less closely the contours of the coil, and heat is conveyed into deeper regions by conduction and by the blood. Here again the body is not in direct contact with the machine and danger from burns due to arcs and sparks is considerably diminished.

Claims have been made that differential heating can be obtained, especially at ultra high

frequencies, so that one organ or part can be heated to a greater degree than the surroundings. Some of these claims are based on measurements of temperature obtained by inserting thermocouples into various parts. One should look with suspicion upon any temperature measurements made with thermocouples or with any temperature measuring device which is a conductor of electricity, because such thermometers are heated by high frequency currents produced in them during the operation of the machine. Furthermore, the distribution of current in the tissue may be changed by their presence.

McLennan and Burton\* have shown experimentally and mathematically that corresponding to each frequency there is a particular specific resistance of the tissue which evokes the greatest heat production. It should be noted, however, that this does not mean that corresponding to each specific resistance there is a frequency which evokes the greatest heating. With this scientific fact before us, it is impossible to say that differential heating is impossible, although considering the temperature equalizing effect of heat conductivity and blood flow, it seems very doubtful that differential heating can be accomplished and controlled to any practical extent.

The action of high frequency currents in surgical cutting and in coagulation, desiccation, etc., again depends upon the heating effect of the currents. A small electrode gives a high current density at the electrode with a consequent rapid production of heat and a high temperature. If the temperature is sufficiently high, coagulation results and if still higher destruction and carbonization take place. If the electrode is not in close contact with the tissue an arc or spark bridges the gap and high temperatures are produced in very localized areas, and the cells are disrupted.

When the current density at the electrode is increased beyond that necessary for coagulation, cutting takes place. Usually the electrode is smaller than for coagulation, to increase the current density. It may be a needle, a wire, or a thin, narrow blade. A good incision shows very little coagulation and no carbonization, which indicates that some effect causes the cutting other than the high temperature produced by the passage of the current through the tissue. McLennan† states that there is a minute arc between the electrode and the tissue when a satisfactory incision is made. This seems to be the most plausible explanation of the cutting effect. A thin film of gas or vapor between the electrode and tissue maintained in an ionized

\*McLennan, J. C., and Burton, A. C. The heating of electrolytes in high frequency fields. *Canad. J. Research.* 3: 234 1936.

†McLennan, A. J.: Davis electro-surgical current generator some underlying principles and results. *Arch. Surg.* 18: 1863 1929.  
Characteristics of adequate electro-surgical current. *Am. J. Surg.* 38: 417 1932.



state by the current would account for the relatively high voltage of about 200 to 250 between the electrode and tissue for a good incision. The rapidity with which a cutting electrode advances and the absence of coagulation except in the surface of the cut, are consistent with the idea of an extremely intense and localized heat. The blade or electrode remains clean as if it never came in contact with the tissue. The film of ionized vapor probably separates the electrode from the tissue so long as it is maintained but if the power supply is too low the film is dissipated, the tissue sticks to the electrode, and cutting ceases. Damped currents have not been so satisfactory for cutting as the undamped currents and can be used only by making the number of trains of oscillations per second very large by shortening the spark gap. It is probable that periods of no current flow allow the ionization to dispel unless the inactive periods are very short, whereas the continuous undamped currents more effectively maintain the ionized film.

Barring any specific biological effects, either in diathermy or in electrosurgery, about the only factors influencing the choice of frequency are the modes of application, whether by direct contact or through capacity electrodes. The ultra-high frequencies are less satisfactory for electrosurgery because of the large currents which pass through small capacitances, such as that formed by the surgeon's hand grasping the insulated cutting electrode. The ultra-high and high frequencies are advantageous in diathermy where application through capacity electrodes is preferable. The increasing number of uses of this new agency has considerable influence in determining the choice of frequency, and it is probably best to leave this point open for the physician and for future developments to decide.

#### DISCUSSION

**CHAIRMAN LOWRY** There is a doctor in New York who is giving a good deal of his time to research, who has done much to rationalize physical therapy. That is Dr. Bierman, and it gives me great pleasure to welcome him here as a fellow member of the Academy of Physical Medicine, to speak to us this afternoon. Dr. William Bierman of New York City.

**DR. WILLIAM BIERMAN** *Mr. Chairman and Members of the Massachusetts Medical Society and Guests*—Permit me first to make some little changes in the title of the paper as it has been assigned to me. I shall not discuss the subject of fever or temperature elevation of the entire body as created

by the short wave current or by any other mechanism. I shall limit myself to the question of the therapeutic use of short wave currents and I want to take the liberty of doing that, because I realize that at the moment there is a very strong controversy as to the relative merits of the short wave current and the other method of convulsive heating which we have used for a period of years, diathermy.

Now, as to the term "short wave radiation", the word "radiation", as Professor Chaffee has told you, is a misnomer. We are not dealing with radiation frequencies, thinking of the word as we apply it to x-rays, or to radium, or radiations from luminous or ultraviolet sources. We are dealing with actual current flow, and so the use of the word "radiation" should be deleted from the title. I have done so on the title of the paper which I have with me here this afternoon.

That leaves us just two other words, "short wave". We feel with Professor Chaffee that the terminology is very labored, and inadequate. In defining the method which we use, we should possibly refer to the frequency of the current. I have thought that we might refer to the application in megacycles, because it makes it a bit more awkward to say "one hundred million cycles". It is much easier to refer to the terminology of the physicist or engineer, and refer to the subject in megacycles. It may well be that our clinical evaluations of the results through the years and in different parts of this country and abroad, would be much better if we had definite knowledge of the exact frequencies used by one man in contrasting his results with the frequency of the currents used by another man.

I think now that we have torn the title to pieces, and agreed not to use any part of it, except as to present usage, the title of the paper before me is "The Therapeutic Use of Short Wave Currents." My paper is a relatively long one, because I have asked the physicist with whom I work, Mr. Schwarzschild of the Beth Israel Hospital, to write that part which deals with the physics. I knew Professor Chaffee would discuss that subject with you, but I as a physician know that it becomes very difficult for a physician to deal with the subject of the physicists, conductive currents, capacity currents, or as we have referred to it here, the displacement currents. Just what is the difference? I can attempt to explain it to you, but in the presence of an authority far greater than I, I would defer the matter to Professor Chaffee, and so you are saved from my perusal of the first eight pages of my discussion, although I feel justified in including them in the paper as it may be printed, so that those of you who may desire may read our explanation of the difference between the currents produced by machines whose frequencies are much smaller than those produced by so-called short wave apparatus. I will encroach somewhat on Professor Chaffee's field, and show determinations we have made from studies of the phantom, studies made on animal tissue, both dead and living, to give you some little understanding of the somewhat different action of the heating of currents of relatively low and relatively high frequencies, and if we can have our first slide we will begin.

(Dr. Bierman then read the paper on "The Therapeutic Use of Short Wave Currents", illustrating his discussion with lantern slides.)

## THE THERAPEUTIC USE OF SHORT WAVE CURRENTS\*

BY WILLIAM BIERMAN, M.D.,† AND MYRON SCHWARZSCHILD, M.A.†

ONE of the most important properties of the electric current is its ability to heat substances through which it passes. This property cannot be used indiscriminately for heating human tissue because, unfortunately, there are basically chemical effects accompanying the passage of this current through tissue. In order to avoid these chemical effects, it is necessary to use electric currents the direction of which changes rapidly, the so-called alternating currents. There are two important ways of specifying the number of alternations a second: the first, and the simplest, is merely to specify that number. This is done in ordinary technical applications of electricity where we speak of sixty cycle current, for example, meaning that the number of alternations a second is sixty. Where the number of alternations is very high, in order to avoid the use of very high numbers it has been customary to refer to a quantity known as the *wave length*. The vibrations of the electric current travel with the speed of light, three hundred million meters a second so that if the frequency of alternations is one million, for example, the wave length (that is, the distance between successive peaks of current) would be three hundred million divided by one million, or 300 meters. This is in the range of frequency of ordinary diathermy. A short wave apparatus which produces a wave length of ten meters is producing an electric current whose frequency of alternation is three hundred million divided by ten, or thirty million alternations a second.

All heating by electric currents is basically of the same nature. At any point in a substance, the heat generated depends upon the electric field strength at that point and the conductive current at that point and, in fact, it is proportional to the product of these two quantities, and aside from magnetic effects involves no others. The problem of determining the distribution of heat in a mass of tissue when it is subjected to the action of diathermy or of short wave resolves itself, then, into the problem of determining the electric field strength and the conductive current density at every point in the mass.

These two quantities vary in magnitude from point to point in the medium, and their distribution depends upon the geometric arrangement of the electrodes, the size and shape of the medium,

and the distribution of electric constants in the different parts of the medium.

It is necessary at this point to distinguish between *conductive* current and *total* current. In a varying electric field such as is produced either with a diathermy machine or a short wave machine, where the field changes its direction many times a second, the current at any point does not necessarily follow the electric field, that is to say, when the electric field is a maximum in one direction, the current may not be at its maximum value in that direction, and when the field intensity is reduced to zero preparatory to going in the opposite direction the electric current may not simultaneously be zero, but may have some value in one or the other direction. In such a case, we speak of a difference in phase between the current and the field strength, or voltage. While both are varying in a sinusoidal manner, there is a time difference between the attainment of maximum value, the current attaining its maximum value earlier or later than the field intensity. A current varying in this manner *out of phase* with the field intensity which produces it may be considered as made up of two components: one a so-called *displacement* current, which is completely out of phase with the field intensity, that is to say, it attains its maximum at the instant when the field intensity is zero and runs through the zero point at an instant when the field intensity is a maximum. The other component we have called the *conductive* current. It is entirely *in phase* with the field intensity, attaining its maximum at the same instant as the field intensity maximum and passing through its zero value at the same instant as the field intensity passes through its zero value. The actual current at any point is, of course, the total that is, the sum of these two currents, and its phase is shifted with respect to field intensity, but for the purpose of studying the power dissipation, that is, the conversion of electric energy into heat, it is necessary to separate the current into these two components, displacement and conductive currents, and the heat at any point is independent of the displacement current but is proportional to the product of the conductive current and the field intensity.

The value of the conductive current and the field intensity at any point in the medium, of course, depends not only upon the electric constants of the point in question, but also upon the electric constants of other parts of the medium. The study of the interaction of one part of a medium upon another is the most difficult part of the problem.

In diathermy, where the frequency of alternations is relatively low as compared with the

From the Department of Physical Therapy, Beth Israel Hospital, New York City.

Read at the Annual Meeting of the Massachusetts Medical Society, Section of Radiology and Physiotherapy, June 3, 1935.

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short wave, we may for practical purposes assume that the current at any point is wholly conductive. Under these conditions, the current distributed through the medium and the distribution of electric field through the medium depends upon a well-known constant of matter, *conductivity*. Such a simple idea as the current takes the path of least resistance is here applicable and we can predict with some assurance the direction and magnitude of the current at various points by making use of this simple concept. Since the current here is entirely conductive, that is, completely in phase with the electric field, we may conclude that the heat developed at any point, being proportional to the current times the field intensity, is in fact proportional to the square of the current, and the proportionality factor involves only the conductivity.

When the frequency is increased and we come into the range of tens of millions of alternations a second, the problem becomes considerably more involved. Here we can no longer neglect the displacement current, that is, the component of the current which is out of phase with the electric field. At infinitely high frequencies the current is all displacement current and no heat can be developed. At intermediate frequencies, that is in the range of so-called short waves, we must endeavor to determine the distribution of conductive currents and of field strengths. To form any conception of the distribution of conductive current it becomes necessary to determine the distribution of total current, that is, to determine the displacement current as well. The displacement current depends for its distribution upon the electric characteristics of the medium known as the dielectric constant. The dielectric constant has a meaning for the displacement current essentially similar to the meaning of conductivity for the conductive current. The conductivity is a measure of the conductive current which would be produced in a substance by a unit of electric field strength. The dielectric constant is, in a similar way, a measure of the displacement current which would be produced in a medium by a unit of field strength. Here again we must remember that the dielectric constant at a single point is not sufficient to tell us the displacement current, but account must be taken of the interaction of other parts of the medium. This point is the stumbling block for any simple explanation of the distribution of heat.

The interaction of other parts of the medium upon the point in question is a matter fraught with great mathematical difficulty and has only been completely solved in very simple cases. Certain simple types of distributions will be considered for the purpose of showing how this interaction functions and wherein the difference

lies between the low frequency diathermy and the high frequency short waves.

Suppose we have a pair of electrodes placed on either side of a mass of fatty tissue and we arrange matters so that a certain fixed total current flows through the circuit. Fatty tissue has a low conductivity but a reasonably high dielectric constant. If the frequency is very low, all current measured by the meter is conductive current and since the conductivity of the material is low, the electric field strength necessary to drive this current through the material must be very high. Hence the product of electric field strength and current is high. Now if the frequency is increased, keeping the current the same, some of the current no longer remains conductive but becomes displacement current, so that for the same total current only a portion of it is in phase with the electric field produced. Since the conductive current and the field intensity are proportional, the decrease in conductive current must be accompanied by a decrease in field intensity. Hence both factors, the electric field strength and the conductive current, are lower than they were in the low frequency case so that the total heat developed is reduced. It follows thus as a result of this consideration that per unit of current, the lower frequency is more effective in heating than the high frequency.

It is of course not to be concluded that the high frequency cannot be used to produce heat in such material because it is easily possible to raise the current to a point where in the high frequency case the same amount of heat would be developed as in the low frequency case. But for current of the same magnitude, the low frequency is the more efficient heating arrangement.

Now suppose that between these two plates instead of a mass of fatty tissue we have two layers, one of fatty and one of vascular material. In the fatty substance the dielectric constant is somewhat lower than that in the vascular tissue, while the conductivity of the vascular tissue is much higher than the conductivity of the fatty tissue. Let us repeat our imaginary experiment and pass a current of definite magnitude between these plates. At low frequency the dielectric constant plays no rôle because there is no displacement current and the field intensity in the low conductivity fat must be much higher than the field intensity in the high conductivity vascular tissue. Since the current is the same in both and is all conductive, the fatty tissue becomes hotter than the vascular tissue. Now if the frequency is increased to a sufficiently high value so that a considerable part of the current is displacement current, the heat distribution changes completely. In the fatty layer with its low conductivity, practically all the current may be displacement current while in the vascular tissue, since

the conductivity is high, a considerable portion of the current remains as conductive current. The total current is the same in both parts but now the conductive current which is the important one for the calculation of heat conversion is higher in the vascular tissue than it is in the fatty tissue. The field strengths in the two types of tissue of course, will depend upon the conductive current, and since this is now higher in the vascular tissue than in the fatty tissue, the heat generated will be higher in the vascular tissue. By a suitable selection of frequency it is possible to attain a frequency at which the heating is the same in both. This will be the frequency at which the field strength in the fatty tissue is greater than in the vascular tissue by the same proportion as the conductive current is greater in the vascular tissue than in the fatty tissue. If the frequency is raised beyond this point, the vascular tissue becomes hotter than the fatty tissue. So in a relatively simple example it is possible by proper selection of frequency to heat one type of tissue at the expense of the other, or to heat both uniformly.

Let us consider another example. Now the electrodes are not placed in contact but are held at some distance away in the air from the mass of tissue. At low frequencies where there is no displacement current, it is impossible to produce any heat in the tissue since the conductivity of air is zero. At high frequencies, however, in spite of the zero conductivity of air it is perfectly possible to heat the tissue because while there is no conductive current in the air, conductivity being zero, there does exist a displacement current since air has a dielectric constant different from zero. All substances permit the passage of current at high frequencies if not the conductive, then the displacement current. Parenthetically we must say that these considerations apply only to conditions in which the magnetic field accompanying the current is to be neglected. This is true of all plate type applications at any practical frequency.

When we come to consider more complicated distribution of different types of tissues than the simple cases here discussed, matters become extremely involved and general statements are in order. As a general rule with the short wave and high frequencies, we are in a position to obtain more uniform heating of different types of tissue than with the low frequency. There are certain cases in which this is not true. For example, if we had two materials of the same conductivity but of different dielectric constants, the low frequency diathermy would heat them uniformly because it recognizes no effect of the dielectric constant whereas the high frequency current would heat them differently. With the exception of fat, however, all human tissue has practically the same dielec-

tric constant so that this consideration need not trouble us unduly. While this tendency to more uniform heating for higher frequencies is certainly present, it is nevertheless possible by the proper selection of frequency to heat a certain type of tissue more than others. This is what is commonly known as *selective heating*. For example, with a frequency of about thirty million, a maximum heating is produced in tissue of conductivity in the range of lung tissue, while with a frequency of seventy-five million, the maximum heating occurs in cartilaginous tissue. While these maxima exist, it nevertheless is true that as a general rule these maxima are not very sharp and short waves tend to produce a more uniform distribution of heat than long waves.

One factor in the problem has purposely been left out of consideration up to this point that is the question of the effect of size, shape and position of electrodes. The problem of heating of different types of tissue which we have discussed up to this point is sufficiently complicated in itself without at the same time attempting to take into account these geometric factors. They can be considered best by them-

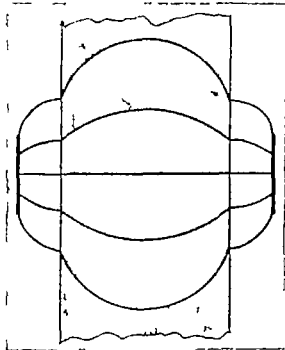


FIGURE 1 Showing the lines of electric induction in the case of a large homogeneous body exposed to the short wave field.

selves that is, we determine what the geometry of the situation can tell us with regard to heating of a homogeneous mass of tissue and then make use of our knowledge of differential heating as best we can in connection with any particular case. The geometric angle of the problem is best considered in a manner somewhat similar to that to which we have been accustomed in diathermy. We determine, if possible, the lines of flow in the substance to be heated considering it as homogeneous. We can then make any corrections we desire on the basis of the inhomogeneities existing. Since the heating in the high frequency field is much more uniform than in diathermy, the amount of such corrections will usually be considerably less.

There has been a tendency in the past in con-



upon the tissue lying beneath the surface of the body by means of the short wave than by diathermy

Living tissue differs greatly from dead tissue in that it possesses a rapidly circulating medium which can carry heat away from the region where it is produced. The most direct way of determining the actual temperature produced within tissues is to measure it by means of thermocouples. We performed such experiments on normal subjects. We applied diathermy and short wave currents to the thigh by means of cuff electrodes. We have previously



FIGURE 4. X-ray showing position of intramuscular and subcutaneous thermocouples in thigh.

described the results of temperature determinations when diathermy was applied by means of cuff electrodes to the leg<sup>1</sup>

We conducted two experiments on two different subjects. The intramuscular, subcutaneous and skin surface temperatures were taken before the application of the heating current. The machines were then applied for a period of twenty minutes, the current turned off, and the thermocouple needles reinserted immediately afterwards into the same area. Readings were then continued for an interval of several minutes. The subject in experiment No. 1 was bigger than the subject used in the second experiment. The thigh measurements indicate this, that of the first man being about fifty-four cm in circumference, and that of the second about forty-four cm in circumference.

In the first experiment, the short wave was applied in the morning. Diathermy was applied to the same thigh of the same subject in the afternoon. The intramuscular temperature before the diathermy experiment was 100°F, as

contrasted with 97.7°F before the short wave experiment. In other words, although more than two hours had elapsed between the time at which the short wave machine was shut off and the time at which the temperature determination was made prior to the diathermy application, there was still some elevation of intramuscular temperature. It is, of course, possible that this persistent local temperature elevation might have been due to the reaction to the trauma caused by the insertion of the thermocouple needle. In the first experiment, the greatest temperature rise was in the subcutaneous tissue when diathermy was applied, and next in the subcutaneous tissue when short wave was used. The intramuscular temperature rose more than five degrees F, following the application of short wave, and only about two and one-half degrees F, following the application of diathermy.

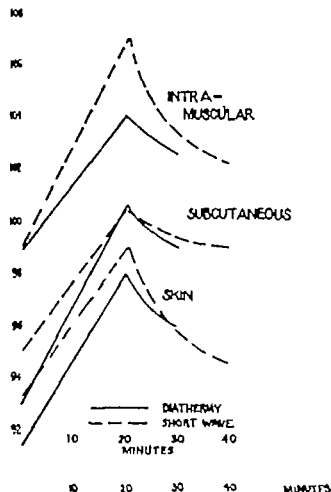


FIGURE 5. Cutaneous, subcutaneous and intramuscular temperature determinations in thigh of lying human subject before and after exposure to twenty minutes of diathermy and to twenty minutes of short wave current. Cuff electrode technique. Temperatures in degrees Fahrenheit.

In the second experiment, the greatest rise (about eight degrees F) occurred in the intramuscular temperature following the application of the short wave current. The next highest (about seven and one-half degrees F) occurred in the subcutaneous tissue following the application of diathermy. The rise in the subcutaneous temperature after short wave amounted to about five and one-half degrees F, while the intramuscular following diathermy was only about five degrees F.

In the second experiment, the first application was that of diathermy. It was made to the left thigh. About twenty-five minutes after this ap

plication, the short wave was applied in a similar manner to the right thigh. This experiment was a more satisfactory one because the intramuscular temperatures prior to both diathermy and short wave were almost the same.

From these experiments we can state that with the technique employed, the short wave applications can cause an elevation of intramuscular temperature as high as and higher than diathermy when applied in the same fashion. The elevations of temperature produced by diathermy in our experiments are about the same as those reported by Mortimer and Osborne.<sup>2</sup> The short wave temperatures are decidedly higher.

Whether there be any effect other than that of heat on applying the short wave current has not been determined with absolute definiteness, but a possibility does exist, as indicated by the work of D'Arsonval and by the work of Mellon, Szymanowski and Hicks who showed the attenuating influence upon diphtheria toxin.<sup>3</sup> In these experiments the heating effect of the current was carefully excluded.

There are many biologic changes which occur as a result of temperature elevation of living tissues. We have referred to some of these.<sup>4</sup> They include the production of an active hyperemia, with its dilatation of blood vessels, increased permeability changes in capillary and intercellular pressure values,<sup>5</sup> chemical changes such as those in pH, and carbon dioxide and oxygen content,<sup>6</sup> increased phagocytosis,<sup>7</sup> etc.

From the point of view of the practicing physician and surgeon, the most important consideration is the determination of the clinical results obtained by the use of this current. The consideration of the physical and physiological changes is important in order logically to explain the clinical changes, but, after all the proof of the pudding is the eating thereof. Clinical impressions, in order to become definite, must be based upon observation on thousands of cases by many different men over a period of several years. Inasmuch as this therapy is relatively new, the number of cases treated has not been sufficiently large, nor the length of time sufficiently long, to permit anything aside from impressions. We have treated well over one hundred cases during the past two years. We have gained the impression that, in general, the short wave current may be used for the treatment of those conditions for which medical diathermy has shown itself to be of value. These conditions include such pathologic states as bursitis (especially about the shoulder joint), traumatic tenosynovitis, myositis, myofascitis, sprains, and arthritis. The types of arthritis treated with most satisfactory results are the traumatic and gonorrheal. The problem of infectious or rheumatoid arthritis is complex because of the focal and systemic factors. Local joint heating is one of the adjuncts in the treatment of this condition. In many of our pa-

tients the vertebral and the sacroiliac joints were involved. Our impression is that the results obtained by the use of the short wave current in the treatment of these conditions are superior to those obtained by the use of diathermy. We must not forget here as in all other conditions where heat is applied, the question of dosage should be kept in mind. We have, for example, observed aggravation of the pain about the sacroiliac joint following short wave treatment when the reaction to diathermy was decidedly less severe. The ability to create a greater amount of heat may be a disadvantage. For this and for other reasons, such as its surgical usefulness, it is reasonable to conclude that diathermy apparatus will not at the present time be replaced by machines giving short wave currents.

Our experience leads us to believe that the use of heat is of value in the treatment of paranasal sinusitis. We have seen individuals suffering from pains due to the involvement of ethmoid, sphenoid, frontal and maxillary sinuses secure rapid and marked relief following the application of diathermy applied by means of a specially constructed cast and following the use of the short wave currents. Many of these patients had for years been under treatment by nose and throat specialists of good standing and of undoubted ability. The nose and throat specialist should add this form of treatment to whatever else he believes to be of value in treating both acute and chronic sinusitis. Here, as elsewhere, the surgical principle of adequate drainage is an important one.

Many of the proponents of the short wave current in Europe have been particularly enthusiastic about its use in the treatment of infections. We have treated such diverse infections as axillary abscesses, infections of the finger, carbuncles of the neck, infected pilonidal wounds (after surgical enucleation), furuncles of the nose and face, infected cervical glands, chronic osteomyelitis (with drainage) and chronic purulent otitis media. Our impression is that the short wave current is of great value in the treatment of these conditions but must be used with surgical judgment.

It appears to be possible frequently to abort localized acute infections if they are treated in their early stages. Very often, however, if the inflammatory process goes on to suppuration, this suppuration seems to develop much more rapidly than it would without the treatment. When it does occur, it is our practice to provide drainage surgically unless such drainage takes place spontaneously. We think it wrong to treat acute suppurative processes without drainage. There is nothing new in the application of heating procedures for the treatment of local infections. Warm poultices have been used for many years. We have used the conductive, the convective and the converse heat from radiant sources for a

long time. It is therefore not necessary to ascribe any specific effects of the short wave currents upon microorganisms to explain the beneficial influence of a procedure which creates heat in the involved area with a thoroughness greater than any other measure used thus far. It is our definite impression that when drainage does exist, the infected process usually appears to heal very much more rapidly following short wave applications than with any other forms of treatment we have used heretofore. It has generally been considered that diathermy is contraindicated in the treatment of acute local infections. It would, of course, be a matter of practical difficulty to apply diathermy electrodes over such acutely inflamed areas.

Short wave currents have the advantage of ease of application not only over areas of infection but also over other regions such as the ear, the eye, the nasal sinuses, and the lower spine.

To achieve the best results it is necessary to have some knowledge of the technique of the application of these currents. The condenser plates should be held at a distance of about one half inch to one inch away from the area treated. Schleichphake\* insists that no material be interposed between the condenser plates and the surface of the body (aside from his glass shoes), while others feel that good results may be obtained if the condenser plates are kept away from the surface by means of felt pads or towels. It is best to remove the clothing from the part to be treated and care should be taken that there is no metal in the field.

An agency such as this which is sufficiently potent to produce considerable elevations of local tissue temperature is not devoid of the possibilities for harm. Burns can be produced if the application is made carelessly or to a region which is anesthetic so that the patient cannot experience the sensation of thermal discomfort. Such burns have been reported\*.

The enthusiastic statements which have been made concerning the therapeutic value of short wave currents have stimulated manufacturers of apparatus to place numerous machines on the market. Many of these machines are of very little, if any value. The fact that a neon bulb may be excited when placed in the neighborhood of the condenser plate is no indication of the therapeutic value of an apparatus. The practitioner may be guided by the Council on Physical Therapy of the American Medical Association which has been investigating the value of different machines made by various manufacturers.

## REFERENCES

1. Bierman, W., and Tarbell, L. A.: Temperature determinations during local application of diathermy. *Arch. Phys. Therapy*, 15: 616 (Nov.) 1934.
2. Mortimer, H., and Osborne, E. L.: Time heating by short wave diathermy. *J. A. M. A.* 141: 1413 (April 29) 1925.
3. Miller, H. R., Rayman, W. T., and Hicks, R. A.: An

effect of short electric waves on diphtheria toxin independent of the heat factor. *Science* 72: 174 (Aug. 19) 1920.

4. Bierman, W., and Plieberg, E. H.: Some physiologic changes during hyperpyrexia induced by physical means. *J. A. M. A.* 163: 1344 (Nov. 3) 1924.
5. Landis, E. M.: Micro-injection studies of capillary blood pressure on human skin. *Heart* 16: 209 (May) 1926.
6. Baxett, H. C., and Schryballe, L.: Effect of local changes in temperature on gas tensions in tissues. *Am. J. Physiol.* 86: 565 (Oct.) 1925.
7. McCutcheon, A. M.: The effect of temperature on the rate of locomotion of human neutrophilic leucocytes in vitro. *Am. J. Physiol.* 65: 185 (1923).
8. Schleichphake, E.: Short Wave Therapy. London: The Actible Press.
9. Kling, D. H.: Burns produced by radio short wave and ultra short wave therapy and their prevention. *J. A. M. A.* 104: 1931 (June 1) 1925.

## DISCUSSION

CHAIRMAN LOWRY: Dr. Bierman has given us an excellent talk. He has a thought that I wish to pass on. He confided in me just before he came in that he takes the time and money necessary for running a home remains a bachelor and uses it for research. There are some young men here. Maybe you will follow his example. We need all the help in this field that we can get.

The meeting now is open for discussion of the last two papers.

DR. E. A. CORMAN, Boston: Mr. Chairman—I should like to ask the last speaker whether experiments have been done by putting in through a cannula, wax that will melt at given temperatures and then dissecting the specimen after the current has been used to find whether the wax has been melted.

CHAIRMAN LOWRY: Would you like to answer that now or at the end?

DR. BIERMAN: Possibly I will answer all the questions at the end.

DR. LOUIS FELDMAN, Boston, Mass.: I have made use of the so-called "Short Wave" generator twenty-four meter wave length type for about seven months. First I experimented upon small animals in vitro and in vivo followed by over 1,000 treatments on the living human body. The indications for its use were the same as for classical diathermy, that is, wherever a deeper penetration of tissue heat was required. Two-thirds the dosage formerly used in conventional diathermy was taken as the standard in the treatment of my patients. The duration was fifteen or twenty minutes. Cuff method on extremities, contralateral pad method elsewhere. The dosage was also computed on the basis of square surface area of condenser electrode always taking into consideration the individual tolerance to heat.

The most satisfactory results were obtained by the interposition of one quarter inch felt, cellulose cotton or toweling between the bare skin and the condenser surface, the pads being held in place by elastic bandages or sand bag abutments. The skin was observed at frequent intervals to see that there was no undue reddening, burning or discomfort or evidence of collection of moisture or pools of sweat. The radiations have a tendency to concentrate in such localities producing an increased density of current with resultant production of burns. This tendency has been minimized to a certain extent by proper technique as above described. With ordinary care common sense and judgment together with skill their likelihood to occur is less than with ordinary diathermy. The cuff method on extremities showed definitely more penetration through the tissues than by use of diathermy.

In the one thousand treatments given we did not get a single burn, but, previous animal experimentation and observation on patients treated elsewhere



muscle structures especially in relation to the bone. Calcification within muscle is well shown. Occasionally rupture of muscles may be seen, particularly if in a favorable position. Early muscle atrophy becomes apparent many times before there is a reduction in size of the involved muscle groups.

Soft tissue infections, particularly gas gangrene, may be detected in an early stage thus permitting surgery to be instituted relatively early.

While the solid bone detail does not show very early periosteal changes, inflammatory or malignant conditions become apparent. Very early callus formation is often shown if the part is not too heavy.

Gall bladder shadows after the Graham test are denser, an advantage with oral cholecystography. There is often improvement in delineation of soft abdominal shadows over the usual technic. Improvement may also be noted in radiography of the larynx.

Obviously in many instances soft tissue radiography should be undertaken in conjunction with a conventional technic. It supplements but does not supplant the latter. The cardinal principle is to obtain detail not outline of the non-calcareous structures.

**Conclusions** The principles of soft tissue radiography are briefly explained and indications for this type of radiographic exploration discussed.

#### DISCUSSION

**CHAIRMAN LOWRY** Dr Hampton of the Massachusetts General Hospital will open the discussion.

**DR. AUBREY O HAMPTON, Boston** As most of you know Dr Carty has been working on soft tissue radiography for four or five years and there is no doubt that he has done some valuable pioneer work in this field. Today he has presented some excellent examples of what can be done by careful x-ray studies of the skin, subcutaneous and muscle tissues. I am particularly impressed by the quality of his lantern slide reproductions because the technique of soft tissue radiography is difficult and reproductions on lantern slides must be even more difficult.

I have not had much experience with radiography of the more superficial soft tissues except in so far as they are related to diseases of the bone. Roentgenologists can no longer interpret films of the abdomen by simply stating "There are no visible areas of calcification," because the soft tissues are also visible and must be interpreted. It is surprising

how frequently tumors of the female pelvis, retroperitoneal masses and other soft tissue abnormalities are clearly demonstrated on a good radiograph of the abdomen.

**CHAIRMAN LOWRY** Is there any further discussion of this paper? Any questions? Have you anything to add, Dr Carty?

**DR. CARTY** I would like to say that Dr Hampton brought out a very important point. There is a great deal of soft tissue detail that can be seen on the conventional bone radiograph. I think we should become more soft tissue minded. We have found it helpful to view these films by lights of various intensities and of various wave lengths.

I would like to reiterate a point Dr Hampton made regarding showing soft tissue radiographs by lantern slides. We had to make over 100 lantern slides to obtain those I showed you. However, soft tissue radiographic technique itself is not overly difficult.

We are very much interested in this work, and feel that here is a field to add to the usefulness of roentgenologists. In several instances, for example, we have been able to make a positive diagnosis of a soft tissue tumor. We feel the work is in its infancy, and we need help in pursuing the various angles which this study I believe opens. I thank you.

**CHAIRMAN LOWRY** We are very grateful for each of the speakers who came here today. This has been a good meeting. We are sorry we did not have the fourth paper.

I would like to say that we are starting something new this year. We have an exhibit under Physical Therapy Section, showing massage and a few of the simpler forms of physical therapy, primarily to get the general practitioner interested in the subject.

The Nominating Committee has brought in the two names presented to you just previous to the reading of the last paper. Are there any other nominations from the floor? (No response.) If not, do I hear a motion about these names?

**DR. HAMPTON** I move that the chairman cast one ballot.

(The chairman cast a ballot for the nominees.)

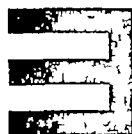
**CHAIRMAN LOWRY** Dr Philip Cook will be Chairman for next year and Dr William G. Curtis the Secretary. I so declare them elected. Dr Cook, will you stand up? Dr Curtis?

**DR. COOK**, you are now the chairman. Fellow members, he has done a good job as secretary this year, and will make us an excellent chairman.

**DR. COOK** Gentlemen, I want to thank you most heartily for this honor. I will try to carry on as well as my able predecessor. Is there anything further to come before the Section? If not, I will declare the meeting adjourned.

BOSTON TEST CHART

50 FEET



40 FEET



30 FEET



20 FEET



## SUGGESTIONS FOR USE OF CHART

For testing the vision of children in the school, the chart on the right side is especially adapted, and for the following reasons

The symbols conform more nearly to physiological requirements for objects than do letters, and more satisfactory results have followed wider spacing of the smaller symbols

The chart is practically unlearnable

It can be used in testing pre-school age groups, illiterates, mutes,

Its size will permit it to be kept clean in an envelope, without staining

The chart should be hung on an easel, blackboard or other device, not in direct sunlight, at right angles to the window. (It might even be hung in window-casing) If one end of the chart is brighter than the other, hang the chart near a window at the brighter end. Height of chart should be about level of average child's eyes.

If there is glare from windows between the chart and the child, the lower half of window may be covered, or shade drawn. This does not bother unless the child, standing at the twenty foot line, is directly in front of a window. (Glare is a brightness, within the field of vision, of an excessive character as to cause discomfort or interfere with vision.)



2 Measure accurately a distance of twenty feet from chart, along windowed wall, placing a thumb tack or chalk mark on floor every five feet. Procure one or more stiff cards, 3 x 5 inches

3 Having arranged for some one (teacher, nurse, or child) to point to the symbols, have the child toe the twenty foot line. Always test the right eye first. If the child wears glasses, ask if he has better vision with or without glasses. If better with glasses, test with glasses on, recording vision thus

Right eye	Left eye	with glasses
20/20	20/30	

If better without, test with glasses off

4 Take position to the side and slightly behind the child, cover left eye by holding the longer side or edge of card against side of the nose with the left hand, support the child's head lightly with the right hand

Your assistant now points to any symbol on the top line, and the child semaphores the direction in which the arms point. If correct, the assistant then points to any symbol on the second line, and so on to the fourth line where at least two symbols (one with arms vertical, one with arms horizontal) must be seen before vision of 20/20 is recorded. The left eye is tested in the same manner. Supporting the child's head enables you to detect any head movement which might prevent the child to see with the covered eye.

If the child can see only to the third line, vision is recorded 20/30. If to the second line 20/40, and if only the largest symbol 20/50.

If the largest symbols cannot be seen, walk the child toward the chart (being sure to keep the other eye covered). Instruct the child to stop when he can see the largest symbols. When this is done, note the distance from the chart in feet, and record the vision using this as the numerator and fifty as the denominator, because the largest symbols can be seen by a normal eye at fifty feet. If, for example, the largest symbols can be seen ten feet from the chart, vision is



ROUTINE VISION TESTING OF SCHOOL CHILDREN,  
A PLEA FOR STANDARDIZATION

BY JAMES J. REGAN, M.D.\*

VISION testing of school children as part of the school program has become so general that it seems a pity not to take steps to standardize this important school function. By methods now in common use, uniformity of findings is impossible, with the result that children with defective vision are not detected, and many with normal vision are said to be defective, the former making it more difficult for the child to acquire an education, and the latter rousing the ire of indignant parents who are put to trouble and expense needlessly.

The most important single factor in the correct estimation of visual acuity is the test object used. With the selection of a test chart which will insure uniform results, only trivial faults in technique of conducting vision tests remain as a cause of error. These need only be called to the attention of the examiner and for this purpose, the writer has printed on the reverse side of a new chart suggestions for its use, with illustrations.

Regarding the importance of the selection of a test object H. Kuehler (1835 or 1836), according to Ewing<sup>1</sup>, was the first to suggest a standard for testing vision which could be employed by anyone, anywhere. Kuehler recommended

(1) "a measure of vision for those with weak eyes, and a measure that would be common to all practitioners",

(2) "a measure of vision by which the same patients could be tested at varying intervals of time and a measure of vision that would be recognized by all physicians as being exact."

Thus is just as true now, a hundred years later, as when the pronouncement was made.

On this important point, Snellen<sup>2</sup> says "As the most suitable objects for measuring the visual angle we may select sets of three parallel lines and the correspondingly distinct figures, which can be geometrically deduced from them. These figures should be square, measuring, as far as possible, the same both vertically and horizontally and having interspaces equal in thickness to their component lines. Everything which might facilitate guessing at the shape of the figures must be avoided etc."

Regarding the development of a variety of test objects, he wrote<sup>3</sup> "Finer types, less complicated letters, and forms which are not square have been proposed, thus losing sight of the principle which is particularly insisted upon,—VIZ.,

that the letters should as far as possible, possess the same order of distinctness as our three equally thick parallel lines with equal interspaces. It is indeed a pity that it appears to be impossible to keep to one uniform scale by which visual acuity shall be tested."

The writer agrees that Landolt's broken ring is superior as a test object to Snellen's three parallel lines or its modification developed by Pergens<sup>4</sup> which resembles the letter E, but its use with school children is not satisfactory.

Of capital letters used as test objects, Jackson<sup>5</sup> said, "as a test for visual acuity they probably afford the poorest and most inexact standard on which any scientific observations are now based. They possess two essential defects as a scientific standard.

"First, the different letters, when made as uniform as possible, are visible from different distances,

"Secondly, they can readily be committed to memory."

After studying the problem for two years, the Committee on Standardizing Test Cards for Visual Acuity<sup>6</sup> reported as follows: "The work of the Committee has served to emphasize the unsuitability of the alphabet as a standard of visual acuity."

They found the letter B had about the same visibility as Landolt's broken ring, while all other letters were more easily seen, and L most easily visible. A rating table based upon visibility gave L 71, T 74, O 80, E 85 H 92, B 100.

The same Committee reporting in 1917<sup>7</sup> reduced the value of letter L to 62 and increased B to 115, compared with the broken ring.

Of letters of the alphabet, only eighteen were found suitable but even these eighteen have different degrees of visibility. Manifestly the fewer letters used, the more easily they can be committed to memory. Cowan<sup>8</sup> suggested modifying the shape of certain accepted letters in an attempt to have them conform more accurately to the Snellen scale, but, in doing so, altered the form to such an extent that they were no longer familiar to the patient. Familiarity with the letters of the alphabet incidentally, is the chief reason for their continuance in favor as test objects. Regarding the non-serif E, which has a very high rating as a test object and which also has been used, pointing in different directions, as an illiterate symbol, Cowan has this to say "The short middle bar changes the outline which aids in determining the position of the symbol, thereby reducing its value as a test object."

Regan, James J.—Ophthalmic Surgeon-in-Chief, Boston City Hospital. For record and address of author see "This Week's Issue" page 844.

The 1916 report of the Committee on Standardizing Test Cards for Visual Acuity<sup>5</sup> mentions several factors which resulted in varying visibility of letters on several charts, one of which was "proximity of neighboring letters", and while no further mention was made of this factor, it has been the writer's experience that children without eye symptoms and with no refractive error could see the symbols on either end of the twenty-foot line, but failed to see the symbols between. It appears then that while most test charts have been printed with a five minute interspace separating five minute test objects, there is nothing contained in Snellen's original monograph<sup>8</sup> suggesting spacing of symbols, and a larger number of children, with normal eyes, have been able to see all the symbols on the twenty-foot line when a chart, with twenty-foot symbols spaced twelve minutes apart, was used.

Inasmuch as the development of the Boston Test Chart (the test object was suggested by Ed Pergens of Belgium, 1863<sup>1</sup>) as well as the technic for conducting vision tests resulted from work done in the schools of Boston, the use of the chart and the method of conducting tests is especially recommended for testing vision of school children. Note—The Department of Education, Commonwealth of Massachusetts, has been furnishing Pergens' symbol charts to the schools since 1917.)

The chart measures 8" x 10½", is printed on 12-ply stock, its size permits its being kept clean in an envelope, without bending or breaking, when not in use. Its front surface contains four lines of test symbols, accurately drawn to Snellen's scale, which resemble the letter E and each symbol points in one of four directions, up, down, right and left. The upper line contains symbols which subtend an angle of five

minutes at fifty feet, the second, third and fourth lines contain smaller symbols which subtend angles of 40, 30 and 20 feet respectively. The reverse side of the chart contains suggestions for the use of the chart, with three illustrations, which we feel make it ideal for the teacher, nurse, medical inspector, or other school official conducting the test, to refresh their memories upon the important points. This is deemed desirable inasmuch as, in most cases, the chart is used but once a year.

Snellen stated that "The most suitable illumination for the examination of visual acuity is average daylight, or artificial light of about the same intensity."<sup>9</sup>

The writer has found average daylight, which according to Luckesh<sup>10</sup>, ranges from 100 to 300 foot-candles at the window casing, most satisfactory, is available during most of the school day, and requires no special apparatus.

A copy of the chart, with text and illustrations on reverse side, is offered herewith.

#### REFERENCES

- 1 Ewing A E. Test objects for the illiterate. *Am J Ophth.* 3: 5 (Jan) 1920
- 2 Snellen Herman. On the methods of determining the acuity of vision. (In 'System of Diseases of the Eye' Edited by Norris W F and Oliver, C A Philadelphia, J B Lippincott Co) 2: 13 1897
- 3 Ibid 2: 15 1897
- 4 Jackson Edward. International standard for testing vision and standardizing other visual tests. *Tr Sect. Ophth. A M. A.* 1914 p 296
- 5 Report of committee on standardizing test cards for visual acuity. *Tr Sect Ophth A M. A.* 1916 p 383
- 6 Report of committee on standardizing test cards. *Tr Sect. Ophth A M. A.* 1917 p 347
- 7 Cowan Alfred. Test letters which comply with the physiological requirements of a visual test object. *A. J Ophth.* 11: 625 (Aug) 1928
- 8 Snellen Herman. Same as reference No 2 pp 11-29
- 9 Ibid p 17
- 10 Luckesh Mathew. 'Magazine of Light' April 1935

Note—The writer wishes to acknowledge with thanks the valuable aid in the preparation and printing of the chart given by Mr Richard B Barry Head of the Printing Department Boston Trade School and the generous endorsement of Dr James A Keenan Director of School Hygiene Boston Public Schools.

## MASSACHUSETTS MEDICO-LEGAL SOCIETY

### ARSENIC IN HUMAN TISSUES AND FOOD ANIMALS\*

#### I So-Called Normal Arsenic

BY WILLIAM F BOOS, M D,† AND A BENJAMIN WERBY, B S †

#### INTRODUCTION

IS arsenic a normal constituent of the human body? This question was first propounded in 1841, by Orfila<sup>1</sup>, whom we may well consider the father of modern toxicology. After that the subject of normal arsenic received little attention till toward the end of the nineteenth century when the French school, represented chiefly by Gautier<sup>2</sup>,<sup>3</sup>,<sup>4</sup> and Bertrand<sup>5</sup>, became actively interested in the problem.

The results obtained by the French school, which tended to show that arsenic was normally present in a number of human organs, were strongly contested by the German school, of which Hódmoser<sup>6</sup>, Ziemke<sup>7</sup>, Cerny<sup>8</sup>, and Kunkel<sup>9</sup> were the chief exponents. The German investigators claimed that although traces of arsenic may be found occasionally in some human organs, that more often it is entirely absent and could not therefore be considered a normal constituent of the human system.

The controversy seems to have ended with Kunkel's declaration in 1905, that as far as forensic medicine is concerned, there is no such thing as normal arsenic. We believe that this

\*Read in part at the Meeting of the Massachusetts Medico-Legal Society June 4 1935

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statement holds good today, and shall refer to it later. Kunkel does not deny the possibility that traces of arsenic may be present more or less constantly in the organs but he does not attach any importance to it. Since the days of the controversy, much work has been done on the subject and we think that the consensus among modern authors is that the French school did not prove its contention of normal arsenic and that the German school did not disprove it.

In 1923, Billeter and Marfurt<sup>10</sup>, two Swiss investigators, employed a painstaking and very sensitive method which enabled them to find minute amounts of arsenic in all the human tissues which they examined. Their work was done on twenty-four cadavers of persons ranging in age from birth to seventy years. They estimated that arsenic makes up about one ten millionth of the body weight. The body of a person weighing 150 pounds would therefore, contain one tenth grain of arsenic. They found further that the quantity of arsenic in the tissues increases with age, a finding which in a sense we can bear out.

In order to demonstrate the presence of arsenic in the tissues, these authors used as a rule twenty grams of material. Now, of course the more material used, the better the opportunity to find arsenic. However, for forensic purposes a proceeding such as theirs would not be suitable, since the object of a forensic investigation is to demonstrate either poisoning by arsenic or the absence of arsenic in the tissues. That is to say, the method used must show either an amount of arsenic which is incompatible with life or none at all. This object may be attained in practice by using only five grams of material for each determination. With this amount of material normal tissues yield a negative result, while those of a victim of arsenical poisoning yield a substantial reading for arsenic in each organ. In this sense, therefore, the dictum of Kunkel that the presence of so-called normal traces of arsenic in the tissues does not affect the results of forensic investigations for this metal, comes into its own.

Billeter and Marfurt have demonstrated that traces of arsenic are actually present in all human tissues, but their work has not thrown any light, so far, on the problem why the arsenic should be there. The term "normal" implies that the presence of arsenic in the tissues is necessary for the proper functioning of the body cells, that the arsenic is not "accidental" and is not due merely to the fact that all food and drink contain so much of the poison that it is impossible for the system to be at any time free from it.

Guthmann and Grass<sup>11</sup>, who used an exceedingly hypersensitive method for the analytic determination of arsenic, tend to show that the metal does play some part in normal life processes. They found that (1) the blood of

all women contains on the average 0.638 parts per million of arsenic during the intermenstrual or "normal" period, with but slight variations (2) at the time of menstruation the arsenic content rises on the average to 0.925 parts per million, (3) with pregnancy the arsenic content of the blood rises on the average to 1.44 parts per million, (4) the arsenic content of the blood reaches its highest point between the fifth and sixth months of pregnancy, (5) that after that it diminishes slowly, but contains throughout pregnancy more arsenic than the blood of the non pregnant woman, (6) the arsenic content in the blood of women suffering from carcinoma is forty three per cent higher than that at the intermenstrual period of normal women.

Based on the fact that the arsenic in the blood is increased by menstruation, pregnancy and new growth the authors assume that the increase of arsenic is directly related to the process of growth and cell proliferation, and that there may be a causal connection.

If the facts found by Guthmann and Grass are borne out by future investigators, their work will rank as fundamentally important. At present, however, their results cannot be accepted without reservation.

Several years ago, we became interested in the deposition of arsenic in hair and bone. From a forensic point of view, the arsenic in hair has no value in acute death from arsenic, but that in the bone is very important.

Considering first the hair, we find, to begin with that all hair contains arsenic, that is to say, arsenic determinable by ordinary forensic analysis. This arsenic is being constantly excreted by the hair which constitutes an important organ of elimination for this poison, but the expulsion of arsenic by hair is a comparatively slow process at any time. The arsenic is taken up by the roots of the hair where it is fixed, and, as the hair grows any of the metal which has been absorbed grows out with it. The growth of the hair is on the average, six inches a year, or one eighth inch a week and less than one sixteenth inch in three days. The three day period is chosen by us because deaths from acute arsenical poisoning may occur in anywhere from a few hours to three days after the ingestion of the poison. It will be seen that a maximum growth of hair of one sixteenth inch in acute arsenical poisoning, will not be high enough out of the scalp to be removed by cutting.

#### ARSENIC IN HAIR

A sample of hair was taken at an autopsy performed by Dr. John Paul Reardon, Medical Examiner of Middlesex County, on Miss Alice Porter. The tress of hair was thirteen inches long. It was divided into three equal parts.

proximal, midway, and distal The results are given in table 1

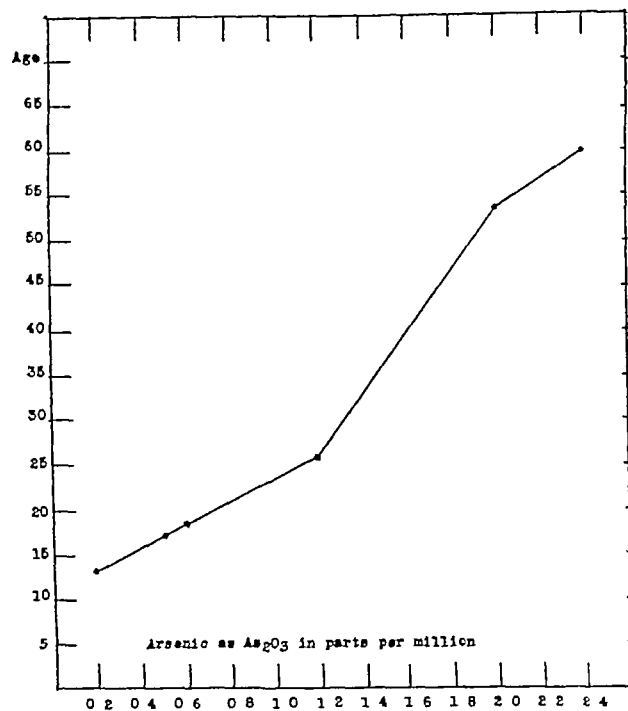


FIGURE 1 Arsenic in Human (Female) Hair

TABLE 1

Part of Hair	Arsenic as $As_2O_3$ , in parts per million
Proximal	1.4
Midway	2.4
Distal	2.0

From another autopsy performed by Dr. Rear-don on Mrs. Elizabeth Stollcker, samples of hair were taken and examined. The results are listed in table 2.

TABLE 2

Part of Hair	Arsenic as $As_2O_3$ , in parts per million
Proximal	3.0
Midway	3.1
Distal	2.7

The very high values obtained in these two cases, prompted us to investigate the hair of healthy living persons, who had never been subjected to arsenic therapy. We analyzed the hair of girls of thirteen, seventeen, eighteen, and twenty-six years of age, and that of a woman aged sixty. In these samples, merely the distal hair was examined. The results are given in table 3.

Several examinations of hair taken from fur, which were made by one of us (W), did not show any appreciable quantities of arsenic. The

probable reason for this is to be found in the environment of the fur bearing animals in which spraying with arsenic compounds does not occur.

TABLE 3

Name	Age	Arsenic as $As_2O_3$ , in parts per million
J. W.	13	0.2
P. M.	17	0.5
G. P.	18	0.6
S. M.	26	1.2
A. Porter*	53	2.0
M. B.	60	2.4

\*We have included Miss Porter's hair (see table 1) but have omitted Mrs. Stollcker's hair (table 2) from table 3 because the arsenic in it was abnormally high and suggested some arsenical medication during the last year or so of her life. The samples of hair recorded in this table (3) show the interesting fact that the deposition of arsenic in the hair increases directly with age (figure 1).

#### SOURCES OF ARSENIC IN FOOD

What is the cause of this increased amount of arsenic in hair? The only logical answer is that the food which we eat today contains more arsenic than was formerly present in food. Remington<sup>12</sup> has noted that the arsenic of the body is usually attributable to food, because of (1) chemical treatment in manufacture, (2) absorption by plants from the soil, (3) presence in sea food and (4) the widespread use of arsenical sprays in America, this having an important bearing on the point of the arsenic mechanically carried and the absorption by the plant as well. Headden<sup>13</sup> found that our virgin soils contain from two and one-half to five parts per million of arsenic and the underlying marl four to fifteen parts, and that the crops grown on such soils, and the animals fed on these crops contain arsenic. Other investigators have reported the finding of arsenic in soils of other localities.

In 1933, Myers and others<sup>14</sup> published their results of the analyses of a number of the common vegetable foods purchased in city markets. These are summarized in table 4, and are recalculated to arsenic as arsenic trioxide.

TABLE 4

Variety	Arsenic as $As_2O_3$ , in parts per million
Broccoli leaves	0.3—0.66
Broccoli	0.00—0.15
Beet greens	Traces
Cabbage	0.00—0.19
Carrots	0.00—0.17
Celery	0.00—0.26
Egg plant	0.00—0.21
Lettuce	0.00—0.17
Lima beans (green)	0.00—1.25
String beans (green)	0.00—0.05
Fruits	0.00—0.22

In 1933 White<sup>13</sup> reported the analyses for arsenic, made in the laboratories of the U S Food and Drug Administration, of a number of American marine foods. These results are extremely interesting, as they disclose a source of much arsenic. The data are recalculated to give arsenic as arsenic trioxide, and are shown in table 5.

TABLE 5

Variety	Arsenic as $As_2O_3$ in parts per million
Cod	2.0—5.4
Eels	2.6
Haddock (smoked fillet)	5.6
Mackerel (fresh)	1.9
Prawns	17.8
Sardines (canned)	1.5—2.9
Irish moss	2.0—8.4
Clams	1.5—2.6
Crab meat	2.0—11.0
Oysters	1.4—2.4
Lobsters	2.3—18.0
Shrimp	2.4—11.0

Much larger amounts of arsenic have been found by Chapman<sup>16</sup>, who reported the presence of relatively enormous quantities in crustaceans from the coastal waters of the British Isles. In lobster, he found an average of over 40 parts per million in the fresh meat, and in one sample as high as 110 parts per million were recovered.

The arsenic content of American cod liver oils offers some startling information. Holmes and Remington<sup>17</sup> in their examination of twenty samples of American cod liver oils, comprising six geographical types, found very high amounts of arsenic. In view of the widespread use of cod liver oil, particularly by babies and young children, a large quantity of arsenic is being consumed by the very young. The average arsenic content of the oils is calculated to the trioxide and will be found in table 6.

TABLE 6

Source	Arsenic as $As_2O_3$ in parts per million
Massachusetts	1.9
Maine	1.8
Deep Sea	4.4
Nova Scotia	4.2
Newfoundland	3.7
Quebec	3.2

## ARSENIC IN BONE

In the examination of human bone in poisoning cases, we sought to determine by the amount of arsenic present, what relation the quantity found bore to the duration of life after the poison was ingested. Our study seemed to show that when the individual lived only a few hours the amount in the bone was quite small, whereas the bone of those cases who had lived several

days, showed a substantial quantity of arsenic. Further to study this question, we examined the bones of food animals, purchased at a market. They included chicken, lamb, veal, pork and beef, and we have tabulated the results under table 7.

TABLE 7

Variety of Bone	Arsenic as $As_2O_3$ in parts per million
Chicken	2.8
Lamb	3.2
Pork	3.2
Veal	1.6
Beef	8.0

It will be noted that these figures are quite high, particularly that for the bone of beef cattle. The figure for veal bone is so much lower than that for beef bone because the animal is very much younger.

## ARSENIC IN FOODS

We also examined a number of other foods for their arsenic content and listed the results in table 8.

TABLE 8

Variety	Arsenic as $As_2O_3$ in parts per million
Sugar (table)	1.4
Salt (table shaker)	0.01
Egg (hen) nearby	1.8
Starch (corn)	0.9
Cocoa	1.2
Calf's liver	0.4
Hamburger (beef)	1.0
Chuck (beef)	1.6

## ARSENIC IN TOBACCO

We examined two popular pipe tobaccos and two well known cigarette tobaccos.

TABLE 9

Sample	Arsenic as $As_2O_3$ in parts per million
Tobacco (pipe) "A"	13.3
Tobacco (pipe) "B"	9.5
Tobacco (cigarette) "C"	11.0
Tobacco (cigarette) "D"	9.0

It is interesting to note that Remington<sup>18</sup> examined pipe tobaccos and found arsenic present to the extent of from six to thirty parts per million, while Myers and others<sup>14</sup> reported that in their examination of seven different tobaccos, the arsenic ranged from none to 1.65 parts per million. Our examinations of smoking (pipe) tobaccos agree with those of Remington, it would appear therefore that the results of Myers and others are perhaps too low and do



not show the true arsenic content of tobacco. Because of the daily use of vast quantities of tobacco in our lives, the figures as shown in table 9, tabulated and calculated to the trioxide, will be of value as indicating an important source of arsenic.

TABLE 10  
ARSENIC IN PIPE TOBACCO

Sample No	Reported by	Arsenic as $As_2O_3$ in parts per million
2	Remington <sup>12</sup>	170
5	"	194
7	"	170
9	"	213
10	"	186
13	"	79
14	"	382
B	Myers and others <sup>14</sup>	165*
C	" " "	066*
D	" " "	073*
E	" " "	014*
F	" " "	062*
G	" " "	099*
H	" " "	059*

\*These figures represent the greatest amounts found

#### HEALTH HAZARDS FROM ARSENIC AND LEAD

According to Myers and others<sup>14</sup> the high arsenic found in broccoli, is indicative of its danger as a food. They state that some time ago, broccoli was served at a dinner given by a large group of medical men and approximately 100 of the individuals present suffered later with varying degrees of gastrointestinal symptoms, several had to be sent to the hospital. Arsenic was found in the broccoli. These authors further say, as a result of data collected over a period of fifteen years, that the elimination from the body of arsenic (and of lead) in any amount is of clinical significance, especially if there are symptoms which can be attributed to either metal. However, they feel that the amount of arsenic excreted is not a reliable guide concerning the extent of the physiological injury that has been wrought, because in some individuals there is a tendency to retention while, in others, there is rapid excretion. They believe that each and every one is exposed to metallic intoxication. According to them, some of the symptoms which should appear as a result of metallic poisoning from spray residue are fatigue, headache, vertigo, irritation of the eyes, pharynx and digestive tract, neuritis, dermatitis, blood vessel changes, possibly associated with vascular disturbances of middle and late life, pigmentation, paralysis, disturbances of locomotion, vomiting, dyspepsia, burning and griping abdominal pain and cramps.

In a second paper we expect to show (1) the amount of arsenic found in individuals who have not been subjected to arsenic therapy, that is to say cases in which death was accidental or due

to natural causes, we shall report (2) our examinations of the various organs of food animals for their arsenic content, and (3) the complete findings of arsenic in most organs of a number of persons who died as the result of acute arsenical poisoning. In this paper we shall describe in detail the procedure which we employ for the determination of arsenic in organic material, as well as tests of the method.

#### SUMMARY

Arsenic is not shown to be a "normal" constituent of the human body, but is present in minute amounts due to ingestion with food. At the present time the arsenic content of food, both solid and liquid, is too large and must be viewed as a menace to the general well-being.

#### REFERENCES

- Orfila. Recherches médico-légales et thérapeutiques sur l'empoisonnement par l'acide arsénieux. Paris 1842.
- de Méd. Paris 41:42: 561 (Nov.) 1899.
- Gautier A. Sur l'existence normale de l'arsenic chez les animaux et sa localisation en certains organes. Bull. Acad. Localisation élimination et origines de l'arsenic chez les animaux. Bull. Acad. de Méd. Paris 43: 116 (Feb.) 1900.
- La fonction menstruelle et le rut des animaux. Rôle de l'arsenic dans l'économie. Bull. Acad. de Méd. Paris 44: 190 (Aug.) 1900.
- Gautier A. Présence de l'arsenic en proportions notables dans tous les végétaux à chlorophylle de la classe des Algues et dans les Sulfurales. Comp. rend. Acad. d. sc. 129: 189 920 1899.
- Localisation élimination et origines de l'arsenic chez les animaux. Compt. rend. Acad. d. sc. 130: 284 1900.
- La fonction menstruelle et le rut des animaux. Rôle de l'arsenic dans l'économie. Compt. rend. Acad. d. sc. 131: 361, 1900.
- Gautier A. L'arsenic existe normalement chez les animaux et se localise surtout dans leurs organes ectodermiques. Compt. rend. Acad. d. sc. 134: 1394 1902.
- Présente les observations suivantes. Compt. rend. Acad. d. sc. 135: 812 1902.
- L'arsenic existe-t-il dans tous les organes de l'économie animale? Compt. rend. Acad. d. sc. 137: 295 1903.
- Bertrand, G. Sur la recherche et sur l'existence de l'arsenic dans l'organisme. Ann. de l'Inst. Pasteur Paris 16: 553 1902.
- Nouvelles recherches sur l'arsenic de l'organisme. présence de ce métalloïde dans la série animale. Ann. de l'Inst. Pasteur Paris 17: 1 1903.
- Sur l'existence de l'arsenic dans la série animale. Compt. rend. Acad. d. sc. 135: 809, 1902.
- Sur l'existence de l'arsenic dans la série animale. Bull. d. l. Soc. Chim. d. Paris 27: 1233 1902.
- Hödlmoser C. Enthalten gewisse Organe des Körpers physiologischer Weise Arsen? Ztschr. f. physiol. Chem. 33: 329 1901.
- Ziemke. Über das Vorkommen von Arsen in menschlichen Organen und seinen Nachweis auf biologischem Wege. Vierteljahrsschrift f. gerichtl. Med. 23: 51 1902.
- Cerny Karl. Ueber das Vorkommen von Arsen im tierischen Organismus. Ztschr. f. physiol. Chem. 34: 408 1902.
- Kunkel. Beiträge zur Frage des sogenannten normalen Arsens. Ztschr. f. physiol. Chem. 44: 511 1905.
- Billeter O. et Marfurt E. De la teneur normale en arsenic dans le corps humain. Helvetica Chimica Acta 6: 780 1923.
- Guthmann H., und Grass H. Über den arsengehalt des Blutes der Frau. Arch. f. Gynakol. 152: 127 1933.
- Remington R. E. A hitherto unsuspected source of arsenic in human environment. J. Am. Chem. Soc. 49: 1410 1927.
- Headden William F. The occurrence of arsenic in soils, plants, fruits and animals. Proc. Colo. Sci. Soc. 9: 345 1910.
- Myers C. N. Thorne B. Gustafson F. and Kingsbury J. Significance and danger of spray residue. Indust. & Engin. Chem. 25: 624 1933.
- White W. B. Poisonous spray residues on vegetables. Indust. & Engin. Chem. 25: 621 1933.
- Chapman A. C. On the presence of compounds of arsenic in marine crustaceans and shell fish. Analyst 51: 548 1926.
- Holmes A. D. and Remington R. Arsenic content of American cod liver oil. Indust. & Engin. Chem. 26: 573 1934.

#### DISCUSSION

PRESIDENT GAY. Dr. Boos's paper is now open for discussion, and I am sure he will be pleased to answer any question which any of you may have.

DR. CANAVAN How much arsenic is there in tap water?

DR. BOOS I think the quantity is negligible. We have never made analyses of it here. But I want to make a great many examinations of this kind because I think it is important to continue this work. It is almost an open territory, a new field of work and there is a great deal to be learned by the analysis of many things that enter into our lives.

A MEMBER You spoke of a good deal of arsenic being in cod liver oil. That is supposed to be a tonic and a medicine.

DR. BOOS Yes, but no one knew it was there as that is a very recent work done only a year ago. I think that none of the manufacturers had any idea that cod liver oil contained arsenic.

Ladies and Gentlemen—It is possible that the small amount of arsenic which Billetter and Marfurt found in the system and it was surprisingly constant in the organs serves a physiological purpose but for the moment, there is no proof of that. However there may be proof forthcoming that some of the arsenic which we have in the system belongs there but of course not all of it because we ingest excessive amounts of arsenic in our foods and liquids. Wine and milk contain arsenic. Milk is bound to contain it because the cows eat so much sprayed grass and hay.

DR. JONES I remember some years ago there was a death reported to this Society of a child who was thought, at the time, to have eaten some berries which had been recently sprayed with arsenate of lead. At that time several mooted cases were brought to the attention of this Society.

I have actually forgotten whether this child was autopsied but I think it was and no arsenic was found.

Previous to that, however, the State Police and I roamed through the area with two other children who showed us where the child had eaten the berries but we could not find any particular berries except blueberries. There, we found great patches of luscious blueberries absolutely white with arsenate of lead. I watched afterwards and found that those berries were all picked and eaten. In fact, the next time I went there I found three women picking them. They informed me when I suggested that they might be uncomfortable after eating them that they had been eating them all along and they had not noticed any bad effects and they didn't see any harm in continuing to do it.

Now you brought up the subject about beef cattle in your paper but in southwestern beef there is no arsenic, I am quite sure. And beef cattle bones would come almost invariably from the west or the southwest.

DR. BOOS Most of the meat, of course does come from the west and southwest. I am told, however that western cattle are fattened for the market in New England where there is much spraying.

DR. JONES We went into the subject very carefully with the State Board of Health. We made it a regular study and could find no report of any cattle having died from that.

DR. BOOS I shall try to trace my information to its source. But there is a very interesting point which has been raised more recently. The Federal Government is beginning to think that the lead in arsenate of lead is almost as important as the arsenic itself.

DR. JONES I think it is

DR. BOOS That is why the Bureau of Chemistry is making such a strenuous effort to exclude lead from all sorts of food. They prohibited the sale of teas that were covered with lead foil as it was said that the tea took up a considerable amount of lead. I think the presence of lead is probably due to the scraping of the tea against the surrounding lead foil because we made some analyses for a client, and we found that the tea in the middle of the package was almost lead free.

The government is considering seriously the exclusion of some delicacies from France because they come in a soldered can which is considered to have quite an amount of lead in it. One product is sardines put out by a well known house.

Just now lead is the one thing that the Federal Government is most concerned with and it may be that lead is quite an important feature in the poisoning from lead arsenate.

Many of the garden vegetables are not sprayed with lead arsenate. They are sprayed with Bordeaux mixture the active principle of which is a copper hydrate. Small traces of this are often left, and you may have seen the light bluish green deposit on the celery. This deposit is entirely harmless.

A MEMBER With reference to Dr. Jones' remark as to the arsenic on the berries, in all probability the majority of people wash berries that is they soak them anyway partly for ordinary matters of cleanliness, and then a great many times to take away the little bits of leaves and branches and little things like that. Wouldn't that take away the possibility of arsenic?

DR. BOOS Have you ever tried to wash off the coating of arsenate of lead? It sticks and it is difficult to remove. You would almost have to rub each berry separately to get it off. You will notice that after heavy repeated rain there is still much white arsenate of lead on blades of grass and leaves.

DR. CANAVAN Do you think there is any flour used in spraying just ordinary flour?

DR. BOOS Yes flour is used to make this material sticky.

A MEMBER I would like to hear from Dr. Leary or Dr. Magrath on that subject, just informally if I could.

DR. MAGRATH I haven't anything very original to contribute as Dr. Boos has done all my analytical work and we have had many experiences in the very acute and more prolonged instances of arsenical poisoning.

I want to take this opportunity of thanking Dr. Boos for his valuable paper which is a real contribution. It seems to me, to the literature on this subject.

But, I haven't anything original of my own, because all the chemistry in cases of recent years where we have gone into the matter at all has been done by Dr. Boos. He has attended to all those matters.

DR. BOOS I forgot to speak to you gentlemen about autopsies. Sometimes it may be a question of poisoning and it would be very well in every autopsy if you would secure a sample of blood from the cadaver. The presence of arsenic in the blood of arsenical cases is very important, because it shows that the poison was still circulating in the blood, and that not all has been deposited in the organs. It is important, therefore whenever you refer a case to a toxicologist, for any kind of poisoning for that matter to give him blood if you can. It is one

of the most valuable of the organic materials for forensic purposes. This is true also of the urine.

Many of the cases that come to us have been embalmed and there is no possibility of obtaining liquid blood. In these cases clots removed from the great vessels will answer very well. In unembalmed cases the Medical Examiner has an excellent opportunity to draw blood from one of the veins.

A MEMBER I have done quite a little work in these matters, and sometimes when you can't find arsenic in the urine, can one still be excreting it for some time so that although you may not find it in the urine, you may find it in the hair? Have you any idea of how long it takes before it is so deposited?

DR BOOS It is not deposited quickly. It takes time. It is deposited much more slowly in the hair than in any of the other organs.

In the Porter case, the proximal hair contained about one and fourtenths parts per million, the midway hair contained two and fourtenths parts per million, while the distal hair contained two parts per million.

A MEMBER And the same is true of the bones, isn't it?

DR BOOS The manner of arsenic deposition in the bone has not been determined.

A MEMBER Then the chances are that if you don't find it in the urine, you will find it in the bones and the hair as the time passes?

DR BOOS Do you mean arsenic taken as a poison in food or as medicine?

A MEMBER The possibility of there being arsenic there.

DR BOOS I feel that you can always find it in the urine. We have found it in every case we have examined.

A MEMBER I would like to inquire how much blood it would be necessary to take?

DR BOOS One hundred cc will do very well. If you can have more, of course, it is better.

You must be able to demonstrate in Court, with the wide-awake defense of today, that the system contained an amount of arsenic which would probably be fatal. That does not mean that you have to examine all the organs, but you should examine the blood, the internal organs, the bone, the skin and the brain. The muscles are very important, because they make up such a large bulk of the body. Even the fat contains an appreciable amount of arsenic. Then, by computing the matter that you have examined you still have a considerable part of the body weight not analyzed. But from your figures, and from the part that you did not analyze you estimate the arsenic to be such and such, whatever it is, for the whole body. Now, you may wonder why the body doesn't contain more than two and a half or possibly three grains of arsenic. I mean in the tissues themselves, you may find in the gastrointestinal tract a great amount in addition, but that arsenic has had little to do with a person's death directly, because it is excessive arsenic that has not been absorbed. It is only the arsenic taken into the system through the blood stream that counts. After the system has taken up two to three grains, it cannot take up any more because death results. The average found is two grains. In a big man, you will

probably find more and in a small woman, there may be less.

That is the reason for the uniformity of results in arsenical poisoning. As I have said, just as soon as the system has taken up enough to destroy the function of the cells, no more can be taken up. Up to that time, the system tries, very actively, to excrete the arsenic. That is why you always get a good test from cecal contents, the large intestine being one of the best of the excretory organs. In the intestine, you also find the arsenic which comes from the liver through the bile.

I don't know of any case of white arsenic poisoning since Dr Magrath's case after the war, I mean the Archhook Case.

The kidneys try hard to excrete the arsenic, therefore the kidneys are usually high in arsenic content.

In the cases of acute poisoning, the skin is also high in arsenic because it is excreted in the perspiration.

The organs that are particularly high in arsenic are the liver, kidneys, large intestine, small intestine, lungs, skin and brain.

If you find much arsenic in the muscles, it means, I think, recent administration, because it is still circulating in the muscles. The longer a person has taken to die, the less arsenic seems to be in the muscles. If on the other hand, the victim died a short time after the dose was taken, there is an appreciable quantity of arsenic in the muscles.

DR JONES You were speaking about the prophylaxis in arsenical spraying. I don't know whether the State law requires it, but very commonly, I have noticed that many trees are sprayed with arsenate of lead, and it is a deadly poison. I have seen this frequently.

DR BOOS What I meant, particularly, was that operatives should be restrained in spraying, they should not spray indiscriminately over such a wide territory, covering orchards, lawns and pastures with the arsenic. What is needed is more scientific spraying confined to individual trees. The sprayers, as a rule, are not highly intelligent or efficient and they do a careless job. I have seen many cases where the spray went all over the windows of the house, through open windows into the house, and over the lawn, the flowers and vegetable beds. I think such careless spraying should be stopped.

Probably the arsenic in tobacco also comes from spraying.

DR JONES It would seem as if it might be beneficial to find other material for spraying.

DR BOOS That would be a matter for the chemists and entomologists. Arsenate of lead is very cheap, while other things are expensive, and perhaps not so efficient. I think, however, that something should be done to prevent the increased amount of arsenic in our foods.

There is one point I would like to consider regarding arsenic in food. Where does the lobster get its enormous amount of arsenic? All sea foods contain some arsenic, but most is found in those of the sea foods which belong to the crustaceans. Crabmeat is high in arsenic, so are prawns and shrimp, and lobsters, of course, top them all. It would seem that the crustaceans have a particular habit of taking up arsenic that the other fish do not show to nearly the same extent. Haddock, for example, is comparatively low in arsenic, even deep sea haddock is fairly low and so are most of the salt water fish. But none of them are scavengers like the crustaceans and it may be that animal and plant refuse which is thrown into the sea and is eaten by

the crustaceans is the source of their arsenic. The subject offers an interesting problem for the biologists. I have heard that fresh water fish do not contain as much arsenic as salt water fish. Perhaps then it is something that has to do with the sea itself.

A MEMBER How much is contained in sea water?

Dr. Boos I don't know

Perhaps you have heard of the cases of arsenical poisoning from beer that they had in London. The presence of the arsenic was due to the commercial sulphuric acid which they used to convert cornstarch

into glucose. The glucose was fermented to make the beer. Serious cases of poisoning resulted and there were some deaths due to large amounts of arsenic in the beer.

PRESIDENT GAY Thank you very much Dr. Boos. Now ladies and gentlemen in spite of what Dr. Boos says that we shouldn't eat eggs, pork cuts, drink milk and a lot of other things, and now it's lobster and beef, I want to announce right here that I haven't developed an antipathy to all these things. For I know that I am still going to eat lobster.

## TRICHINOSIS IN BOSTON\*

BY WESLEY W. SPINK, M.D.† AND DONALD L. AUGUSTINE, S.C.D.‡

**T**RICHINOSIS is one of the commoner parasitic diseases in New England. For the past three years, we have been interested in the clinical aspects of the disease, and in skin and precipitin tests as aids in its diagnosis. The results of these studies are presented in more detail elsewhere.<sup>1, 2, 3, 4</sup> The purpose of this paper is to discuss some of the epidemiological phases of the disease in Boston with a consideration of preventive measures.

It is of interest that the first case of trichinosis reported in America was by Dr. Henry Ingersoll Bowditch of Boston in 1842, and appeared in the pages of the predecessor of this *Journal*.<sup>5</sup> Evidence of the disease was discovered at autopsy in a young man who died from a malignant growth. Bowditch states: "The muscles, and cellular membrane underneath them, seemed literally covered with myriads of minute white lines, looking at first sight like the ova of the common fly upon decaying animal matter."

Almost one hundred years have elapsed since Bowditch described his findings and, in the meantime, hundreds of cases of trichinosis have been recorded in American literature. While trichinosis is not so common as some infectious diseases, it occurs far more frequently than published reports indicate. In the statistical reports of infectious diseases which appear from time to time in this *Journal*, trichinosis is listed as a rare disease. This is in sharp contrast to the high incidence of the disease to which attention has been called recently as a result of observations made at routine postmortem examinations. Queen<sup>6</sup> in Rochester, New York, found, after examining the diaphragms in three hundred and forty four consecutive autopsies,

that fifty nine (17.5 per cent) contained *Trichinella spiralis*. A similar study made on fifty eight autopsies in Boston, Massachusetts, showed sixteen of the diaphragms, or 27.6 per cent parasitized. Riley and Scheffley<sup>7</sup> studied the diaphragms of cadavers in the Anatomy Department of the University of Minnesota, and found the incidence in one series to be 17.9 per cent and 20 per cent in a second series. As a result of these studies, it appears that the incidence of trichinosis in three large cities is probably rather high. It might be pointed out that in Queen's series of cases no antemortem diagnosis of trichinosis had been made.

During the past three years, we have obtained clinical data in sixty five proved cases of trichinosis in Boston. Most of these cases were observed at the Boston City Hospital, but through the courtesy of Dr. James H. Means, patients were also studied at the Massachusetts General Hospital. It is to be noted especially that most of these infections were sporadic and severe enough to require hospital care of the patients. If it could have been possible to observe other members of the families at home, the number of cases might well have been larger, as it is well known that individuals may be infected with the parasite and yet have few or no symptoms.

Of considerable interest in the study of these patients was the variable symptomatology. Standard textbooks of medicine, in discussing the symptoms of trichinosis, usually divide the clinical course into three stages. The first stage, that of the development of worms to maturity in the intestine, includes nausea, vomiting, diarrhea, and abdominal pain; the second stage, the period of dissemination of the larval worms as marked by muscle tenderness, edema of the eyes, and eosinophilia, while the third stage, or the period of encystment, is that of convalescence. But such was not the clinical course in most of the sixty five cases. One patient was observed having only edema of the eyes and a fever. There were no gastrointestinal symptoms or muscle tenderness, and yet a biopsy of the gastroc

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nemius muscle, when examined microscopically, showed four larvae per high power field. Another patient had an unexplained fever as the only complaint. Some patients had no gastrointestinal symptoms, yet they developed severe muscle pains. Others had gastrointestinal symptoms but no muscle pains. A most puzzling case was that of a young colored girl who developed a fever, and marked weakness of the muscles of the back, arms and legs. She was under observation for poliomyelitis until examination of blood smears showed a marked rise in the number of eosinophile cells. Microscopic study of a muscle biopsy revealed several recently encysted larvae. During the whole clinical course, she had no edema of the eyes, gastrointestinal symptoms, or muscle tenderness.

Since the disease manifests such a variable symptomatology, the diagnosis of the sporadic case may be very difficult. We have found the most valuable aid in diagnosis to be the presence of eosinophilia. Many persons were first suspected of having trichinosis because of the blood picture. Perhaps the reason why trichinosis is not recognized more often is that the routine examination of stained blood specimens is not done frequently enough in private practice or even in hospitals. The diagnosis may be made more difficult when eosinophiles are absent in the blood smear. One of us (W W S<sup>8</sup>) has observed that eosinophiles may not be found in the blood of either trichinous animals or human beings when a secondary pyogenic infection is present. Thus in two of our patients who were under observation for one to two weeks before the correct diagnosis was made, it was eventually found that a secondary pyogenic infection had suppressed the eosinophiles, and it was only when the secondary infection subsided that eosinophiles appeared in the peripheral blood. Skin and precipitin tests have been very useful in the diagnosis of suspected cases. The skin test usually becomes positive after the second week of the disease, and the precipitin test between the third and fourth weeks.

Briefly, the diagnosis of trichinosis depends upon a careful history of the patient's illness, a complete physical examination, repeated examinations of blood smears for eosinophiles, and the use of skin and precipitin tests. In our experience looking for the larvae in the blood, spinal fluid or muscles is a waste of time and unnecessary if the foregoing procedures are carried out.

An analysis of the epidemiological data in these cases is desirable, as an aid in controlling the disease. Only one of the sixty-five cases terminated fatally. This occurred in an Italian laborer who had eaten about four pounds of raw salt pork over a period of several days. Death

was due to an acute myocarditis and bronchopneumonia<sup>4</sup>.

The distribution of the cases according to parentage is seen in table 1. It is interesting to note that no Germans are included, but this may be explained on the basis that there are relatively few Germans in Boston. Most epidemiological studies have pointed out that a large proportion of cases occurred in Germans, due to the fact that they consume a great deal of raw pork. Another point of interest is that not all the cases occurred in people of low intellect and social status. Seven cases occurred in the families of two prominent physicians.

TABLE 1  
DISTRIBUTION OF SIXTY-FIVE CASES OF TRICHINOSIS  
IN BOSTON ACCORDING TO PARENTAGE

Parentage	Number of Cases
American	22
Italian	22
Irish	13
Jewish	5
Negro	2
Syrian	1
Total	65

It was found that thirty-three of the cases (52.3 per cent) occurred singly without other members of the families having symptoms. On two occasions, groups of five persons were found to have trichinosis, and in one instance eight Italians became infected after eating fried pork sausages made at home.

An endeavor was made to determine the source of the infection in every case. In thirty cases (46.1 per cent) no definite relationship could be found between the disease and the food eaten. In only three instances was the meat eaten in a raw state without any preliminary cooking. In the remaining cases, it is evident that although the meat was cooked, it was not cooked thoroughly. Cooked pork sausage was the cause of the infection in fifteen cases, nine were due to boiled ham, six to cooked pork chops, one to fried ham, and one to cooked pork spare ribs. It is significant that several patients became infected after eating meat that had passed inspection by Federal meat inspectors.

An effort was made on several occasions to determine the incidence of infected pork on sale in Boston markets. This investigation was carried out in cooperation with Dr. Frederick J. Bailey, Deputy Health Commissioner of Boston. Small specimens of raw pork and pork products were obtained from several local markets. These were digested in artificial gastric juice and a search was made for larvae in the sediment. Trichinae were not found in any of the samples of pork examined.

Our observations indicate that the mortality rate of trichinosis in Boston is low, with only one death occurring in sixty five cases. The incidence of the disease appears about equally divided between those of American and of foreign parentage and not limited to those of low intellectual and social status. A majority of cases occurred in patients who had consumed cooked meat, and meat that had passed the inspection of Federal inspectors. From these facts, one might conclude that although the incidence of trichinosis is high, it is not a serious disease, and a suitable motto for its prevention would be, "Let the buyer beware and cook his pork thoroughly." But any clinician of experience knows that trichinosis may be a serious disease, leaving a patient prostrated for weeks. As for controlling the disease, it is well to consider some of the attempts that have been made.

Our knowledge concerning the parasite *Trichinella spiralis*, is about one hundred years old. Richard Owen<sup>8</sup> is usually credited with its discovery in 1835. However, James Paget while still a medical student at St. Bartholomew's Hospital, made careful sketches and dissections of the parasite<sup>9</sup> and called Owen's attention to his findings. These findings of Paget and Owen remained only of scientific interest until the brilliant work of the German pathologists, Virchow<sup>11</sup>, Leuckart<sup>12</sup>, and Zenker<sup>13</sup> about 1860, emphasized their pathological significance. In the years from 1860 to 1866, the people of Prussia and Saxony were almost in a state of panic because of fear of the disease<sup>14</sup>. A few years later the German Government instituted the method of examining microscopically the muscles of hogs killed for human consumption. This measure of prophylaxis against human trichinosis is still continued in Germany. After the system had been in use for several years at a considerable expense, it was found that the incidence of the disease had not been reduced according to expectations. The importation of unexamined American pork was blamed for its failure, and the importation of American pork to Germany was promptly prohibited. This materially affected the packing industry of our country, and in 1898 the United States Government sent Dr. C. W. Stiles to Germany to ascertain the value of microscopic examination of pork. His conclusions<sup>15</sup> after two years' observation showed that out of 6,329 cases of trichinosis occurring in Germany between 1881 and 1898, 3,388 cases with 132 deaths appeared to have been due to faults of the method of German inspection. Furthermore, such a system gave a false sense of security, and pork was eaten raw. It is interesting as Stiles pointed out, that for Prussia alone the trichina inspection force in 1895 was almost as large as the entire regular army of the United States (27,089), and during the years of 1892 to 1895 the number of Prussian

trichina inspectors was greater than the number of enlisted men then authorized by law for the United States army. He estimated that the trichina inspection for Germany would cost \$500,000 to \$1,000,000 more than the entire annual appropriation for the United States Department of Agriculture for that year. The United States Government inaugurated a similar system in pork for foreign export in order to regain the market, but discontinued it in 1906 because of the excessive cost and its relative inefficiency.

It is assumed now as a governing principle in the United States, that the consumer is himself responsible for the proper preparation of fresh pork and pork products that are usually cooked before eating. The packer is, however, under obligation to make sure that pork products to be sold as cooked products are properly cooked or, if of a kind customarily eaten without cooking, to make sure that the products are free from viable trichinae<sup>16</sup>.

In 1914, Ransom<sup>17</sup> showed that encysted larvae of *Trichinella spiralis* are destroyed by cold. As a result of these and further studies by Ransom and his co-workers<sup>17</sup>, all pork products of kinds customarily eaten without cooking which are prepared in establishments operating under Federal supervision are specially processed to destroy trichinae and are thereby rendered safe without cooking by the consumer. The methods of processing include cooking, refrigeration and special curing. Because of the exactitude required in these processes, they can be carried out effectively only in establishments under Federal supervision. Methods of preparing pork other than cooking are not readily applicable in the home. Therefore, the only safe rule in preparing pork purchased on the market not intended to be eaten without cooking is to cook it thoroughly.

One is frequently asked whether the ingestion of pork is the sole cause of trichinosis infections. As far as we know, the eating of improperly prepared pork is the usual source of trichinosis in human cases although severe and fatal cases from the consumption of bear meat have occurred recently in California<sup>18</sup>.

It is the current conception that one of the chief methods of infection in swine is the eating of trichinosis rats which are alleged to be numerous where hogs feed upon garbage and offal. While it is known that swine readily eat dead rats thrown to them, our own observations made at both large and small piggeries have led us to question the generally accepted idea of the importance of rats as reservoirs of infection for swine. Never did we note any close association between swine and rats, even at feeding times. Garbage delivered to the piggeries was usually fed within a few hours to the pigs in their pens, runs and pastures. Rats were seen to feed only from temporary storage bins

or barrels or from the pig troughs after the hogs had left. At the time of slaughter in those piggeries in which the offal was fed back to hogs, this was immediately and completely devoured by the latter and at no time were rats seen attempting to approach it. It appears that the infection in swine may be chiefly of porcine origin (uncooked pork scraps and offal) and that the infection in rats may also be of porcine origin and transmitted through cannibalistic habits, but that the infection in the rat is seldom transmitted to the pig.

A survey (made by D. L. A.) for helminths in rats caught at piggeries and from the market districts, along the water front and at a large packing establishment in Boston supports this view. A total of two hundred and eighty rats was examined for helminths in this survey. Particular attention was given to the incidence of *Trichinella spiralis*. One hundred and ninety-three rats were trapped at four large piggeries located approximately twenty miles from Boston. Seventeen rats were caught at a packing house in Greater Boston and seventy were trapped in the market district and along the water front of Boston proper. Of the one hundred and ninety-three rats from the piggeries, only two were found trichinous, whereas nine or approximately 12 per cent of those from the market district and water front, and five or 42 per cent of the packing house rats were similarly infected. It is evident, therefore, that rats at these piggeries are not an important source of infection for the pigs.

Examinations of pigs for trichinosis were made at two piggeries. At one the food consisted largely of garbage collected from the residential districts of the town and, at times of slaughter, offal was fed to the remainder of the animals. Twelve young pigs which were to be slaughtered on the following day were given a skin test for trichinosis. All were negative by this test. At slaughter the diaphragms were obtained and examined after artificial peptic digestion. None were found trichinous. The second piggery was selected because three cases of trichinosis in man were known to have originated from it. Two large hogs which were to be slaughtered within the next few days and seven younger pigs, chosen at random as they fed upon garbage, were skin tested for trichinosis. One of these younger pigs developed a positive reaction while the tests on the others were negative. A precipitin test of the blood serum of this pig was likewise positive and the parasite was later demonstrated in the muscles. At this piggery the garbage was collected principally from small meat markets of the nearby city. A casual examination of the garbage held temporarily in barrels revealed pork scraps including a large piece of raw pork and several pieces of raw skin. It was evident that trichinosis in

this piggery originated directly from garbage.

These observations have, therefore, led us to believe that trichinosis in pigs (at least in this locality) is usually the result of their ingesting trichinous pork either in garbage or in the offal at times of slaughter and that the infection in rats, although relatively rare at the piggeries, has its origin in trichinous pork scraps, and may be transmitted from rat to rat through cannibalistic habits but that its return to swine through rats seldom occurs.

A review of the cases of trichinosis we have encountered within the past five years in eastern Massachusetts shows that the majority originated from locally raised and slaughtered hogs. As a specific example, during February of this year, twelve cases of the disease developed in a single family in consequence of eating pork from a hog to which the family had fed garbage collected in the town (not included in this series).

Inasmuch as trichinosis in swine in this region appears to have its source in garbage and offal it would be advisable to encourage the feeding of cooked garbage and cooked offal, particularly where garbage is collected from market districts and known to contain raw meat scraps.

Although our one absolute protection against trichinosis is by thorough cooking of pork, the necessity of thoroughly cooking all pork is not generally understood. To many the stamp "U S Inspected and Passed" is a guarantee that that piece of pork is free from trichinae and can be used without fear. It is not a lay conception alone but one that has been held correct by authorities on foods and sanitation, and so stated in textbooks on Hygiene and General Science now used extensively in our High Schools.

As stated by Riley and Scherfley<sup>7</sup> "It is evident that there is still abundant need for educating the public regarding the source of trichinosis and the simple means of protection that may be taken against the infection." It would seem that one of the most effective means of bringing this information to the public is through the school.

It is possible that at some future day trichinous hogs may be eliminated from the market by means of the serologic tests, now valuable aids in diagnosing the infection in man. The observations made by Augustine and Theiler<sup>1</sup> have shown that these are more accurate than muscle examination. No false positive skin reactions were encountered in swine in Massachusetts, even when concentrated dilutions of the antigen were used, but under tropical conditions, in the Panama Canal Zone and Colombia, South America, typical positive reactions were frequently encountered in non-trichinous hogs when concentrated dilutions of the antigen were used. High dilutions which were still effective in producing a typical reaction in trichinous hogs failed to produce a reaction in hogs sensitive

to the concentrated dilutions. The tests appear specific but further studies are necessary before their practical application can be determined.

For the present, the control of trichinosis obviously rests with the housekeeper, which means that all pork should be cooked thoroughly before it is eaten.

## REFERENCES

- Augustine, D. L., and Theller, H. Precipitin and skin tests as aids in diagnosing trichinosis. *Parasitology* 94: 60 (March) 1932.
- Spink, W. W., and Augustine, D. L. The diagnosis of trichinosis with special reference to skin and precipitin tests. *J. A. M. A.* 104: 1801 (May) 1935.
- Spink, W. W. Clinical and pathological observations of the heart in trichinosis. *J. Clin. Investigation* 13: 792 (July) 1934.
- Spink, W. W. Cardiovascular complications of trichinosis. *Arch. Int. Med.* 18: 225 (August) 1935.
- Bowditch, H. L. *Trichina spiralis*. Boston M. & S. 26: 117 (March) 1932.
- Queen, F. B. The prevalence of human infection with *Trichinella spiralis*. *J. Parasitol.* 18: 1-3 (Dec.) 1931.
- Riley, W. A., and Scheffey, C. H. Trichinosis of man, a common infection. *J. A. M. A.* 103: 121 (Apr.) 1934.
- Spink, W. W. Effects of vaccines and bacterial and parasitic infections on eosinophilia in trichinosis animals. *Arch. Int. Med.* 84: 308 (Nov.) 1931.
- Owen, Richard. Description of a microscopic entozoon in feeding the muscles of the human body (*Trichina spiralis*). *Proc. Zool. Soc.* 31: 32 1935.
- Editorial—"The discovery of *Trichina spiralis*." *Brit. M. J.* 2: 616 (Oct.) 1920.
- Virechow H. Ueber *Trichina spiralis*. *Virechow's Arch. f. path. Anat.* 18: 230 1840.
- Leuckart, R. Untersuchungen über *Trichina spiralis* mit gleichem Beitrag zur Kenntnis der Wurmkrankheiten. Leipzig u. Heidelberg 1859.
- Zenker, F. A. Ueber die Trichinen Krankheit des Menschen. *Virechow's Archiv f. path. Anat.* 18: 561 1850.
- Silow, O. W. Trichinosis in Germany. *U. S. Dept. Agric. Bureau of Animal Industry Bulletin No. 39* 1901.
- Schwartz, B. Trichinosis, a disease caused by eating raw pork. *Leahet No. 34* U. S. Dept. Agric. 1929.
- Ransom, B. H. The effect of cold upon the larvae of *Trichinella spiralis*. *Science* 39: 181 1914.
- Ransom, B. H. Effects of refrigeration upon larvae of *Trichinella spiralis*. *J. Agric. Res.* 5: 819 1915.
- Ransom, B. H., Schwartz, B., and Haffenberg, H. P. Effects of pork-curing processes on trichinae. *U. S. Dept. of Animal Industry Bulletin No. 230* 19 0.
- Walker, A. T. Trichinosis report of an outbreak caused by eating trichinosis bear meat in the form of Jerky. *J. A. M. A.* 98: 2551 (June) 1932.
- Editorial: Trichinosis from bear meat. *Weekly Bull. Calif. Dept. Public Health* November 14 1931.

## TRICHINIASIS AMONG JEWS

BY HYMAN MORRISON, M.D.\*

**T**RICHINIASIS is recorded as the diagnosis in seven cases at the Beth Israel Hospital in the past four years four of the patients being Jews. This disease is not rare even under modern food control, but its occurrence among Jews is noteworthy and it indicates a change in an age-long dietary tradition. The pig has always been an unclean feeder and it is fair to assume that bitter experience was the basis for the specific injunction in the Mosiac code against the use of swine as food. Certainly there was no trichiniasis among Jews so long as they abstained from eating pork. With increasing lapse of dietary observance however, we must learn to consider this disease in differential diagnosis even among Jews.

The four cases mentioned above are reported here with a view of emphasizing two points. First and chiefly, the occurrence of this disease among Jews, and secondly, the importance of bearing in mind this disease when confronted with cases of fever of apparently unexplained origin.

**CASE 1** A traveling salesman of forty came to our attention after he had been ill with fever for about three and a half weeks. His only complaint was dull headache and malaise. At the beginning of his illness a swelling about the eyes had been noted. Examination on the day before he was sent to the hospital revealed no apparent explanation for the fever but a stained smear of his blood showed an eosinophilia of twenty five per cent. This was corroborated on his admission to the hospital and a routine investigation for fever of unknown origin brought out no other findings. A biopsy from the deltoid and soleus muscles disclosed encysted trichina embryos. Questioning as to his diet disclosed that in his travels he had eaten various pork prod-

ucts. The temperature became normal at the end of the fourth week of his illness and he has been well since.

**CASE 2** A man of forty two was admitted to the hospital with a story of heartburn and sharp burning pain in the epigastrium for three weeks. On admission he was found to have fever but this came down to normal four days later. Because a complete routine examination yielded no other data except an eosinophilic count ranging between twenty nine and sixty-one per cent he was questioned as to his diet, and the fact was brought out that he had eaten pork three weeks previously followed for several days by diarrhea and puffiness of the eyelids to which he paid no attention. A biopsy revealed encysted trichina embryos.

**CASES 3 and 4** Husband and wife both twenty two years old. The wife was sent to the hospital with a provisional diagnosis of acute appendicitis. She had been ill for about a week with malaise and abdominal colic, at first localized in the right lower quadrant but subsequently diffuse. A routine blood examination showed an eosinophilia of sixty eight per cent and subsequently biopsy revealed encysted larvae of trichina. Her husband came in several days later. His story was that a week previously he became ill with fever, malaise and abdominal distress and that four days later his eyelids became puffy and on the night before admission he had generalized muscular pain and soreness. At the hospital his eyelids were still puffy he had fever and his eosinophilic count was fifteen to forty three per cent. The history now brought out that both he and his wife had eaten pork a few days before the onset of their illness. His temperature subsided four days after he entered the hospital.

Of the four patients only one presented the classical picture of trichiniasis when first observed at the hospital. This was the last case mentioned. The diagnosis in his case was simple because it had already been made in the case of his wife whose symptoms were chiefly abdominal pain. After the finding of eosinophilia by routine examination muscle biopsy

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cleared up the diagnosis. The first case was puzzling because he showed fever of over three weeks' duration without any explanation, and in this case, also, a routine blood smear examination gave the clue.

If the possibility of this disease is borne in mind, the diagnosis should not offer any difficulty. Remittent fever with muscle pain and edema localized around the eyes should at once prompt examination of the blood for eosinophilia and a searching inquiry for a history of the ingestion of pork. Finding of encysted larvae through muscle biopsy or the skin or precipitin tests makes the diagnosis absolute. If the patient is seen after the edema has disappeared, or if the edema is so slight as to be overlooked, or if the muscle pain is slight or limited to special muscle groups, then fever alone is the

dominant feature of the disease and the diagnosis may be baffling if the blood is not examined in a routine way. This accounts for the many failures in the diagnosis of such cases until the patients are taken to a hospital where routine blood examination gives the necessary clue.

## SUMMARY

1 Four cases of trichiniasis among Jews, out of a total of seven, at the Beth Israel Hospital are cited briefly.

2 The diagnosis in all of them was obscure until a high eosinophile count gave the clue.

3 Because of the change in dietary habit, a diagnosis of trichiniasis should be borne in mind in cases of fever of obscure origin even among Jews.

## THE ENERGY REQUIREMENT IN STRENUOUS MUSCULAR EXERCISE\*

BY H. T. EDWARDS, A. A.,† A. THORNDIKE, JR., M. D.,† AND D. B. DILL, PH. D.†

**S**TUDENTS of physiology are familiar with the report of Woods and Mansfield<sup>1</sup>, that Maine lumbermen have an energy exchange of about 8,000 cal. per day. Workmen are rarely called upon for such a high level of sustained effort. However, strenuous muscular exercise requires increased metabolism over certain definite periods of time. It is of interest to determine in this day of organized amateur athletics the energy requirement of sustained effort in such a sport as American football. In the last edition of Bambridge<sup>2</sup>, the statement was made that football players lose weight on a diet of less than 7,500 cal. We now have to report that measurements made during the past two years on Harvard football players show that on 5,600 cal. body weight is maintained.

The menu at the Harvard training table is arranged by a trained dietitian under the supervision of one of the authors (A. T.). A varied diet unlimited in amount is provided. Lunch and dinner from Monday to Saturday noon are served.

Eight players were observed during three periods of several days each, one period in 1933 and two in 1934. Each item of food placed on the table was accurately weighed, and food residues were all collected and weighed. Weights of protein, fat and carbohydrate were calculated from standard tables<sup>3, 4</sup>.

During the season of 1933 accurate estimates were made for lunch and dinner only, but in

1934 breakfasts also were served at the training table for six consecutive days. The average breakfast eaten during this period is shown in table 1 together with the estimated calorie

TABLE 1

FOOD INTAKE AT BREAKFAST AND BETWEEN MEALS

During six days of the 1934 periods eight men ate breakfast at the training table and reported all food eaten between meals. The caloric value of extras is small and even if in error by 50 per cent the total will be not greatly in error.

		Carbohydrates	Proteins	Fats	Total
Breakfasts	Cals	699	122	582	1403
	%	50	9	41	
Extras	Cals	131	36	121	288
	%	46	12	42	

intake between meals. The estimated *extra* calories were consistent from day to day and amounted only to about five per cent of the total food intake.

We thus obtained, by addition of the average breakfast and estimated extras to the measured lunches and dinners for the three periods, the total calorie intakes shown in table 2. The weights of the players were observed daily as shown in table 3. There were the usual day to day fluctuations, but no significant net change in the average weight from Monday through Friday. It may be concluded, therefore, that these players had an average energy requirement of about 5,600 cal. during the periods studied. The average for the week may be slightly less because the players eat lightly on Saturday before the game (table 2) and are cautioned to eat a light dinner after the game.

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From verbal reports, Sunday appears to be a feast day and may in a large measure offset the low intake of Saturday.

An estimate may be made of the proportion of the total energy required for football. These

Saturday game average about two hours each, it follows that the increased requirement attributable directly and indirectly to an hour of football playing is one half this quantity, or 1,250 cal. If this increased metabolism were

TABLE 3  
FOOD INTAKE OF 8 FOOTBALL PLAYERS 1ST WEEK,--1934

		Mon	Tues	Wed	Thurs	Sat.*	Average Mon. Thurs
Energy from	Cals.	2740	2475	2475	2220	270	2480
Carbohydrates	%	49	41	44	43		44
Energy from	Cals.	543	728	638	555	119	618
Proteins	%	10	12	11	11		11
Energy from	Cals.	2293	2803	2623	2373	279	2498
Fats	%	41	47	45	48		45
Total Cals		5576	6008	5636	5148	668	5594
Light lunch only							

FOOD INTAKE OF 8 FOOTBALL PLAYERS 2ND WEEK--1934

		Tues.	Wed	Thurs	Fri	Average Tues Fri
Energy from	Cals.	2375	2405	2415	2195	2347
Carbohydrates	%	44	42	45	42	43
Energy from	Cals.	700	609	576	593	619
Proteins	%	13	11	11	11	12
Energy from	Cals.	2283	2553	2318	2508	2448
Fats	%	48	47	44	47	46
Total Cals		5358	5667	5339	5296	5414

FOOD INTAKE OF 8 FOOTBALL PLAYERS, 5½ DAYS,--1933

	Mon	Tues	Wed	Thurs	Fri	Sat.*	Average Mon. Fri
Total Cals	6076	58.5	5711	5727	5643	1049	5796
Light lunch only							

sixteen men had a mean height of 184 cm. and a weight of 83 kg which corresponds, according to accepted standards, to a basal metabolism of 80 to 84 cal. per hour, in other words to about 2,000 cal. per day. According to Rubner's figures\* such an individual in light activity would require about 2,800 cal. per day. The

TABLE 3

HEIGHT AND WEIGHT OF 8 PLAYERS ON DIETARY REGIME

	Mon	Tues	Wed	Thurs	Fri
Mean Weight,					
1933, kg	83.7	84.4	83.7	83.5	83.6
Mean weight 1st period, 1934 kg	79.5	80.0	79.5	79.5	80.1
			1933	1934	
Mean height, cm			186.5	183.0	
Mean surface m <sup>2</sup>			2.05	2.02	

difference attributable, directly and indirectly, to football is 5,600 - 2,800 = 2,800 cal. Subtracting ten per cent (300 cal.) for loss through the urine and feces there remain roughly 2,500 cal. attributable directly and indirectly to football playing. Since the daily practice and the

limited to the period of play, football playing would involve an increase in the metabolic rate of about fifteen times normal. But the data collected by Lusk\* indicate that the trained athlete is capable of increasing his resting metabolic rate only about ten fold in any sustained effort. While an increase of fifteen times resting metabolism may occur in a marathon race during a period of two and one-half hours, such an effort could hardly be made six days a week. We accordingly assume a metabolism during play of 800 cal. per hour.

Since the metabolism of Rubner's student during his working hours is approximately 135 cal. per hour, this represents an increased metabolism of 800 - 135 = 665 cal. per hour, i.e., 2 x 665 = 1,330 cal. per day which is directly attributable to playing football. But the increased metabolism directly and indirectly attributable to playing football is 2,500 cal. per day. This amount less 1,330 cal. directly attributable to football gives 1,170 or in round numbers 1,200 cal. increased metabolism per day indirectly attributable to football.

Accordingly, a large part (roughly one-half) of the increased metabolism attributable to football occurs after the game is over. Only a

small fraction of this can be considered as oxygen debt in the sense used by Hill and his associates<sup>7</sup> When players leave the field, their blood lactate may be as high as 100 mg per 100 cc but according to the calculations of Margaria, Edwards, and Dill<sup>8</sup> this implies an oxygen debt of only eight or ten liters, equivalent to about four per cent of the 1,200-cals excess. However, no matter what name is given to this excess oxygen consumption, it must be considered a consequence of strenuous activity. Benedict and Carpenter<sup>9</sup> studied this phenomenon. A summary of their results is shown in table 4.

TABLE 4  
HEAT PRODUCED DURING SLEEP (1 A.M. TO 7 A.M.)  
FOLLOWING DIFFERENT CONDITIONS OF ACTIVITY, AS  
REPORTED BY BENEDICT AND CARPENTER\*  
(Average per hour)

Subject	Sleep after rest	Sleep after moderate work	Sleep after severe work	Sleep after very severe work
	cals	cals	cals	cals
E O	69.3	74.8	—	—
J F S	60.4	65.3	—	—
J C W	77.2	—	83.1	—
B F D	69.8	—	83.3	—
A L L	78.3	—	83.7	97.9

\*All work ceased at least 7 hours before metabolism measurements began except in the case of very severe work in which work ceased but 1 hour before.

The same phenomenon has been studied recently by Herxheimer, Wissing and Wolff<sup>10</sup>. They find that even forty-eight to seventy-two hours after severe work the metabolism may be ten per cent above normal. While they concluded that this increase is a consequence primarily of severe work, we find that even when the work is only seven times the resting metabolic rate, with no increase in lactic acid, there is a considerable increase in resting metabolism<sup>11</sup>. Apparently,

the increase depends on quantity of work, i.e., it is a function not only of intensity of work, but of its duration also.

Table 5 contains measurements of the B.M.R. of three members of the Harvard team. They were studied shortly after being awakened on each of seven successive mornings following a game, and subsequently on the morning after the weekly game, and finally some weeks after the season was over. Then metabolism in this final study was high enough to suggest that in the above computations a value slightly higher than Rubner's<sup>5</sup> should have been employed. It is clear, however, that even fifteen hours after a game or a strenuous practice, as notably after the Thursday practice, the metabolic rate is in general distinctly elevated. Observations on subjects in this laboratory indicate that while lactic acid, alkaline reserve and other properties of the blood return to the resting level promptly, the metabolism after strenuous activity returns to normal asymptotically and slowly, the fact that it may be twenty-five per cent above normal after fifteen hours' recovery gives some clue to the elevation in earlier stages of recovery.

In lacrosse, a game similar in intensity and duration to American football, the metabolism was twenty-three per cent above its minimal value after thirteen hours and eight per cent after thirty-one hours.

The significance of these facts is twofold. The modern program of physical activity for the college student entails for many men, besides those on football teams, an unusually large caloric requirement. This means that any dietary régime based on the assumption that the college student is a sedentary person or even engaged in moderate activity is apt to be erroneous. Adequate allowance must be made for the wide range in requirement. The average requirement is meaningless, if it is supplied arbitrarily, the sedentary student will be surfeited.

TABLE 5  
RESTING METABOLISM AFTER FOOTBALL PLAYING

	Player B		Player H		Player G	
	B.M.R.	Playing time min	B.M.R.	Playing time min	B.M.R.	Playing time min
Brown, Sunday	—	25	+28	60	+25	60
Monday	+23		—		+7	
Tuesday	+19		+18		—5	
Wednesday	+10		+13		—11	
Thursday	+14		—4		—5	
Friday	+19*		+16*		—3*	
Saturday	—2		+4		—5	
Holy Cross, Sunday	+8	43	+20	33	+12	57
Dartmouth, Sunday	+34	42	+13	48	±0	52
Princeton, Sunday	—1	0	—		—7	53
Army, Sunday	+9	17	—		+25	48
New Hamp, Sunday, Nov 18	+22	16	+6	16	+5	30
January 15	+6		—4		+5	

\*Strenuous practice preceding afternoon

and the student engaged in strenuous sport will go hungry.

The other point worthy of emphasis is that the increase in resting metabolism should be taken into account in calculating the dietary requirement of a given activity. It is a common practice to determine the oxygen intake during activity and neglect the fact that hours may elapse before metabolism has returned to normal. If this were applied to football players, we might estimate that the twenty-four hour requirement is  $2,800 + (2 \times 665)$  or 4,130 cal. Our results indicate that such a calculation would be in error by about 1,500 cal, since we have presented sufficient proof to establish 5,600 as the average caloric requirement of football players.

#### CONCLUSION

From this study of the diets, weights and metabolic rates of two groups of football players we conclude that

1 The average energy requirement is 5,600 cal. per day

2 Approximately twelve per cent of this requirement is provided by protein, forty-four per cent by carbohydrates and forty-four per cent by fat.

3 On the assumption of a metabolic rate of

ten times the normal B.M.R., fifty per cent of the energy requirement of football playing remains to be accounted for after the game.

4 After physical activity has ceased the return to normal metabolism is slow and fifteen hours after activity the B.M.R. may be plus twenty-five.

5 This increased resting metabolism must be provided for.

#### REFERENCES

- 1 Woods, C. D., and Mansfield, E. H. U. S. Dept. Agr. Bull. No. 113, 1934.
- 2 Bainbridge F. A. The Physiology of Muscular Exercise. R. written by A. V. Hill, and D. B. Dill. Third Edition. London: Longmans, Green & Company, 1931.
- 3 Joslin, Elliott P. Diabetic Manual. Philadelphia: Lea & Febiger, 1931.
- 4 Bulletin of Office of Experimental Stations, U. S. Dept. Agr. April 14, 1906.
- 5 Rubner, M.: In von Leyden's "Handbuch der Ernährungs-therapie" 1: 153, 1903.
- 6 Lusk, G. The Science of Nutrition. Fourth Edition. Philadelphia: W. B. Saunders Company, 1931.
- 7 Hill, A. V., Long, C. N. H., and Lupton, H. Effect of fatigue on relation between work and speed, in contraction of human arm muscles. Proc. Roy. Soc. B 97: 14, 1924.
- 8 Marxaria, R., Edwards, H. T., and Dill, D. B.: The possible mechanisms of contracting and paying the oxygen debt and the role of lactic acid in muscular contraction. Am. J. Physiol. 106: 433, 1933.
- 9 Benedict, F. G., and Carpenter, T. M. The metabolism and energy transformation of healthy man during rest. Carnegie Institution of Washington, Publication 136, P. 163, 1910.
- 10 Herzheimer, H.; Wisinger, E., and Wolff, E. Spätwirkungen erschöpfender Muskelarbeit auf den Sauerstoffverbrauch. Ztschr. f. exp. Med. 81: 916, 1918.
- 11 Dill, D. B.; Jones, B. P., and Edwards, H. T. Le Travail Humain. 2: 1, 1934.

#### MASSACHUSETTS DEPARTMENT OF HEALTH WORCESTER CANCER CLINIC

The Worcester Cancer Clinic of the Massachusetts Department of Health has been reorganized and its work concentrated at Memorial Hospital where excellent accommodations have been placed at its disposal by the trustees and Superintendent Stone.

Its staff has been augmented by representative specialists from all the hospitals. At least three specialists will be in attendance at each session of the clinic in order that patients referred may have the benefit of group diagnosis as prescribed by the American College of Surgeons. This is a purely diagnostic clinic. Each case will be sent back to the referring doctor or hospital with a full report as to diagnosis and treatment advised.

There are no charges for this service and it is open to all classes provided applicants are accompanied by their physicians or bring referring letters from their physicians, or from hospitals or welfare organizations.

The clinics are held each Wednesday at 11 A.M. in the Out Patient building at Memorial Hospital, Belmont Street, Worcester.

This clinic does not supersede or interfere in any way with the treatment clinics maintained by the hospitals and conducted under their rules but supplements them by group diagnosis and social service.

It is hoped that physicians will avail themselves of the opportunity to observe cancer cases by being present at the clinics especially when presenting patients of their own.

Wm. F. Lynch, M.D. Secretary and Treasurer

#### ORGANIZATION

Chairman of Committee and Chief of Staff Dr. Ernst L. Hunt.

Secretary Treasurer of Committee and Staff Dr. William F. Lynch.

Members of Committee and Clinic Supervisors  
Dr. Edwin H. Trowbridge Dr. Edgar A. Fisher Dr. Michael F. Fallon, Dr. Royal P. Watkins Dr. Benjamin H. Altom

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Memorial Hospital Dr. Walter C. Seelye, Surgeon Dr. Richard Dresser, Radiologist Dr. William J. Elliott, Pathologist, Radiologist Dr. H. H. Serunian, Physician

Worcester City Hospital Dr. Frank L. Maguire, Surgeon Dr. Benjamin F. Andrews, Surgeon Dr. Percy A. Brooke, Gastro-Enterologist Dr. Raymond H. Goodale, Pathologist.

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Fairlawn Hospital Dr. Everett Jewett, Surgeon Dr. A. Brassau, Surgeon.

Clinic Social Worker Gertrude J. Carney, R.N.

Clinic Clerk Constance B. Pothier

Office Memorial Hospital, Belmont Street Worcester

Clinics Wednesdays at 11 A.M.

Telephone 42626 Extension 49

# CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C CABOT, M.D

TRACY B MALLOY, M.D, *Editor*

## CASE 21371

### PRESENTATION OF CASE

A thirty-three year old American taxi driver entered complaining of pain in the left lower quadrant

Approximately two months before entry the patient first developed a dull ache in the left lower quadrant, appearing usually upon standing and walking and relieved by lying down. The pain persisted and was relieved only when he went to bed. Upon defecation the pain radiated sharply around to the back and occasionally to the right. There was no relation of the pain to meals. About one week after the onset he noticed that his left testis had gradually become swollen and was often painful, especially when high in the scrotum. During the past month he had slight frequency during the day and nocturia. There was no dysuria or hematuria. His bowels were regular and there was no diarrhea. During the past month he noticed that the shape of his feces had been flatter. There had not been any tarry or clay colored stools and once after taking a cathartic he passed whole blood for one day. He attributed this blood to piles which he had had for at least six years. Occasionally he had a similar pain in the right lower quadrant, but this was mild and only transient. During this illness he had lost a good deal of his energy and ambition. He had lost about twelve pounds in weight. Two weeks before entry he noticed a small hard lump in the left lower quadrant. Recently it was pointed out to him at a clinic that this mass had grown in size.

His family history is non-contributory.

He had a Neisserian infection ten years before entry which was treated for about three months. Associated with this infection he had venereal warts. Three years later he had a second Neisserian infection which was followed by a chronic prostatitis. This was treated routinely twice a week for about six months.

Physical examination showed a well-developed, muscular man. The heart and lungs were negative. Just to the left of the midline in the lower quadrant was a large non-movable nodular mass, approximately 10 by 6 by 4 centime-

ters. The prostate was boggy. There was a left hydrocele.

The temperature was 99°, the pulse 78. The respirations were 20. Blood pressure was 114/74.

Laboratory examination of the urine was negative. The blood showed a red cell count of 5,510,000, with a hemoglobin of 80 per cent. The white cell count was 9,300, 76 per cent polymorphonuclears. The stools were soft, firm, blackish brown, and showed a 2 plus guaiac.

X-ray of the chest showed slight tenting of the left diaphragm in the region of the heart. A flat abdominal plate showed normal kidneys and no evidence of urinary calculi. A barium enema stopped abruptly after it had filled the rectum. The colon could not be filled beyond this point. It could not be determined whether or not the overlying soft tissue mass was intrinsic or extrinsic. An intravenous pyelogram was negative.

On the eighth day an exploratory laparotomy was performed.

He developed a few râles in the right base postoperatively. These, however, cleared up and he was discharged two weeks after operation.

He returned six days later because of marked cramps in the lower abdomen with distention. An ileostomy was performed under local anesthesia. Following operation he received fluids intravenously and was kept comfortable with opiates. He gradually went downhill and died on the eleventh postoperative day.

### DIFFERENTIAL DIAGNOSIS

DR GRANTLEY W TAYLOR. Pain in the left lower quadrant is rather apt to be more obscure and due to more diverse causes than pain in the right lower quadrant. The history brings out one brief relationship to the gastrointestinal tract, namely, that on defecation he had radiation of pain to the back, and a definite implication of the genitourinary tract in that his testis was swollen and painful and he had slight frequency and nocturia. We want more data before we can decide which one of these tracts is primarily involved in the process. The character of bleeding from the rectum must be carefully gone into as one takes a history. I think in regard to a single bleeding episode one is perhaps justified in attaching less significance to it than if it were the usual thing. We might find that it is present especially after vigorous catharsis, sometimes in relation to trauma and sometimes in relation to piles. This bleeding episode may have no significance in the clinical picture as you see it now.

The loss in weight and energy is the first indication that this is more than a purely local process. It is severe enough to involve and affect the entire individual to some extent. The

presence of a mass is the first indication we have that there is any physical abnormality except for a swelling of his testicle which was referred to farther back.

We have a very definite past history episode which might conceivably enter into the picture along with the swollen testicle, pain, frequency etc. It is worthwhile to pause for a minute and wonder if the whole picture, including the mass, could be accounted for by some complication of Neisserian infection and chronic prostatitis. Prostatitis due to Neisserian infection is very common but the number of times we see an abdominal mass associated with it is so infrequent as to be a rarity. I have never heard of it.

The history states that the mass has grown very rapidly to a rather large size. A mass of this sort you would like to be able to feel for yourself to know if it had been entirely discrete from true pelvis or whether it was barely sticking out that much from below. Whether a mass of that sort is fluctuant or hard is of considerable significance in the diagnosis. We know that it is fixed and nodular. If you had a suppurative process or an infectious process reaching that size in that space of time it seems to me it would be reasonable to look for some evidence of fluctuation. You might also find some evidence of fluctuation in a neoplastic mass that had grown to that size.

Those evidences which we have had pointing toward the urological tract, to wit the painful testicle which was swollen, the hydrocele and the slight change in urinary habits, do not necessarily mean that the primary process originated in that tract. You can have disturbances of the urinary tract of that sort from extrinsic tumors which impinge on the nerve or blood supply or lymphatic return from the region of the testicle. Hydrocele is very commonly associated with inflammatory or neoplastic processes in or about the inguinal region or in the pelvis in deep relationship to the drainage from these areas, so although the symptoms require that we investigate with some care, it does not necessarily mean we will find primary trouble in that region. The temperature of 99°, the normal pulse and the white count of 9300 with 76 per cent polymorphonuclears are the only data which will bear on the presence or absence of a primary inflammatory process. It seems to me there is no very good ground for suspecting sepsis. It does not mean, however, that it cannot be present. A chronic inflammatory process occasionally gives rise to very little in the way of reaction in the chart, especially long standing tuberculosis or long standing abscess of any cause. On the other hand we have the patient's story to the effect that this has been a rapid development, and it seems to me any inflammatory process as rapid as that would still be giving rise to considerable variations in the

chart and influencing the leucocyte count more than it is. The possible exception might be tuberculosis.

The stools were soft, firm, blackish brown and showed a two plus guaiac which would be in keeping with a lesion in the gastrointestinal tract, but on one observation a positive guaiac is not very significant, especially if the patient is not on a restricted diet. It would be consistent with the history of bleeding. We should like to know whether there were hemorrhoids present and also some statement as to the character of the rectum in so far as it was subjected to examination by the finger. We will assume that it was negative or they would have commented on it. In connection with the possibility of chronic piles or bleeding of any significance in the gastrointestinal tract, we must consider the high red count which certainly means the patient has not had chronic blood loss or any acute blood loss within recent times.

It is hard to know why a chest x ray was taken unless the condition was considered tuberculous and they were looking for confirmation of tuberculosis elsewhere in the body. Tenting of the diaphragm does not mean very much to me.

#### X RAY INTERPRETATION

DR GEORGE W HOLMES. As Dr Taylor has suggested, this is the so called tenting of the diaphragm. Sometimes, at least, these changes are due to adhesions between the diaphragm and pleura at the base of the lung, they are sometimes due to localized areas of atelectasis in the lung, sometimes unexplained. I do not think they are of any clinical importance in this case. His lungs are unusually clear. As Dr Taylor suggested, it is possible that the film was taken to rule out tuberculosis but I think it more likely that the observer had in mind the possibility of malignancy in the lung and wanted to be sure there were no metastases in the lung or mediastinum. The heart is normal in size and shape and there is no evidence of changes in the aorta. You can see the fairly well filled ureters and a small amount of dye in the bladder. This shadow is well outside the ureter and is probably a calcified gland. It is on the right side. The tumor mass that was felt was on the left side. I presume that the patient was unable to retain the enema and that the obstruction was so low that the enema was expelled before the examiner had an opportunity to take a film.

#### DIFFERENTIAL DIAGNOSIS CONTINUED

DR TAYLOR. This x ray information gives us definitely more data and tends to exempt the urinary tract as a primary focus for the process. It would be a very large tumor indeed which would give rise to obstruction high in the rectum and at the same time be felt above Poupart's

ligament, and there should be some connection between the two. We have definite stoppage of the colon between the rectum and the sigmoid. The x-ray could not determine whether it was intrinsic or extrinsic. The x-ray also points out that we are not dealing with a bone tumor in that region.

We are left with a tumor in the lower abdomen and a lesion that has caused some loss of weight, strength, etc., and it seems to me we have to make up our minds what it is. It is hard to know without further data. We should like certainly to have a proctoscopic examination. It seems to me that at proctoscopy one would have been confronted with a wall of perfectly normal, smooth, rectal mucosa, with some trouble in deciding whether the bowel lumen passed behind that wall, and whether right or left or anterior to it. Certainly there is nothing characteristic of primary new growth in the rectum or rectosigmoid region, in spite of the few things pointing in that direction. Let us consider again the possibility of an inflammatory process. Diverticulitis and that sort of thing we cannot rule in or out. Certainly the history does not disclose anything to make us think that that is the right diagnosis. Primary neoplasm, retroperitoneal sarcoma, is a kind of catch all. A tremendous number of tumors appear in that region—lymphomas, chondromas or sarcomas. We see a certain number of metastatic tumors in the pelvis from primary foci which are silent but which may give infiltration of the lymph nodes or direct tumor extension. It is possible that something of the sort is responsible for this picture. It seems to me the significant thing is the very rapid growth that the lesion has had and the relative freedom from localizing symptoms, so I should say retroperitoneal malignant tumor, possibly lymphoma, was the best bet.

The patient was explored on the eighth day. I do not know what was done. It would seem as long as there was obstruction of the colon by x-ray it might have been considered desirable to do a colostomy at that time. Certainly exploration would shed more light, but on exploration I suspect a definite diagnosis could not be arrived at unless a biopsy was removed. Undoubtedly any abdominal organs passing into the pelvis went into a dense matted mass the nature of which was obscure to the surgeon. He might or might not have removed a specimen for pathologic examination and closed the abdomen.

The ileostomy was done presumably as an emergency measure. It is interesting that his obstruction required an ileostomy rather than a colostomy. You would suppose that obstruction would be at the place pointed out by x-ray. But under novocain you take what you can and put a catheter in.

As regards the immediate cause of death in this case, we do not know but it seems unlikely that the tumor has progressed so rapidly as to cause demise. Whether he had peritonitis, whether he had ileus or dehydration, you cannot tell. I should feel that if I saw this case clinically I would not be any clearer as to diagnosis until I had seen the autopsy. I should place my bet on malignancy in the pelvis, rapidly growing, and await the pathologist to tell us the findings.

DR TRACY B MALLORY Dr Leland, you saw the patient on the wards. Have you anything to add?

DR GEORGE A LELAND, JR I saw this patient prior to both of his operations but did not operate upon him. Anybody seeing a patient in vivo certainly has an advantage over the man who tries to make the diagnosis from a sheet of paper. As one looked at this man, the likelihood of inflammatory disease did not strike one as being very probable. The mass was hard, quite completely fixed, and in a very bizarre situation. Tests were undertaken as indicated to determine as far as possible its origin, whether the urological system or the gastrointestinal tract. It was felt that any preoperative diagnosis was chiefly of academic interest because it was quite apparent that it must be some malignant condition. Exploration was undertaken with the hope of ascertaining whether or not the malignant condition might be amenable to palliation from x-ray therapy. In the Outpatient Department a diagnosis of retroperitoneal lymphosarcoma had been made. Further studies in the ward did not advance us any farther and he was explored with that preoperative diagnosis.

#### CLINICAL DIAGNOSES

Preoperative Retroperitoneal sarcoma  
Postoperative Carcinomatosis

#### DR GRANTLEY W TAYLOR'S DIAGNOSES

Malignant tumor of pelvis  
Retroperitoneal sarcoma?

#### ANATOMIC DIAGNOSES

Colloid adenocarcinoma of sigmoid with multiple peritoneal metastases  
Pulmonary edema, bilateral  
Esophagitis, acute  
Hydrothorax, bilateral  
Cholesterosis of gall bladder  
Multiple ulcers of small intestine  
Septicemia, hemolytic streptococcus

#### PATHOLOGIC DISCUSSION

DR MALLORY Dr Rogers did the exploration and found the pelvis and lower abdomen completely filled with an irregular mass of malignant tissue apparently arising from the left

posterior wall but he was unable to localize it any more accurately than that. He was still completely in the dark as to the primary source of the tumor. A piece of tumor was excised and showed colloid adenocarcinoma.

His second operation, of course, was for intestinal obstruction and although the patient died a very short time after that, within the short interval between the time of the first operation and death this malignancy had spread throughout the abdominal cavity so that the entire omentum and almost every structure in the cavity was a mass of gelatinous colloid material. The rate at which colloid carcinomas sometimes extend once they begin to grow freely in the abdominal cavity is almost incredible. Following the ileostomy a localized peritonitis had developed and I think was probably the immediate cause of death.

DR. TAYLOR Did you find the source of the carcinoma?

DR. MALLORY It was at the rectosigmoid junction, a very small portion only lying within the lumen of the bowel, not more than two centimeters in diameter. The vast majority of the tumor was lying almost free in the peritoneal cavity.

A PHYSICIAN It was ulcerated and he was bleeding from it?

DR. MALLORY Slightly, yes

## CASE 21372

### PRESENTATION OF CASE

A fifty-one year old divorced Canadian practical nurse entered complaining of sore throat of two weeks' duration.

The patient had been working on a case doing twenty four hour duty for five weeks. Two weeks before entry she developed a sore throat near the left tonsil. This was associated with pain on swallowing. A physician swabbed the throat with phenol and glycerin. She became very tired and the condition in her throat grew worse. On the fourth day she went to bed, where she stayed for two days. Two days later a physician incised her throat to allow for free drainage. During the week before admission she was very feverish and chilly although she had no definite chills. She developed a constant head ache and vomited once. The throat became very sore and she was able to take only liquid foods. Six days before admission she applied a hot water bag to her neck which resulted in a slight burn. On the evening before entry she took six allonal tablets.

Her father died of Bright's disease. Her mother and seven siblings were living and well.

She was married at sixteen and divorced at twenty-one. She had one child who died at the age of six months. There were no miscarriages.

She had measles as a child and diphtheria at

the ages of twenty five and twenty-eight. (sic) At the time of the birth of her child she developed peritonitis. For a period of fifteen years preceding the past fifteen years she had attacks of tonsillitis every spring. She had never had attacks similar to the present illness.

Physical examination showed a fairly well developed and nourished woman apparently drugged but fairly well oriented. The skin was sallow. The cheeks were flushed. The pupils were contracted and reacted very slightly. Examination of the throat showed a large area of gray ulceration with a sharply demarcated non inflammatory border over the left tonsil. Smaller and similar areas were present above the uvula and on the anterior pillar. The breath was foul. There were a few moist râles at both bases. The abdomen was slightly distended and tympanic.

The temperature was 101.2°, the pulse 100. The respirations were 22.

Examination of the urine showed a specific gravity of 1.016 to 1.020 with a slight trace of albumin and a brown test for sugar. The sediment was not remarkable. The blood showed a red cell count of 3,480,000 with a hemoglobin of 60 per cent, and a white cell count of 650. The smear showed 94 per cent lymphocytes and 6 per cent large mononuclears. There were no polymorphonuclears. The platelets were normal. Examination of the stools was negative. A smear of the left tonsillar region showed Vincent's spirochetes. The Hinton test was negative. The nonprotein nitrogen of the blood was 38 milligrams.

She was given intravenous glucose and several injections of pentnucleotide intramuscularly. Blood examinations on the second and third days showed white cell counts of 1,150 and 1,500 respectively. Both smears showed one hundred per cent lymphocytes. She failed very rapidly. The temperature rose steadily to 106°, she became irrational, developed an early cellulitis of the left arm, and died on the third day.

### DIFFERENTIAL DIAGNOSIS

DR. F. DENNETTE ADAMS The history in this case indicates that one is dealing with something more serious than ordinary sore throat. During the first few days there was apparently nothing to distinguish it from the usual case of acute tonsillitis and pharyngitis, but with this type of infection the patient should have been getting better, not progressively worse, at the end of a week. The record fails to indicate whether pus was obtained from incising the area. If we could be sure it was not, we would have an important diagnostic point. It is not uncommon in cases of agranulocytosis, even before the appearance of definite ulceration, for the throat to develop edema sufficient to be confused with the swelling of peritonsillar abscess.



The fact that the patient took six allonal tablets during the night before admission causes one to speculate as to whether she might not have had similar medication earlier in the disease. It is tempting to assume that being a nurse and consequently familiar with drugs, being tired and sick, she might well have tried to combat fatigue, insomnia and infection with this drug during the earlier stages. Allonal contains amidopyrin, which is considered by many to be a dangerous drug. It is generally agreed that in certain individuals who appear to have a particular susceptibility there is a relationship between its use and the development of agranulocytosis.

Diphtheria at twenty-five with a second attack at twenty-eight is quite possible, particularly in a nurse.

The areas of ulceration in the throat are consistent with agranulocytosis. The description does not suggest diphtheria, Vincent's angina is possible, but the patient was sicker than one would expect if only this disease were present. The râles in the chest could be simple congestion or the earliest sign of developing bronchopneumonia.

The blood count with practically total elimination of the granulocytic elements is typical of agranulocytosis. The presence of spirochetes of the Vincent type is not surprising. They are found in any type of ulcerative lesion in the mouth but not customarily in so great numbers as in the case of true Vincent's angina, where myriads are found in any smear, provided it is taken not from the surface slough but from the deeper and more active part of the lesion.

The blood culture is not reported. Septicemia might or might not be present.

The abscess on the arm is not localized in our summary. With no added information we might surmise that it came from glucose leaking into the tissues around the vein at the point of injection or from a hypodermic injection in a patient obviously lacking any resistance to infection. Failure to respond to nucleotide might be explainable on the basis of severity of the disease and the late stage at which it was administered, but opinion as to its efficacy in all cases, even if treated early, is not uniform.

The evidence in this case of acute sore throat with ulceration, marked prostration, and rapid downhill course, taken into consideration with the history of allonal ingestion, the physical findings and the blood count, is overwhelmingly in favor of agranulocytosis. Septicemia or bronchopneumonia, or both, may be present. The relationship between the disease and the use of drug containing amidopyrin cannot be stated definitely, but there is evidence sufficient to make one suspect that the drug may have been an important etiologic factor.

A PHYSICIAN Are you satisfied as to the throat cultures and examination?

DR ADAMS By that do you mean they should

have been studied for diphtheria? The type of lesion described is certainly not a typical picture of diphtheria. Cultures for diphtheria must have been taken. It is, I believe, a routine procedure on acute throat cases in this hospital.

A PHYSICIAN What about blood stream infection? Is there a possibility of that?

DR ADAMS General septicemia? Most of these patients show no positive blood cultures but some do become positive in the late stages.

DR TRACY B MALLORY A good many of them do, in my experience, though it is hard to say how large a proportion. Probably twenty-five per cent show positive cultures. Especially in the earlier cases reported several years ago there was a striking frequency of positive blood cultures with organisms ordinarily considered non-pathogenic, such as staphylococcus albus and bacillus pyocyaneus.

A PHYSICIAN How often do you find it with Vincent's?

DR MALLORY A large proportion of the cases will show Vincent's organisms in the throat.

We never did get an accurate past history in this case and we do not know how long she had been taking allonal, but I should think the deduction reasonable that one who takes six pills must be familiar with the drug. I cannot imagine anybody swallowing that many who had never taken them before. Habituation to this particular group of drugs is an extraordinarily common thing in the nursing profession, also in the medical profession and the families of medical men. Dr Hunter, who has just finished a very careful review of the literature on agranulocytosis, found, as other people have, that an overwhelming proportion, more than three fourths of the cases, have been in nurses, doctors and doctors' families. It is peculiarly a disease of the medical profession and closely related individuals. There is also a notable difference in the number of cases in different countries. Germany and America have provided the greatest number of cases, England and France, where coal tar drugs are less popular, many fewer.

#### CLINICAL DIAGNOSES

Agranulocytic angina  
Aleukemic leukemia?  
Septicemia

#### DR F DENNETTE ADAMS'S DIAGNOSES

Agranulocytosis  
Septicemia, terminal?  
Bronchopneumonia, terminal?

#### ANATOMIC DIAGNOSES

Agranulocytic angina.  
Septicemia with lymphangitis of left arm  
Ulcerative stomatitis  
Esophagitis, acute

Bronchopneumonia, early  
Endocarditis, acute, mitral  
Hydropicardium  
Arteriosclerosis Aortic and coronary, slight  
Chronic salpingitis  
Leiomyomata uteri

## PATHOLOGIC DISCUSSION

DR. MALLORY The autopsy on this patient was fairly typical of this disease. There was a terminal pulmonary infection which showed histologically fibrin, serous exudate and red cells—everything characteristic of pneumonia except leukocytes. A rather unusual finding was an ulcer in the esophagus which was very peculiar in appearance. On its surface were a lot of bright yellow granules, one millimeter to two millimeters in size, which looked like colonies of staphylococcus aureus on a blood agar plate. That in fact was what they were. Each little granule was a colony of millions of bacteria around which there was no leucocytic response at all. They were growing exactly as they do on favorable culture media.

She had an ulcer in the stomach as well which was interesting histologically for, whereas the vast majority of stomach ulcers are entirely free from bacteria, this ulcer showed a thick layer of bacteria all the way around it.

A PHYSICIAN This was not a chronic ulcer?

DR. MALLORY No, a very acute one.

A PHYSICIAN Was it something that developed during the course of the disease?

DR. MALLORY We think so.

A PHYSICIAN Were these organisms spirochetes?

DR. MALLORY No.

The bone marrow in these people presents extremely variable pictures. There are three types that I have seen. You sometimes see people dying of an acute infection with a white cell count down to 1,000 or lower, few or no polymorphonuclears in the smear, and at autopsy you find a bone marrow that is totally lacking in granulocytes but with red cell formation going on in a normal fashion. Those cases have always had, in my experience, an infection, generally a septicemia, with an organism of high virulence, such as a hemolytic streptococcus.

Dr. Jackson rules that group out and says that they are not true agranulocytosis. The leukopenia is to be regarded as secondary to a toxemia. The more typical cases, where the lesions tend to remain superficial and the organisms are of only average or low virulence, in whom you can often get a history of several recurrences of the disease and in whom we so frequently in the last two years have obtained a history of the ingestion of amidopyrin, show quite a different picture. In them the bone marrow is swarming with immature stem cells and it would be a fairly easy thing to mistake the section for one of leukemia. In fact, I am very sure that has often been done in the past. This type of case Dr. Jackson likes to compare with the bone marrow picture in pernicious anemia where red cells are being formed in more than sufficient numbers but they are not being matured to the point where they can be delivered into circulation and be useful. In true agranulocytosis the white cells are not being matured, most of them remain as stem cells, a few become myelocytes, practically none differentiate to leukocytes.

In patients that have run a somewhat longer course—this woman was in the hospital three days and had been sick for nearly two weeks, so that as cases go we can say she had reached the chronic stage—one often finds the bone marrow loaded with plasma cells. They may be so numerous that the sections may raise a question of a diagnosis of multiple myeloma. Such a picture is rarely seen in cases dying within the first four or five days of the disease but becomes common in those lasting seven days or longer.

A PHYSICIAN What is the feeling here about the use of liver extract in treatment?

DR. MALLORY None of us here can see any logic in it.

A PHYSICIAN Why would not a transfusion have helped her?

DR. MALLORY The local experience here has been that transfusions do not help. We have seen a number of bad reactions and no good results. It has become a matter of policy not to use them. It is only fair to admit, however, that any one person can see only a small number of these cases and hence is hardly justified in coming to a dogmatic conclusion. That just happens to have been our experience here.

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## LEAD THERAPY OF CANCER

THE *New York Times*, under date of August 21, 1935, reports an attempt to revive the long-quiescent use of lead in the treatment of cancer. The paper was read by a group from the Mayo Clinic before the American Chemical Society. It is certainly unfair to say that the excellent facilities for publicity afforded by the presentation of a paper before such a gathering had anything to do with the choice of audience. But it is unfortunate to present material of interest to thousands of sufferers before a group which, by virtue of divergent interests and training, is incapable of thoroughly criticizing and evaluating it.

Whereas material of primarily chemical nature is properly treated before a group of chemists, a paper which apparently emphasizes chiefly the results of therapy, particularly in such a disease as cancer, seems definitely out of place. In this instance presentation before a group

interested and experienced in cancer treatment would be far more valuable.

As far as one can judge from the quotation in the newspaper seven cases of eighty-five, all inoperable, improved with lead treatment alone. The investigators do bring out the fact, established years ago, that unless lead therapy is pushed to the point of toxic symptoms, little in therapeutic results may be expected.

Following Blair Bell's initial announcement, some ten years ago, lead therapy was taken up in various centers and carefully scrutinized. Little value, however, has been derived from the use of this form of treatment in the past. When one considers the dangerous and painful effects of acute lead poisoning, considerable hesitancy is indicated before using such an uncertainly helpful and surely dangerous substance.

It is indeed to be regretted that such wide spread publicity has attended a report which encourages the wider use of lead compounds in cancer therapy. If and when details of the procedures of Osterberg, Borgen, and Horton are presented before medical groups or published in periodicals seen by physicians it may be possible to evaluate the importance of their contribution. We all hope they have made a step forward in the struggle against the disease. For the present, at least, the general reluctance to use lead compounds in treating cancer should continue.

## THE INTERN AND INSURANCE

RECENT reports are to the effect that the Intern Council of Greater New York has sought legislative action to provide for interns appropriate compensation and proper "insurance protection in case of mishap, disability or death suffered in line of duty." The movement has been characterized as an enlightened protest against the exploitation of the intern and is to be taken as another sign of the growing self-consciousness of this group of young physicians. The implication is that because they are hospital employees the cost of such insurance should be borne by the institution. Thus the burdens of the hospital administrator are becoming more onerous almost daily, but there is here a problem that deserves most careful and thorough study.

Again, the legal status of the activities of the intern is not always clear. Is he practicing medicine? Is he licensed so to do? Is he subject in every way to the provisions of the medical practice act? Is he responsible as any other physician in all civil matters involving his profession and in all the laws of the state pertaining to the practice of medicine, including malpractice?

That the intern is substantially practicing medicine is clear. Whether he does so in the legal sense is not always so clear. Physicians may and do delegate to unlicensed persons certain tasks which otherwise the physicians themselves would perform. Which of these tasks are the practice of medicine? It is because there were delegated to interns many duties, performed in the absence of the registered physician and involving the assuming of certain responsibility by the intern, that it was thought best in Massachusetts to protect hospitals and medical staffs and interns by specific license of this third group.

The restrictions under the statute are as follows: "But such limited registration (as intern) shall entitle the said applicant to practice medicine only in the hospital or other institution designated on his certificate of limited registration, or outside such hospital or other institution for treatment, under the supervision of one of its medical officers who is a duly registered physician, of persons accepted by it as patients and in either case under the regulations established by such hospital or other institution."

Under the license he is subject to every provision of the medical practice act, and all the laws of the Commonwealth pertaining to the practice of medicine, including malpractice.

But he is an officer of the hospital and an employee and certain of his acts are in this capacity. For example, he does not need an individual narcotic permit if the hospital is duly registered under the narcotic regulations. As an officer of a charitable institution he is protected against certain claims by law. What protection has he if he is dealing with a patient who is not a charity patient?

His position differs, however, from that of the physician not an intern in that he is in part an agent and may be called upon to perform acts on which he is not competent to pass judgment medically. The visiting physician has left an order which he carries out to the best of his ability. Some sort of disaster occurs and suit is brought against him for malpractice.

Should the intern be protected by insurance? Should the hospital or the medical staff or the intern pay for such insurance? The answer will depend in part on the laws of the state. However, this should be kept in mind. Insurance against malpractice suits is one of the most certain ways to stimulate such suits. The purpose of these suits generally is to obtain a financial salve for a real or imaginary harmful result of the action of the agent. If the agent has no money, he cannot pay money and suit is not likely. If it is generally known that a wealthy insurance company is back of the intern a lawsuit may be an appealingly easy way to get some of the company's money. Certainly suits for malpractice have enormously increased

since insurance companies have entered the field in defending physicians and paying damages.

The value of such an organization as has been set up in New York will depend on what it does. It is capable of much good. It is capable of much harm. *Pessima corruptio optimae*. It may be that interns in seeking protection would expose themselves to a greater evil.

## BOSTON HEALTH LEAGUE

### ACTIVITIES OF THE PAST YEAR

The activities of the Boston Health League in promoting better health conditions in Boston during the past year were summarized by the reports of its various committees at the annual meeting of the Corporation late in May.

The health education committee has approved the formation of an Advisory Committee on Health Education for the City Health Department.

Mention has previously been made of the republishing and revising of the bulletin of the Summer Camp Committee. Over four hundred of these bulletins have been distributed. The Educational Committee on Cancer has as usual been very active, distributing much literature and arranging for educational talks on cancer. A social study of cases in each of the seven cancer clinics is now in progress.

The Committee on Social Hygiene has continued to sponsor the staff council on syphilis and gonorrhea and the consultation service of the Massachusetts Society for Social Hygiene. It is coöperating with the Massachusetts Society in the Boston aspects of a study of social hygiene instruction in the educational system.

Domiciliary medical care has been under considerable discussion during the past year, and the Committee on Techniques and Standards has recommended that a continuing committee on Domiciliary Medical Care for the Sick Poor of the City of Boston be organized as an integral part of the newly formed Hospital Council of Boston.

The Committee on the Needs of Ward Nine, where health conditions among the Negro population have been so unsatisfactory, sponsored an exhibit on nutrition in the fall. The Committee on Pneumonia has continued its efforts to reduce mortality from lobar pneumonia by urging prompt nursing care, and calling attention to the fact that the Community Health Association gives nursing service on a visit basis to persons not needing or unable to afford a full time nurse.

It is apparent that the Boston Health League is continuing to fulfill the important functions for which it was formed, to advise to educate and to coordinate.

## THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

CHAFFEE, E L S B, A M., Ph D Gordon McKay Professor of Physics and Communication Engineering, Harvard University His subject is "The Physics of High-Frequency Currents as Used in Medicine—Diathermy, Radiotherapy and the Electric Knife" Page 505 Address 130 Goden Street, Belmont, Mass

BIERMAN, WILLIAM M D Columbia University College of Physicians and Surgeons 1917 Attending Physical Therapist, Mt Sinai Hospital, New York, and Sydenham Hospital, New York. Lecturer, Physical Therapy, Department of Therapeutics, New York University Medical School Instructor in Surgery (Physical Therapy) Columbia University, New York Address 471 Park Avenue, New York City Associated with him is

SCHWARZSCHILD, MYRON B A., M A Physicist, Beth Israel Hospital, New York Address Beth Israel Hospital, New York City Their subject is "The Therapeutic Use of Short Wave Currents" Page 509

CARTY, JOHN R B S, M D Cornell University Medical College 1921 Associate Professor of Radiology, Cornell University Medical College Radiologist-in-Chief, New York Hospital His subject is "Diagnostic Possibilities in Soft Tissue Radiography" Page 517 Address New York Hospital, 525 East 68th Street, New York City

REGAN, JAMES J M D Tufts College Medical School 1913 Ophthalmic Surgeon-in-Chief, Boston City Hospital School Physician assigned to Ophthalmology, Boston Public Schools Assistant Professor of Ophthalmology, Tufts College Medical School His subject is "Routine Vision Testing of School Children, A Plea for Standardization" Page 519 Address 520 Commonwealth Avenue, Boston

BOOS, WILLIAM F A B, Ph D, M D Harvard University Medical School 1901 Former Instructor in Chemistry, Harvard University, and Assistant in Hygiene, Harvard University Medical School Now, Toxicologist for State of Massachusetts and other States, and Lecturer on Toxicology, Harvard University Medical School Address 196 Beacon Street, Boston Associated with him is

WERBY, A. BENJAMIN B S, Massachusetts Institute of Technology 1911 Chemist, Research Laboratories New York and Boston Address 88 Broad Street, Boston Their subject is "Arsenic in Human Tissues and Food Animals I So-Called Normal Arsenic" Page 520

SPINK, WESLEY W A B, M D Harvard University Medical School 1932 Assistant Resident Physician, Thorndike Memorial Laboratory, Boston City Hospital Assistant in Medicine, Harvard University Medical School Address Thorndike Memorial Laboratory, Boston City Hospital, Boston Associated with him is

AUGUSTINE, DONALD L Sc D Johns Hopkins School of Hygiene and Public Health 1923 Assistant Professor of Helminthology, Harvard University Medical School Address Harvard University Medical School, Boston Their subject is "Trichinosis in Boston" Page 527

MORRISON, HYMAN A B, M D Harvard University Medical School 1908 Professor in Clinical Medicine, Tufts College Medical School Visiting Physician, Beth Israel Hospital. His subject is "Trichiniasis Among Jews" Page 531 Address 483 Beacon Street, Boston

EDWARDS, H T A A Harvard University 1927 Assistant, Fatigue Laboratory Address Fatigue Laboratory, Morgan Hall, School of Business Administration, Harvard University Medical School, Boston. Associated with him is

THORNDIKE, A, Jr M D Harvard University Medical School 1921 F A C S Surgeon Department of Hygiene, Harvard University Medical School Assistant in Surgery, Harvard University Medical School Associate Surgeon, Children's Hospital, Boston, Milton Hospital, Milton, and New England Baptist Hospital, Boston Consulting Surgeon, Massachusetts Hospital School, Canton Address 319 Longwood Avenue, Boston Associated with him is

DILL, D B Ph D Stanford University 1925 Assistant Professor of Biological Chemistry, Harvard University Medical School Address Fatigue Laboratory, Morgan Hall, Soldiers Field Station, Boston Their subject is "The Energy Requirement in Strenuous Muscular Exercise" Page 532

## MISCELLANY

SCREW WORM LOSSES CHECKED IN THE  
SOUTHEASTERN STATES

The screw worm made practically no gains in the Southeastern States during August. But the lull in its activity that occurs about the first of September if the weather is hot and dry does not mean the pest has quit for the season, says Dr F C Bishopp of the Bureau of Entomology and Plant Quarantine. When the weather is cooler and more rain falls, the screw worm flies will be back with renewed energy. They will remain aggressive until low temperatures of late fall or early winter drive them to hibernate.

Recent reports to Doctor Bishopp, who is in charge of the control campaign financed with a special appropriation of \$480,000, refer especially to infestation of animals.

Screw worm cases among human beings are not

uncommon in many parts of the South. Twenty-five such cases have been reported during the present season. People with exposed sores or wounds Doctor Bishopp says, take a long chance when they sleep out in the open with no protection against the screw worm fly. The screw-shaped worms that hatch from the eggs laid by the adult flies can soon turn a tiny scratch into a large deep wound. Sometimes the flies lay their eggs in the nasal pas-

sages of people suffering from catarrh or a nose injury. Swelling and soreness always accompany the activity of the worms that hatch from these eggs. The swelling or soreness of the nose of a person who has been exposed to fly attack is a signal to seek competent medical advice. These small burrowing worms have been known to destroy the bridge of a person's nose.—Excerpt from the *Bulletin of the Department of Agriculture*

# ANTERIOR POLIOMYELITIS CASES FOR 1935

## WEEKLY LIST

City or Town	January May	June	July	August	September 3-7	Total to Date for Year
Attleboro	0	0	0	1	2	3
Brewster	0	0	0	2	0	2
Fall River	0	0	6	66	15	87
Falmouth	0	0	0	1	0	1
New Bedford	0	0	0	4	1	5
Plymouth	0	0	0	1	0	1
Somerset	0	0	0	3	1	4
Swansea	0	0	0	1	1	2
Taunton	0	0	0	0	1	1
Truro	0	0	0	1	0	1
Wareham	0	0	0	1	0	1
Westport	0	0	0	3	0	3
Braintree	0	0	0	1	2	3
Brockton	0	0	0	5	0	5
Dedham	0	0	0	2	0	2
East Bridgewater	0	0	0	0	1	1
Hopkinton	0	0	0	1	0	1
Millis	0	0	0	1	0	1
Milton	0	0	0	0	1	1
Natick	0	0	0	0	1	1
Norwood	0	0	0	0	2	2
Quincy	0	0	0	4	1	5
Scituate	0	0	0	4	1	5
Stoughton	0	0	0	0	1	1
Weymouth	1	0	1	2	1	5
Arlington	0	0	0	2	2	4
Belmont	0	0	0	2	1	3
Boston	0	1	19	176	46	242
Brookline	0	0	0	2	1	3
Cambridge	1	0	1	18	14	34
Chelsea	0	0	0	11	3	14
Concord	0	0	0	1	0	1
Everett	0	1	1	9	2	13
Lexington	0	0	0	1	0	1
Malden	1	0	0	5	4	10
Medford	0	0	0	8	2	10
Melrose	0	0	0	3	2	5
Newton	0	0	0	3	3	6
Revere	0	0	0	2	4	6
Somerville	0	0	0	11	4	15
Waltham	1	0	2	9	6	18
Watertown	0	0	1	7	1	9
Wellesley	0	0	0	0	1	1
Winthrop	0	0	0	5	0	5

City or Town	January- May	June	July	August	September 3 7	Total to Date for Year
Amesbury	0	0	0	3	0	3
Andover	0	0	1	1	1	3
Beverly	0	0	1	11	0	12
Billerica	0	0	0	3	1	4
Danvers	0	0	0	2	0	2
Dracut	0	0	0	0	4	4
Gloucester	1	0	0	3	0	4
Hamilton	0	0	0	0	1	1
Haverhill	0	0	1	18	6	25
Ipswich	0	0	0	3	0	3
Lawrence	0	1	3	1	1	6
Lowell	0	0	3	16	6	25
Lynn	0	0	2	5	2	9
Manchester	0	1	0	2	0	3
Marblehead	0	0	1	0	0	1
Methuen	0	0	0	0	1	1
Middleton	0	0	0	1	0	1
Newburyport	0	0	0	3	2	5
North Andover	0	0	0	4	0	4
Peabody	0	0	0	1	0	1
Salem	0	0	0	1	0	1
Saugus	0	0	0	2	0	2
Swampscott	0	1	0	1	0	2
Wakefield	0	0	0	1	0	1
Westford	0	0	0	1	0	1
Woburn	0	0	0	0	1	1
Blackstone	0	0	0	1	0	1
Fitchburg	0	0	0	6	3	9
Marlboro	0	0	0	1	0	1
Millford	0	0	0	0	1	1
Millbury	1	0	0	0	0	1
Northbridge	0	0	0	1	0	1
Shrewsbury	2	0	0	0	0	2
Templeton	0	0	0	1	0	1
Uxbridge	0	0	0	3	0	3
Westboro	0	0	0	2	0	2
Worcester	0	0	1	4	2	7
Chicopee	0	1	0	0	0	1
Ludlow	0	0	0	0	1	1
Northampton	0	0	1	0	0	1
South Hadley	0	0	0	0	1	1
Springfield	0	0	1	2	6	9
Greenfield	0	0	0	1	0	1
Pittsfield	0	0	0	1	1	2
Becket	0	0	0	1	0	1
Total	8	6	46	486	169	715

## CASES FOR SEPTEMBER BY DAYS

September	3	4	5	6	7	Total
Cases	26	35	46	22	40	169

## CASES BY WEEKS

Week Ending August 3	47
10	72
17	116
24	109
31	163
September 7	169

Three cases reported during August have been revoked, one from Cambridge, one from Fall River and one from Malden

## ORGANIZED MEDICINE GOES ON THE AIR

A copy of an announcement which will appear in *Hygela* for October 1935 is appended

This is evidence of the purpose of organized medicine to furnish practical instruction for use by the laity when confronted by emergencies of a medical nature. In order to promote the greatest possible interest in this movement physicians may have, displayed in their offices copies of this announcement. A few copies for distribution are in the office of the Boston Medical Library. State Medical Societies may bring this information to the public through announcements in the daily newspapers.

This plan is worthy of medical endorsement

### DRAMATIZED RADIO PROGRAMS FOR MEDICINE AND HEALTH!

your health

ladies and gentlemen

This toast—through the music—each Tuesday at 5 00 P.M. Eastern Standard Time (4 00 P.M. Central Standard Time 3 00 P.M. Mountain Time) will introduce the new radio program of the American Medical Association. It will be offered over the Blue network of the National Broadcasting Company beginning October 1 1935. With the cooperation of the National Broadcasting Company a new type of program in vivid dramatic form with incidental music, is being developed, showing

medical emergencies and how they are met!

The hero of the medical emergency the doctor who is available day and night for the protection and promotion of YOUR HEALTH is the real sponsor of this series of practical and entertaining health broadcasts

Each Tuesday—

“ ladies and gentlemen  
your health

BLUE NETWORK, N B C WJZ—WSYR—KDKA  
—WKCY — WENR — WIBA — KSTP—WIBC  
KFYR — KWCR — WREN — KWK — KSO —  
WBAL — WMAL — WTAR — WPTF — WYNC  
WBOC — WIS — WSM — WMC — WJDX —  
KVOO — WKY — WFAA — KTBS — WOAI—  
(Preprinted from *Hygela*, the Health Magazine  
October 1935)

## CORRESPONDENCE

### AN EXTRAORDINARY MEDICAL RECORD

Editor *New England Journal of Medicine*

The following quotation is from *The Countryman* a remarkable magazine published quarterly in London. It is full of the most unusual items among them many concerning medical history and I hope that physicians interested in unusual notes on the history of medicine and natural history may perhaps see it and derive as much pleasure from it as I have done. The quotation is from the current issue July-September 1935

### A REMARKABLE INSCRIPTION

I have preached in the chapel at Loughborough in the graveyard of which I copied the following inscription nearly forty years ago. I have also preached at the chapel at Wimeswold mentioned on the gravestone.

“ In Memory of Sarah Johnson who died August 4th 1819 aged 28

S Johnson was tapped for Arcites 28 times 6 operations by Dr Vicars 12 by Mr Brown of Wimeswold

Here follow in ruled columns the quantities in gallons quarts and pints

“Total in six years 310 gallons 1 quart 1 pint.

Kenneth Bond.

Surely this seems an all time record

Very truly yours

WM PEARCE COUES M.D

Prouts Neck, Maine,

September 5 1935

### ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON PHARMACY AND CHEMISTRY

535 North Dearborn Street, Chicago III

September 5 1935

Managing Editor *The New England Journal of Medicine*

In addition to the articles enumerated in our letter of July 31 the following have been accepted

Health Products Corporation

White's Cod Liver Oil Concentrate (Liquid)

White's Cod Liver Oil Concentrate Capsules  
3 minims

White's Cod Liver Oil Concentrate (Liquid)  
Vials 50 cc.

Hoffmann-La Roche Inc

Larycaline Hydrochloride

Lederle Laboratories Inc.

Cod Liver Oil Concentrate Liquid (Lederle)

Cod Liver Oil Concentrate Liquid (Lederle)  
Vials 5 cc

Cod Liver Oil Concentrate Liquid (Lederle)  
Capsules 3 minims

Diphtheria Antitoxin Globulin—Lederle—Modified

Erysipelas Streptococcus Antitoxin “Globulin—  
Lederle—Modified

Tetanus Antitoxin “Globulin—Lederle—Modified

Wm S Merrell Company

Ampoules Solution Dextrose 50% 20 cc.

Ampoules Solution Dextrose 50% 50 cc.

Parke, Davis & Co

Diphtheria Toxoid—P D & Co., one 0.5 cc vial  
package

Diphtheria Toxoid—P D & Co., one 5 cc. vial  
package

Diphtheria Toxoid Alum Precipitated—P D &  
Co., one 0.5 cc. vial package



- 10 A M to 12 Noon Dry Clinic Elliott Hospital  
 12 30 P M Luncheon—Elliott Hospital  
 2 P M Scientific Program Ballroom—Hotel Carpenter  
 5 P M Tea.  
 7 P M Annual Dinner Manchester Country Club

SATURDAY, SEPTEMBER 28, 1935

- 9 A.M Annual Meeting of the Society Ballroom—Hotel Carpenter  
 9 30 A M to 12 30 P M Scientific Program Ballroom—Hotel Carpenter

### SCIENTIFIC PROGRAM

Ballroom, Hotel Carpenter

FRIDAY AFTERNOON, SEPTEMBER 27, 1935

- 1 "Malignancy of the Breast" Dr H Gildersleeve Jarvis  
Discussion Dr Channing Simmons, Dr Robert B Greenough
- 2 "Results in Mammary Carcinoma at the Elliott Hospital" Dr George C Wilkins, Dr George F Dwinnell—by invitation  
Discussion Dr Robert B Greenough, Dr Channing Simmons
- 3 "Secondary Carcinomata of the Large Bowel" Dr Edward L Young, Jr  
Discussion Dr Daniel F Jones, Dr Lucius C Kingman
- 4 "One Hundred Untreated Cancers of the Rectum" Dr Ernest M Daland, Dr Claude Welch—by invitation, Dr Ira Matheson—by invitation  
Discussion Dr Lyman Allen, Dr Walter C Seelye
- 5 "Stones in the Common and Hepatic Bile Duct." Dr Frank H Lahey  
Discussion Dr Richard H Miller, Dr Ralph B Ober
- 6 "Inflammatory Sclerosis of the Bile Ducts" Dr Horace K Sowles  
Discussion Dr Donald S Adams, Dr Carl M Robinson
- 7 "Surgical Complications of the Salmonella Suppurer" Dr Irving Walker  
Discussion Dr Samuel C Harvey, Dr John F Gile
- 8 "Congenital Diaphragmatic Hernia in Children" Dr Philemon E Truesdale  
(To be read by title)

### SCIENTIFIC PROGRAM

Ballroom, Hotel Carpenter

SATURDAY MORNING, SEPTEMBER 28, 1935

- 1 "A Form of Sclerosing Osteomyelitis following Fractures of the Long Bones" Dr Paul P Swett  
Discussion Dr James W Sever, Dr Robert B Osgood

- 2 "Statics of the Foot in Relation to Surgery" Dr Frederic J Cotton  
Discussion Dr Carleton R Metcalf, Dr Ezra A. Jones
- 3 "DeQuervain's Disease and Carpal Ganglia" Dr Daniel C Patterson  
Discussion Dr George R Anderson, Dr James B Woodman
- 4 "Certain Aspects of Hand Surgery" Dr Torr W Harmer  
Discussion Dr Edward H Risley, Dr Allen G Rice
- 5 "Congenital Absence of the Pericardium." Dr William E Ladd  
Discussion Dr Thomas H Lanman, Dr David W Parker
- 6 "Urologic Aspects of Vesico Vaginal Fistula" Dr William C Quinby  
Discussion Dr Frank A Pemberton, Dr Stephen Rushmore
- 7 "Acute Arterial Obstruction with Arteritis" Dr Howard M Clute  
Discussion Dr Arthur W Allen, Dr John Homans
- 8 "Personal Experiences with Cancer of the Bladder" Dr J Dellinger Barney  
(To be read by title)
- 9 "Reconstruction of the Vagina from a Portion of the Sigmoid, Report of a Case" Dr Herman C Pitts  
(To be read by title)

### SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

#### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, SEPTEMBER 16, 1935

Wednesday, September 18—

112 M Clinico-Pathological Conference Children's Hospital

Saturday, September 21—

\*10-12 Staff rounds at the Peter Bent Brigham Hospital

\*Open to the medical profession

†Open to Fellows of the Massachusetts Medical Society

September 17, 18, 19—Eleventh Clinical Congress of the Connecticut State Medical Society For details address Dr Creighton Barker, 129 Whitney Avenue, New Haven, Conn

September 27 28—New England Surgical Society See page 549

September 30 October 12—International Medical Post-Graduate Courses in Berlin For further information apply to the Geschäftsstelle der Berliner Akademie für ärztliche Fortbildung Robert Koch—Platz 7 (Kaiserin Friedrich Haus), Berlin N W 7

October 6 20—Seventh Annual Training Course For Medical Reservists at the Mayo Clinic See page 441, issue of August 29

October 7-10—American Public Health Association will meet in Milwaukee Wisconsin For information address the American Public Health Association, 50 West 50th Street New York City

October 14 19—Inter-State Postgraduate Medical Association of North America See page 549

October 21 November 2—1935 Graduate Fortnight of the New York Academy of Medicine See page 898, issue of May 9

October 28 November 1—The Twenty-Fifth Clinical Congress of the American College of Surgeons See page 1065, issue of May 80

# The New England Journal of Medicine

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NUMBER 12

## THE TREATMENT OF COMPOUND FRACTURE OF THE SKULL\*

A Study of 185 Cases

BY DONALD MUNRO, M.D.†

**INTRODUCTION** Compound fracture of the skull occurs in roughly 105 per cent of all cases of skull and brain injury. In a group of approximately 900 head injuries, it is only one per cent less frequent than subdural hematomas and the two together comprise 22 of the 29 per cent of cranial injuries that require operative therapy. Such a large group of patients justifies more interest than has been accorded them in the past. It is the purpose of this paper to present figures which will demonstrate that such increased interest pays dividends in the form not only of lowered mortality but also of a great decrease in morbidity.

A review of the literature for the past ten years yields only one paper given over to an adequate exclusive consideration of the subject. This was written from Germany. The authors analyzed 169 cases treated over a period of twenty-three years. Their mortality (41 per cent) and morbidity (11 per cent) rates are high for this reason. The earlier poorly treated cases are not separated from the later ones which were operated upon under modern conditions and by modern methods except in a late result series of posttraumatic epileptics. Here the incidence was 6 per cent in the group treated by a modern closed débridement method as opposed to 12 per cent in a group of about the same size treated by the old open packed wound method. Operation in the first twelve hours with complete mechanical débridement and closure without drainage except where the frontal sinus is involved is urged. Grant<sup>1</sup> on the other hand advises only a modified débridement of the dura and brain only if cerebrospinal fluid is leaking. He drains all wounds. Nelson's Loose Leaf Surgery<sup>2</sup> does not list "compound fractures of the skull" in the index. What text there is on this subject is under "depressed fractures." Homans<sup>3</sup> gives the subject a short paragraph advocating débridement in six hours with out drainage. If done later the cortex should be drained. In Lewis' Surgery<sup>4</sup> prompt

débridement (within twelve hours) without drainage is advised. Large free fragments of bone are replaced if removed within this time after the accident. Other authors<sup>5, 6, 7, 8, 9</sup> discuss the subject from the point of view of experience with a single case or as one that requires no explanation.

**The Mortality Rate** This paper is based on a series of 185 cases that have been collected from the records of the Boston City Hospital. Ninety-six of these were treated on the general surgical services in the thirteen years from July, 1922 to July, 1935. The remaining eighty-nine were treated on the neurosurgical service of the same institution during the five years from July, 1930 to July, 1935. The cases from the general surgical services were treated in a variety of ways. These included no operation, cleaning and sewing the scalp wound only, débridement of scalp wound only with drainage, and débridement of the scalp wound with varying degrees of débridement of the bone and rarely also of the dura but practically never of the brain. No cases were treated until they were out of surgical shock. The diagnosis was usually made by inspection with instrumental palpation through the wound. More recently though, palpation by the operator's gloved finger has replaced this method to a great extent. The operative technique varied greatly with the individual surgeon but it was only rarely that an adequate débridement was performed and even less rarely that a wound was closed without drainage. Where the scalp wound was treated at all on admission it was always shaved, scrubbed and mechanically cleansed at once. Such practices, however, may be fairly taken to represent an average cross section of the general surgical methods in use at the present time. By contrast, on the neurosurgical service all cases were theoretically diagnosed and treated by one standard method to be described in detail below. Any variation, when it occurred has been recorded against the outcome of the case as a technical error and has been duly considered in evaluating the results.

In the consideration of the comparative mortality of these two groups it became at once ap-

\*From the Neurosurgical Service of the Boston City Hospital.

†Munro, Donald—Surgeon in charge of the Neurosurgical Service, Boston City Hospital, Boston. For record and address of author see "This Week's Issue" page 146.

parent that true treatment mortality could only be ascertained after the elimination of those cases that were so severely injured on admission that all active treatment was out of the question. Therefore the admissions that died without treatment within twenty-four hours have been segregated from the rest of the group. This permits the compilation of mortality rates from two points of view for each series (Table 1).

resultant adherent scars between scalp and cortex, are considered inevitable consequences of this type of injury. These are all in fact the immediate end results of wound infection. The morbidity from sepsis in both series was therefore compared. The figures include only those patients that left the hospital alive as it was felt that these were the only cases in whom an accurate diagnosis of postinjury or postoper-

TABLE 1  
GENERAL MORTALITY

	Total	Living	Dead	24 Hour Deaths Untreated	Mortality	
					Whole Series	Without 24-Hour Deaths
Total Series	185	104	81	52	43.7%	21.8%
B C H Series	96	44	52	35	54.1%	27.8%
N S Series	89	60	29	17	32.5%	16.6%
Wanke and Weselmann*	169	100	69	49	40.8%	16.6%
Theoretically Possible Figures	89	68	21	17	23.5%	5.5%
Permissible Figures					25.0%	10.0%

\*The number of untreated twenty-four hour deaths and the corresponding mortality percentage are only approximate in this group.

Based on the total number in each group the mortality rate in the general surgical series was 54 per cent as opposed to 31 per cent on the neurosurgical service, a difference of 23 per cent. With the cases which died in twenty-four hours eliminated, the difference is still 10.3 per cent lower in the neurosurgical group (17.5 per cent as compared with 27.8 per cent) though these totaled seventy-four cases as opposed to sixty-one and in spite of the fact that no case regardless of condition was refused treatment. It should be pointed out that all diagnoses in both groups that were unconfirmed either by operation or direct examination of the wound were verified in case of death through the courteous cooperation of Dr Timothy Leary, Medical Examiner of Suffolk County.

*The Morbidity Rate* The mortality rate in compound fractures of the skull is only half the story, however. Leaving out of consideration all problems of end-results beyond the actual period of hospitalization, the question of postoperative and postinjury sepsis must still be dealt with. It is well recognized that meningitis, encephalitis, intracranial abscess and healing of the scalp wound by granulation with

active sepsis could be made (Table 2). In both groups all wounds were considered septic that did not heal by first intention. In case drainage was inserted only the healing of the wound exclusive of the opening of the drainage tract was considered. The difference of approximately 52 per cent in the operated cases and 30 per cent in the non-operated cases speaks strongly in favor of the standardized method of treatment as a means of reducing the morbidity.

*Operative Mortality and Morbidity* Any consideration of a surgical procedure that involves operative interference must also include a study of the mortality and morbidity inherent in it. Again let me emphasize that the figures included herewith concern themselves only with mortality and morbidity during the patients' hospital stay. Table 3 summarizes these figures from both series and also includes the percentage of operated cases. In spite of the fact that more than 70 per cent of the neurosurgical patients were operated upon as opposed to less than one-half of those admitted on the surgical side, the operative mortality of the former is about 10 per cent below the latter, while the morbidity from sepsis has been reduced by more

TABLE 2  
ANALYSIS OF MORBIDITY

	Total Treated	Operated				Not Operated			
		Total	Clean	Septic	% Sepsis	Total	Clean	Septic	% Sepsis
Total Series	104	85	58	27	31.7	19	10	9	48.2
B C H Series	44	32	12	20	65.6	12	5	7	58.3
N S Series	60	53	46	7	13.2	7	5	2	28.6
Theoretically Possible Figures	60	53	53	0	0.0	7	5	2	28.6

than 50 per cent. It seems fair to conclude therefore that well-conceived operative therapy will not only of itself lower the death rates but will also, if properly carried out, reduce the occurrence of postoperative sepsis from three out

after their injury. The corollary to this is as pointed out below, that immediate emergency treatment of compound fracture of the skull is not only unnecessary but is actually dangerous. The one death from hemorrhage occurred on the

TABLE 3  
OPERATIVE MORTALITY AND MORBIDITY

	Total Operated	% Operated	Dead	% Mortality	Sepsis	% Sepsis
Total Series	108	58.3%	28	21.4%	48	44.4%
B C H Series	44	45.8%	12	27.2%	33	75%
N S Series	64	71.9%	11	17.4%	15	23.4%
Wanke and Weselmann*	162	95.8%	62	38.2%	17	10.3%
Theoretically Possible Figures	64	71.9%	3	4.6%	1	1.5%
Permissible Figures				10.0%		5.0%

\*The figures and percentages of operation and sepsis are only approximate in this group

of four cases to slightly more than one out of five cases

*Analysis of Deaths* A final test of the justification of a method of treatment and a corollary to the analysis in the preceding paragraph is found in a detailed study of the causes of death. Table 4 gives a tabular view of such figures in these two groups. It is in the main self-explanatory and needs emphasis only in one or two points chiefly because of their bearing on what

table and resulted from an inadequate appreciation of the dangers inherent in a fracture which crosses a cranial venous sinus. The deaths due to pneumonia and heart failure are self-explanatory.

*Treatment* In dealing with any method of treatment of compound fracture of the skull it is essential that certain fundamental principles be recognized and followed. These are both general and specific in nature. In general the oper-

TABLE 4  
ANALYSIS OF DEATHS

	Total Treated	Operated		Not Operated		Sepsis			Causes of Death Operative			Miscellaneous			
		Clean	Septic	Clean	Septic	Meningitis	Brain Abscess	Sepsis	Medullary Edema	Surgical Shock	Hemorrhage	Diagnosis Missed	Extradural Clot	Pneumonia	Heart Failure
B C H Series	17	6	6	2	3	5	2	1		5		2	1		
N S Series	12	3	8	1		5	3		2		1			1	1

follows. The first and most important is the fact that in the general surgical services three cases died because the diagnosis was missed, two from the effects of the compound fracture and one from an extradural clot. The first two did not come to operation at all while the third was operated upon but so incompletely that the source of the clot was not recognized even then. The obvious implication is that the diagnostic methods as used on the general surgical services were inadequate. The second point has to do with immediate postoperative deaths. The majority of these were from surgical shock and occurred within twenty-four hours after the operation while medullary edema at a somewhat later time accounted for the others. The ratio of five to two emphasizes the fact that these patients were operated upon too soon

ator must always bear in mind that he is dealing not alone with a lesion of the bony covering but that the scalp, the meninges and the brain are all also always involved. If this conception is held firmly in mind the requirements of any method of treatment will be more apparent. Further more he must for his own protection locate the bony lesion in relation to the large cranial venous sinuses and also in relation to the frontal air sinuses. This knowledge will prevent him on the one hand from stumbling blindly into a fatal operative hemorrhage and on the other will permit him to place his incision in such a way as to provide for adequate drainage later. As far as specific procedures go the most important is to realize that if a debridement is attempted it should be 100 per cent in type and should not end in a drained wound. Any neces-

operative method as described is emphasized by the accompanying table 5. This lists the significant data in all the cases of death and sepsis in the neurosurgical group regardless of the method of treatment. Two deaths, one due to sepsis, occurred after operations that, as far as could be told, were technically perfect in both cases. The uncomplicated death was due to pneumonia in fifteen days after admission. That due to sepsis occurred in twenty-one days from a streptococcus hemolyticus meningitis in which the bacteria were demonstrated in the cerebrospinal fluid twelve hours after the operation. Other fatalities included two which were the result of an operation performed while the patient was possibly still in surgical shock. They were done twenty-eight and nineteen hours after injury respectively. All other deaths were secondary to infection except one in which an incidental heart failure was the cause.

The greatest single cause of postoperative sepsis was some type of major technical error in the performance of the operation. This occurred as the sole cause ten times, and was a factor in two other septic cases. This is 60 per cent of the entire group. The errors varied from parallel scalp incisions, and packing a wound to control bleeding, to failure to debride both bone and brain. Half of the twelve died and the other six had an average hospitalization of thirty-nine days, the maximum being seventy-eight and the minimum twenty-three. Improper handling of the wound on admission caused no deaths and no major sepsis but was associated with two infected scalp wounds in neither of which was any operative procedure carried out. Operations performed after the forty-eight hour period were the only cause of sepsis in four cases, three of whom died. The postponement was for nine days, four days, seventy-two hours and fifty-five hours after the injury respectively.

It is obvious that technical errors in operating are subject to correction and that operative interference at too late a time is inexcusable. It is theoretically possible therefore to calculate ideal mortality and morbidity rates for the method of treating compound fractures of the skull as described. For this purpose it is reasonable to consider eight deaths as preventable (all having been operated) and sixteen cases of sepsis as preventable, fourteen of them having been partially débrided. When revised in this manner, this neurosurgical series has a gross mortality of 23.5 per cent in a group of eighty-nine cases and including all cases dying untreated within twenty-four hours of admission. If these latter are excluded the theoretical mortality of treatable compound fractures of the skull in this series of seventy-two cases drops to 5.5 per cent. The operative mortality and morbidity in the sixty-four débrided compound fractures of the skull takes an equally striking drop. Here the mortality rate drops from 17.4

per cent to 4.6 per cent and the morbidity from sepsis from 23.4 per cent to 1.5 per cent.

#### CONCLUSIONS

1 From a series of ninety-six compound fractures of the skull admitted to the general surgical services of the Boston City Hospital during thirteen years, and lacking other confirmatory data it is suggested that the mortality of this injury as treated by the general surgeon has a gross figure of 54.1 per cent and a net figure of 27.8 per cent.

2 From a series of eighty-nine similar cases admitted to the neurosurgical service of the Boston City Hospital during five years and treated by a standardized method the actual gross mortality was 32.5 per cent and the net 16.6 per cent. It should be possible to reduce these figures further to the neighborhood of 23.5 per cent and 5.5 per cent.

3 The morbidity from sepsis in compound fractures of the skull when treated by general surgical methods ranges from a total of 75 per cent, through 65.6 per cent in the living operated cases to 58.3 per cent in the living unoperated ones.

4 The morbidity from sepsis in compound fractures of the skull when treated by the special method in use in the Boston City Hospital neurosurgical service ranges from a total of 23.4 per cent, through 13.2 per cent in the living operated cases to 28.5 per cent in the living non-operated ones. It should be possible to reduce these figures further to the neighborhood of a total of 1.5 per cent, through 0 per cent in the living operated cases but with the same 28.5 per cent in the living unoperated ones.

5 A method of treating compound fractures of the skull is described. Emphasis is placed on the care of the wound on admission, the length of the preoperative interval, the method and completeness of the débridement and the requirements of closure of the wound.

6 The cases that either died or developed sepsis in this neurosurgical service series are discussed in detail from the point of view of method and efficiency of treatment.

7 The maximum permissible mortality rate in compound fractures of the skull should be grossly not over 25 per cent. If the cases that died untreated within the first twenty-four hours of admission to the hospital are eliminated the mortality rate should not be over 10 per cent.

8 The maximum permissible operative mortality rate in treated compound fractures of the skull should not be over 10 per cent.

9 The maximum permissible morbidity rate from sepsis in treated compound fractures of the skull should be not over 5 per cent.

#### REFERENCES

- 1 Grant F. C. Treatment of fractured skull. *Clinics A. America* 4: 295 (Feb.) 1924.
- 2 Downs George A. Treatment of fractures of skull. *North-west Med* 23: 460 (Oct.) 1924.

Age	Location of Fracture	Type Treat Op	Length of Stay in Hospital		Chief Cause of Death or Sepsis
			Dead	Living	
6 yrs.	Frontal + Temporal	✓	24 hrs		Operated too soon
32 yrs.	Frontal Bone + Sinus	✓	6 days		Operation too late
75 yrs.	Frontal Bone + Sinus Mult. Injuries	✓	15 days		O K.
24 yrs.	Frontal Bone Cribiform Plate Mult. Injuries	✓	48 hrs.		Operation too soon
36 yrs.	Frontal Bone + Sinus	✓	23 days		Technical Error
29 yrs.	Frontal Bone + Sinus	✓	26 days		Operation too late
58 yrs.	Frontal Bone	✓	4 days		Technical Error
8 yrs.	Frontal Bone Mult. Injuries	✓	21 days		O K.
20 yrs.	Temporal Bone	✓	30 days		Operation too late
60 yrs. +	Vertex Biparietal	✓	6 days		Technical Error
18 yrs.	Occiput	✓	2 days		Technical Error
7 yrs.	Frontal Bone	✓		30 days	Technical Error
58 yrs.	Frontal Bone	✓		78 days	Technical Error
54 yrs.	Parietal Bone	✓		30 days	Technical Error
11 yrs.	Parietal Bone	✓		30 days	Technical Error
36 yrs.	Parietal Bone	✓		23 days	Technical Error
53 yrs.	Parietal Bone	✓		44 days	Technical Error
46 yrs.	Frontal Bone	✓		30 days	Operation too late
15 yrs.	Parietal Bone			19 days	Sutured on Admission
32 yrs.	Frontal Bone			13 days	Wound packed on Admission
69 yrs.	Occiput			6 days	Incidental



- 3 Soudagar M. H. A. Case of compound fracture of skull Indian M. Gaz. 52: 377 (Jun.) 1927
- 4 Tichborne C. R. H. Case of multiple compound fracture of the skull with recovery Lancet 2: 599 (Sept.) 1928
- 5 Bayerl R.: Ein seltener Fall von schwerer Stichverletzung des Schädels Deutsche Zeitschr. f. d. gen. gerichtl. Med. 15: 191 (May 15) 1918
- 6 Augé, A. and Bery S. Fracture comminutive ou de la base vultu crânienne irrégulière à la base Trépanation. Hémostase Suture primitive Guérison sans sequelles Arch. Soc. d. sc. méd. et biol. de Montpellier 13: 197 (Apr.) 1913
- 7 Wanka R. and Weselmann H.: Über die Behandlung offener Schädelverletzungen Beitr. z. klin. Chir. 139: 51 1924
- 8 Grinker Roy R.: Neurology First Edition. Baltimore Charles C Thomas 1934
- 9 Homans John Textbook of Surgery. First Edition. Chapter 29 page 521. Baltimore Charles C Thomas, 1921
- 10 Nelson's Loose Leaf Living Surgery Volume 1 Chapter 7 and Volume 3 Chapter 11. New York Thomas Nelson and Sons.
- 11 Dean Lewis Surgery Volume 1 Chapter 1 Page 1 Hagerstown, Md. W. F. Prior Company

## REPORT OF A CASE OF LEAD ENCEPHALITIS DUE TO TRIETHYL LEAD\*

BY KARL M. BOWMAN, M.D.,† AND PAUL M. HOWARD, M.D.†

**E**NCEPHALITIS due to either tetraethyl or triethyl lead is quite rare and very few cases have been reported since the first group of about seventy cases in 1924 and 1925. It seems worth while, therefore, to present a case of triethyl lead poisoning.

The patient was a white married male of forty years. He was sent in to the Boston Psychopathic Hospital on September 12, 1934 by Dr. Joseph Aub who had made a tentative diagnosis of encephalitis from tetraethyl lead.

On admission the patient was disoriented, confused and had marked disturbance of memory for both recent and remote events with some tendency to confabulation. He could remember nothing that had happened during the past year, could not give a correct chronological history of his past life and could not recall an address or name after one minute. He gave his age as about thirty-seven. There was no disturbance of mood although he seemed somewhat restless; no special trends were elicited. There was no evidence of delusions or hallucinations but a few days later he apparently thought that he saw insects. There was no insight the patient claiming that he was not ill and that his mental faculties were not impaired. The mental picture was that of an impersonal organic psychosis.

The physical examination showed a white male, five ft., ten in. tall, weight 147 lbs., with evidence of recent loss. He appeared seriously ill. The heart, lungs, abdomen and extremities were normal. The throat was not injected although the patient complained of a sore throat and cough. There was no evidence of dehydration. Blood pressure was 110/80; the pulse rate was 80. The neurological examination showed a coarse tremor of the hands, arms and head and fine tremors about the mouth. The deep reflexes were equal and active. There were none of the classical signs of lead poisoning such as lead line, wrist drop or muscular weakness, colic, anemia or stippling of red blood cells.

The laboratory findings showed variable traces of sugar in the urine with some acetone and the slightest possible trace of albumen. Microscopic examination was negative. At the same time, the blood showed a nonprotein nitrogen of 48.4 mgm. per 100 cc. and a sugar of 141 mgm. per 100 cc. The spinal fluid sugar was 110 mgm. per 100 cc. These findings cleared up within a few days and there was no further evidence of faulty sugar metabolism. The other laboratory findings were negative at this

time. The spinal fluid findings including dynamics except for the increased sugar were normal.

Specimens were sent to Dr. Robert Kehoe of the University of Cincinnati Medical School and Dr. Lawrence T. Fairhall of the Harvard Medical School. Dr. Kehoe reported that on September 29 the blood showed 0.15 mgm. of lead per 100 Gm. of blood and that the urine showed 1.13 mgm. of lead per liter of urine by spectrographic method. On October 30 he reported that the blood showed 0.13 mgm. of lead per 100 Gm. of blood. However, this test tube had broken in transit so the results were not considered accurate. A urine specimen at the same date showed 0.10 mgm. of lead per liter of urine. A third specimen of blood collected November 16 showed 0.07 mgm. of lead per 100 Gm. of blood. A urine specimen collected at the same time showed 0.05 mgm. of lead per liter of urine.

Dr. Fairhall reported that two specimens of spinal fluid were questionable for lead, that a twenty-four hour specimen of feces on September 18 contained 0.23 mgm. of lead, a second twenty-four hour specimen on September 24 contained 0.77 mgm. of lead and a third twenty-four hour specimen of September 28 contained 0.77 mgm. of lead. That a urine specimen of 2200 cc. on September 26 contained 1.4 mgm. of lead and a second specimen of 4000 cc. of September 28 contained 0.19 mgm. of lead. In these specimens the lead was additionally separated as sulphate and identified positively as lead by microchemical analysis.

The history shows that the patient was of Scotch English descent, with no family history of mental or nervous disease or alcoholism. Birth and early development were normal. He finished high school and took a night course in accounting. He held various jobs and was considered a conscientious and efficient worker. For the past year he had worked for an oil company and recently he had worked at cleaning gasoline tanks. In 1923 he had an appendectomy and in 1925 a light attack of pneumonia. Otherwise there was nothing of significance in the medical history. He was married in 1921. In personality the patient was described as cheerful, energetic, industrious, popular and even-tempered.

The exact details leading up to his illness were not entirely clear. The patient was employed cleaning out gasoline storage tanks. He wore an asbestos suit and a gas mask connected with a pipe line to an oxygen supply. His duty was to remove the crust or scale from the sides of the tank after they had been emptied. Between August 20 and September 4 he entered nine gasoline tanks. About August 21 to 23 he complained that he could not smoke on account of burning in the eyes, nose and throat. He also said that there was something wrong with the air supply in his gas mask. On August 30 head ache and insomnia developed. He began to lose weight rapidly and complained of great body fatigue. On September 5 he collapsed while at work, was quite pale but managed to stagger about. He was

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†Bowman, Karl M.—Assistant Professor of Clinical Psychiatry, Dept. of University School of Medicine, Howard Paul M.—Intern Neurological Service, Boston City Hospital 1935. For records and addresses of authors see "This Week's Issue" Page 556.



taken to a general hospital, where he was kept until the next day and then sent home. On September 6 he was perspiring profusely, had headache, and again collapsed. On September 7 he was weak and confused, and showed mental symptoms. His insomnia had continued throughout this period. On September 8 he was very restless. On September 9 his restlessness continued and he showed marked memory impairment. This picture continued until the time of his admission to the Boston Psychopathic Hospital on September 12.

After admission to this hospital the patient grew worse rapidly. He began sweating frequently and profusely. He would lie on his bed, rolling his head back and forth in a fashion sometimes seen in rickets. The temperature which was normal on admission rose to 102° and the white blood count which was 6,400 on admission rose to 18,000. He became practically comatose with absent reflexes. There was an area of hyperesthesia to light touch over the lumbar region. Deep pressure, however, seemed to cause no pain. There was vague generalized abdominal tenderness. The only signs elicited in the chest were that the breath sounds were heard better on the left side than the right. This condition soon cleared up, the fever fell by lysis, the confusion disappeared and memory improved.

On October 5 he was transferred to a convalescent ward. It was noted at this time that the temperature had been normal for a week and that the white blood count was normal. On October 15 it was noted that he was improving steadily. His memory appeared fairly good for past events, but quite poor for recent events. He could not remember having worked at any time cleaning gasoline tanks. A special memory test was done on this date using the Wells memory examination. It was noted that the patient was very cooperative, that he worked with excellent effort and with considerable interest. Memory for recent events was especially poor, scoring below average and, in two items, below the normal limits. Memory for old material was good. These findings were considered consistent with the clinical history of the case and were felt to represent the type of memory defect one would expect in a case of this type.

About October 20 the patient developed a cough and was put to bed. It was noted at this time that he had been quiet and cooperative, that he seemed alert and cheerful, talking freely with others and being quite sociable. No delusions or hallucinations were present. He seemed definitely confused about events in his past life and could not get the order of his occupations correctly. He developed many more physical symptoms from this time on. By October 26 it was noted that he had a temperature of 101.8°, skin was moist, there was considerable cough, inguinal and epitrochlear adenopathy was noted. There was slight tenderness over the epigastrium.

On October 29 a blood examination showed a hemoglobin of 76 per cent, Sahli. The red blood cells were 3,580,000, the white blood cells 19,000, 70 per cent being polymorphonuclears, the smear was normal. On October 30 an x-ray of the chest was reported by Dr. W. K. Coffin to indicate marked pathology in the chest, suggesting bronchopneumonia, pneumonitis, abscess without cavity, or even neoplasm.

He was seen on November 3 by Dr. S. William Marlowe who noted that there was marked inequality of chest expansion, the right side lagging and not expanding so much as the left, the right supraclavicular fossa was deeper than the left. The heart was not enlarged nor displaced. Posteriorly there was dullness at the right apex with no alterations in breath sounds or vocal fremitus. After coughing,

a few râles were heard at the right apex. No other findings were made out. Tuberculosis was considered the most likely explanation and repeated sputum examinations were done which were negative.

By November 8 the temperature had dropped to 99° and remained normal after that time. The blood examination on that date showed a hemoglobin of 65 per cent, Sahli. The red blood cells were 3,800,000, the white blood cells 22,800, 78 per cent being polymorphonuclears, the smear was normal. The



FIGURE 1 'Film No. 1' X-Ray Report. There is an extremely dense extensive and mottled, and indefinitely bounded shadow surrounding and radiating from the right hilum and occupying an area the size of a large flattened orange with bands and striae prolonged raggedly outward and upward to the axilla. In the left side though a somewhat similar but far less dense shadow is seen. Heart negative. Findings suggest a distribution, largely peribronchial though there is some parenchymal involvement. Probably not Tbc but it cannot be altogether excluded. bronchopneumonia, pneumonitis, abscess without cavity, possibly even neoplasm and syphilis are to be considered. W. K. Coffin 10/31/34

patient's physical condition improved steadily from this time on. He was given iron and ammonium citrate for the anemia and by November 24 the hemoglobin was 80 per cent, Sahli. The red blood cells were 5,010,000, the white blood cells, however, were 20,500, 72 per cent being polymorphonuclears and the smear normal. The urine had been essentially negative during this period.

Two further x-rays of the chest, an oblique chest made on November 13, and a six foot chest plate made on November 22 showed a less intense shadow in the right lung near the hilum, with slight lessening of density in some areas in the right lung. No decided clearing up was noted. These three x-ray plates were examined by Dr. M. C. Sosman of the Peter Bent Brigham Hospital who reported as follows:

"I think it is a very difficult series of plates to read, and in fact cannot tell exactly what this process is.

"It is probably an inflammatory process. I do not think it is tuberculosis or malignancy. The regression shown between the two series of plates is against malignancy. It is possibly a fungus infection and I suggest culture for this. There is something of the appearance of a pneumoconiosis. Was he in a dusty trade? Very possibly it is a bronchopneumonic type of pathology. There is a possible connection between this and his recent exposure to tetraethyl lead."

On November 9 a second memory test showed definite improvement, the memory quotient having risen from ninety-two per cent on the first test to 107 per cent. From this time on convalescence has been gradual with no relapses.

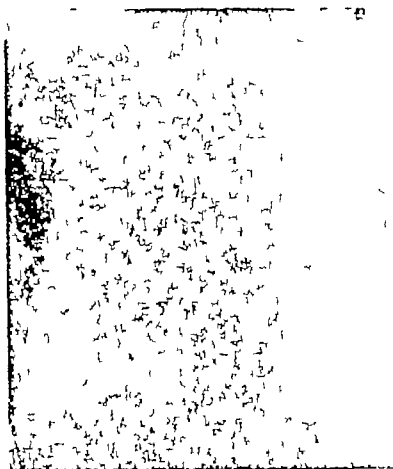


FIGURE 2. Film No. II. X-ray Report. There is the general appearance as before but the intensity of the right lung near the hilum is somewhat less dense than before and apparently there is a somewhat wider diffusion of the clouding both right and left. W. K. Coffin. 11/15/34

On November 27 it was noted that the patient continued afebrile that there were no night sweats but that there was considerable cough and sputum. The right chest showed dullness posteriorly breath sounds were heard better on the left side.



FIGURE 3. Film No. VI. X-ray Report. Marked improvement since last time. The individual bronchial markings are now quite as clearly traceable and much of the parenchymal infiltration has cleared. W. K. Coffin. 1/10/35

than the right anteriorly. There seemed general improvement both physically and mentally.

The patient's weight curve is of some interest. On admission September 12 he weighed 142 pounds.

There was a drop to 132½ pounds by October 5 following this there was a slight gain in weight so that on October 19 it was 135 pounds. With the acute illness at this time the weight dropped to 125 pounds on November 23. Following this there was a steady rise so that on December 7 it was 130½ pounds. December 23 141 pounds. January 4 148½ pounds. January 31 157½ pounds.

There has been steady mental and physical improvement. A third memory test on January 26 showed a memory quotient of 118 per cent. The general physical and laboratory examination from examinations made during the last week in January were essentially negative. The urine showed a one plus sugar but the blood sugar was 97 milligrams per 100 cc of blood. It was also noted that there were ten white blood cells per high power field in the urine with some clumps which suggested that there might be some pyelitis. Temperature however was quite normal and there was no localized tenderness.

An x-ray of the chest on December 8 showed definite improvement of both lungs although there was still a great deal of infiltration particularly on the right. Three more x-rays taken on January 7, 16 and February 9 show further improvement.

The treatment in this case consisted of forcing fluids and the use of light metals such as calcium and magnesium. It would seem that this patient entered the hospital with a lead encephalitis due to the inhalation of tri-ethyl lead. The reason for assuming that it was due to tri-ethyl rather than tetraethyl is a personal communication from Dr. Robert A. Kehoe, which is as follows:

"I am taking the liberty of discussing briefly one point in the case about which there seems to be some doubt, or perhaps misunderstanding. It seems to be your idea that appreciable quantities of tetraethyl lead may remain on the sides of gasoline storage tanks, and that workmen may be exposed both to this tetraethyl lead and to its decomposition products. This is not quite the situation and I should like to describe, therefore, what happens inside these storage tanks.

"First let me point out to you that the evidence adequately demonstrates measurable amounts of tetraethyl lead (in the employed concentrations) are not absorbed out of gasoline by human beings within tanks or outside of them, either through skin contact or inhalation. Thus the question of tetraethyl lead does not enter into the problem as such under conditions in which gasoline containing tetraethyl lead in the commercial concentrations is involved. The following conditions must be pictured. Gasoline containing tetraethyl lead is allowed to stand for comparatively long periods of time (years) in storage tanks which have a layer of water at the bottom. The decomposition of the tetraethyl lead, which takes place mainly at the surface in the absence of light, results in the formation of finely divided tri-ethyl lead compounds which are only slightly soluble in gasoline, and in water. Thus finely divided material slowly separates out and small quantities of it are deposited in the scale on the sides of the tank.

Most of it, however, settles to the bottom of the tank, passing through both the gasoline and water layer, and is deposited along with debris from the sides of the tank in the form of a sludge. This entire process is so slow as to be insignificant over short periods of time but the tanks often go uncleaned for years, during which time they are used for the storage of one batch after another of gasoline. Thus after one or more years, there may be a significant amount of material on the bottom of the tank, which is finely divided, and which is relatively high in its lead content, such lead being in part (apparently up to as much as two per cent in our observations) composed of tri-ethyl lead compounds. There is also a measurable quantity of tri-ethyl lead compounds in the rust and scale on the tank. There are only traces of tetra-ethyl lead since tetraethyl lead does not separate out of its true solution in the gasoline.

"When such a tank is cleaned, if it is emptied out or steamed out and then allowed to air until the sides are dry, and the sludge has been partially dried, any attempts to remove either the scale or the sludge in this dry state result in the dispersion into the atmosphere of finely divided material including tri-ethyl lead salts. These salts make themselves known by their irritating effect upon the eyes and mucous membranes of the nose and throat. They even produce some burning and stinging of the skin. They are absorbed from the pulmonary surfaces with much greater rapidity than most inorganic lead compounds, and due to their chemical properties they are deposited in the tissues of the body in much the same fashion as tetraethyl lead. Their physiological effect is like that of tetraethyl lead. They produce, therefore, a fulminating type of lead intoxication with predominant central nervous system symptoms. Coincident with the rapidity of their absorption, they are apparently excreted somewhat more rapidly than most lead compounds. As a consequence, in both animals and men, lead excretion reaches a very high level shortly after exposure, and falls off much more rapidly than is the case with the more usual lead compounds.

"I have gone to some length to explain this matter because it seems quite clear to me that unless some unusual circumstance occurred, the explanation of the illness of Mr W is that he was exposed to such materials in a partially dry state, and either had an unsatisfactory mask or did not make use of it continuously during the period in which he worked.

"This is the only situation I know in which significant amounts of any lead compound separate out of gasoline containing tetraethyl lead, and it is of importance because it provides an occupational hazard at this one specific point. We have investigated the extent of the deposition which occurs in tank cars used for the trans-

portation of leaded gasoline. Here the situation is different not only because of the rapidity of turn-over of the contents, but also because there is no water layer in tank cars to act as a continuous means of separating out the tri-ethyl lead compounds. The tank cars, therefore, are found to contain only insignificant traces of these compounds."

#### SUMMARY

It is well recognized that tetraethyl lead may produce encephalitis and that mental symptoms form a prominent part of the picture. In fact, when the first series of cases were reported in New Jersey in 1924, ethyl gasoline was called "looney" gas. The symptoms in order of frequency are as follows: Insomnia, lowered blood pressure, subnormal temperature, anorexia, nausea, bodily weakness, abdominal cramps, unaccustomed or annoying dreams, decided loss of weight, slow pulse, headache and tremors. Kehoe<sup>2</sup> reported a series of cases in 1925 in which he emphasized that the clinical picture is different from that usually seen in lead poisoning. He stated that stupor and lead line occur only infrequently and not early in the disease, that the mode of entrance was by inhalation or directly through the skin. He stated that in some cases the mental picture resembled delirium tremens with the patient being overactive, over talkative and suffering from hallucinations. It is generally agreed that tetraethyl lead combines more readily with nervous tissue than do other forms of lead, hence one is likely to get a sudden attack of lead encephalitis without the ordinary signs of chronic lead poisoning. Kehoe<sup>2</sup> reported in 1934 that tri-ethyl lead may be inhaled in the form of finely divided dust by workmen cleaning the interiors of gasoline tanks with lead absorption and acute intoxication following. He states that the tetraethyl lead which is left on the sides of the tank decomposes after long standing to form crystalline tri-ethyl compounds. Apparently the clinical picture from tri-ethyl lead is similar to that from tetraethyl lead, and on the basis of Kehoe's report and personal communication it would seem that our patient had developed a lead encephalitis due to inhalation of tri-ethyl lead.

The interpretation of the pulmonary condition does not seem easy. Since tri-ethyl lead is intensely irritating and the patient presumably inhaled sufficient to produce a lead encephalitis, it is possible that the lung condition was produced by tri-ethyl lead. Dr Sosman suggests this from his interpretation of the x-ray plates. Dr Kehoe in a personal communication doubts the likelihood of this occurring. The length of time that ensued between the inhalation of the tri-ethyl lead and the development of the acute pulmonary signs, namely about six weeks, would also seem to argue against it. On the other

hand, it has been agreed by everyone who has examined the patient and the x ray films of the chest, that the picture is atypical and does not conform to the usual picture of any of the well recognized lung conditions. Without attempting to argue the matter further we merely raise this question.

The patient was also seen by Dr Joseph Aub and Dr Alice Hamilton.

#### REFERENCES

1. Wells, F. L., and Martin, H. A. A. A method of memory examination suitable for psychotic cases. *Am. J. Psychiatry*, 31: 243, 1932.
2. Kehoe, R. A. Tetra-ethyl lead poisoning. Clinical analysis of a series of non fatal cases. *J. A. M. A.* 85: 108 (July 11) 1934.
3. Kehoe, R. A. Problems in handling ethyl fluid and ethyl gasoline. *National Safety News* 23: 18 (Jan.) 1931.

#### DISCUSSION

**DR. JOSEPH AUB.** It is important to remember that the whole picture of lead poisoning from organic lead compounds is entirely different from poisonings by inorganic compounds. The peripheral manifestations seem to be largely lacking and lead colic and wrist drop do not seem to occur while stippling in the blood only appears long after the acute cerebral abnormalities produced by these organic compounds. Kehoe has shown that after ten to fourteen days the distribution of the lead from lead tetraethyl differs little from that of inorganic compounds but Gettler was able to find lead tetraethyl in the brain in a patient who died of poisoning from it. In the patient under discussion tonight, considerable quantities of lead could be isolated from the urine thereby showing that he had absorbed toxic amounts of some lead compound. While I have heard of other cases with severe mental disturbance such as this patient showed, most of the patients I have seen before have had only mild delusions and this patient stands out as unique in my experience in the severity of his symptoms with recovery.

**DR. ALICE HAMILTON.** I do not think I can add anything to this case except to review the history of tetraethyl lead. I heard of it first in 1922 when an expert from the du Pont Company asked me what I knew about it. I said I knew nothing and asked him what the symptoms were as he had seen them. He described an acute cerebral form of plumbism which was not encephalopathy as we know it but resembled delirium tremens and he said that they held the ethyl radicle responsible not the lead. A little over a year later the situation be-

came a matter of sensational publicity when some twenty eight severe cases occurred in New Jersey in the du Pont Works and in the Standard Oil Works where the compound was produced. The newspapers took it up the health services of several states threatened to forbid the use of ethyl gasoline the story crossed the ocean, questions were asked in the British Parliament, and Switzerland forbade the importation of ethyl gasoline. It was not so much the danger to the makers and blenders that aroused this excitement, but the fear that the lead discharged from motor engines might be a danger not only in garage work but in the streets for in the course of combustion tetraethyl lead is changed to the chloride or bromide (according to the carrier used) both of which are unusually toxic compounds and are discharged in the exhaust gas. These public protests moved the purveyors of ethyl gasoline to ask the Public Health Service for a scientific study of the possible danger to the public, and this was done. The Service attacked the problem in a very practical way. They examined four groups of men.

First, taxi drivers who had never used lead gasoline. Secondly, taxi drivers who had used it for two years. Thirdly, mechanics in garages where it had never been used. Fourthly, mechanics in garages where it had been used for two years and fifthly a control group of storage battery workers who were exposed to a known lead hazard of unusual severity. The investigators found what they considered evidence of lead poisoning only in the control group and evidence of lead absorption in the fourth group but not in any of the other three. Kehoe of Cincinnati and his colleagues had previously made a similar study of filling station attendants and garage mechanics and had come to the same conclusion. The Public Health Service then announced that there was no reason why ethyl gasoline should not be put on the market. Some time later a British Royal Commission examined these findings and confirmed them. The Public Health Service has ordered the labeling of all pumps delivering ethyl gasoline and has arranged with the purveyors for an investigation of every case of supposed plumbism resulting from contact with it. Leake of the Service, and Kehoe of Cincinnati have followed up all these cases and in 1932 I was told by the former that ninety four illnesses in seventy two individuals had been investigated but in none was lead found to have played a part. The present case belongs in the category of the early cases and is for that reason an interesting rarity for under present conditions one would look for such an acute poisoning only as the result of an unusual combination of circumstances.

That there is danger in the use of this compound is recognized and vigilance must not be relaxed.

## ADJUSTMENTS DURING FOUR YEARS OF PATIENTS HANDICAPPED BY POLIOMYELITIS

BY ELLEN H. BARBOUR\*

**T**HIS follow up study was made with the purpose of determining the physical improvement and the emotional adjustment during a period of four years, of sixty children who were victims of infantile paralysis. In 1930 in an article published in this *Journal* (207: 1195 [Dec. 29] 1932) the degree of paralysis of these

children was described in social terminology. Briefly they were classified under the following headings: educationally paralyzed, implying that the individual was paralyzed to such a degree as definitely to impede his educational progress, occupationally crippled, meaning that although the child could lead a quite normal childhood there would be a great possibility of his paralysis prohibiting him from certain occupations in later life and socially handicapped, a disfiguring paralysis which although it

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did not interfere with his physical life, might be a source of social embarrassment to him

All the children, with but two exceptions, received approximately the same treatment respective to their individual needs, either in their homes or at hospital clinics. The accompanying chart shows the relative proportions of the three groups of handicaps in 1930 and their redistribution in 1934. In 1930 over one-half of all the children were in the social paralysis group, approximately one-fourth fell in the most severely crippled, educational group and a little less than one-fifth were described as occu-

dicate that the socially paralyzed child has an excellent chance of being completely normal at the end of four years of treatment

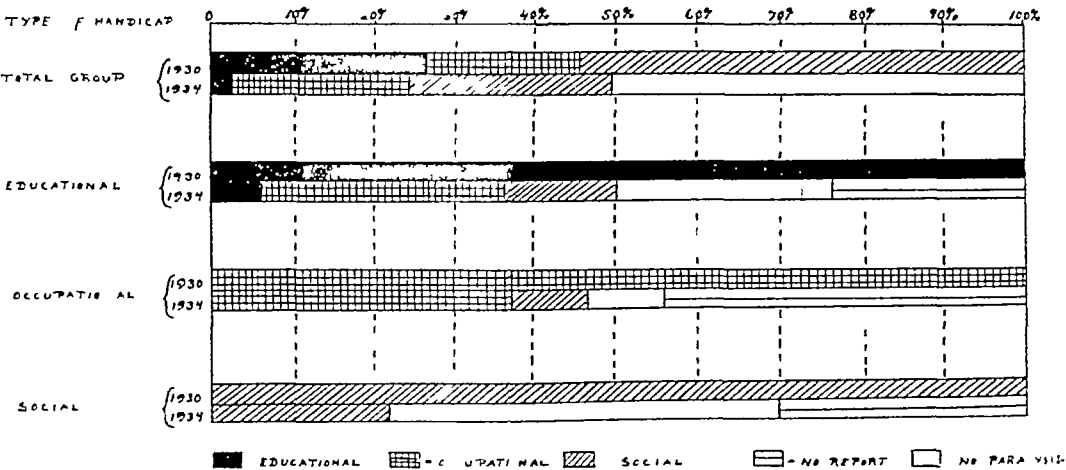
The scholastic retardation was an interesting social factor of this study. Twenty-five out of forty children, at the end of four years, were not educationally retarded, nine were one year behind, four were two years and two were three years behind their classes. One of the two last mentioned attends the school for crippled children in Canton where she is rapidly making up her educational deficiency, and the other has undergone so many operations that,

REDISTRIBUTION OF TOTAL GROUP OF PATIENTS HANDICAPPED

BY

INFANTILE PARALYSIS

1930 — 1934



REDISTRIBUTION OF TOTAL GROUP OF PATIENTS HANDICAPPED

BY

INFANTILE PARALYSIS

1930 — 1934

TYPE OF HANDICAP	POLIOMYELITIS PATIENTS			
	CONDITION IN 1930		CONDITION IN 1934	
	NUMBER	PERCENT	NUMBER	PERCENT
TOTAL	60	100%	41	100%
EDUCATIONAL	16	26.7	1	2.4
OCCUPATIONAL	11	18.3	9	22.0
SOCIAL	33	55.0	10	24.4
NO PARALYSIS	0	0	21	51.2

pationally handicapped. In the 1934 redistribution the paralysis of one-half of the total group had disappeared and one-half of those still crippled had only the mildest degree of paralysis. Slightly more than one in five were occupationally crippled and only one in fifty was severely limited in motion.

The charts also indicate the changes that have occurred during these four years in the groups. The educationally paralyzed seem to redistribute themselves either in the occupational or no-paralysis groups, with relatively few in the social class. The occupationally handicapped show the least change and the marked decrease of the social group would seem to in-

dicate that the socially paralyzed child has an excellent chance of being completely normal at the end of four years of treatment. The scholastic retardation was an interesting social factor of this study. Twenty-five out of forty children, at the end of four years, were not educationally retarded, nine were one year behind, four were two years and two were three years behind their classes. One of the two last mentioned attends the school for crippled children in Canton where she is rapidly making up her educational deficiency, and the other has undergone so many operations that, although between operations he is quite able to attend school, he has not yet succeeded in finishing one scholastic year since 1930. The twenty-one children who have completely recovered from the disease seem to have no darker memories of it than an attack of measles. They are a normally happy group, one of whom is described by his school-teacher as "the happiest boy in the class". Six out of the twenty children who are still paralyzed are emotionally maladjusted to their handicaps. The factors causing individual unhappiness may be more clearly discerned by the following brief case histories.

CASE 1 B P., a fourteen year old girl of good home environment, was left four years ago with a complete paralysis involving the facial nerves as well as those of her body. Today the only traces left of the paralysis are a slight limp when fatigued and a twitching of the right side of the face when she becomes nervous or embarrassed. Nevertheless she is extremely sensitive and bitterly resents any inference that she is not so strong as her sisters. As a result of this attitude she often overdoes to prove that she is normal. Whereas formerly she had a sunny disposition she is now touchy and irritable due to a constant condition of fatigue. Her age coupled with her particular type of paralysis are probably the two most important factors in her emotional maladjustment.

CASE 2 M P now thirteen years old was left with a paralysis of the right forearm and wrist. Her condition has not greatly changed during the last four years. Her arm is still useless and is noticeably smaller than the left. Any occasion, such as meeting people, which calls for shaking hands discloses her infirmity and causes her great embarrassment. She retires rather than face that painful ordeal. As in case 1 probably the two paramount causes of her unhappiness are her age and her particular type of paralysis.

CASE 3 Both legs of R E., an eight year old boy were completely paralyzed by the disease. His parents displayed such ignorance and stubbornness in refusing to permit the operation advised by the hospital and in ignoring the offer of suitable braces by the social service department that action was threatened by the Society for the Prevention of Cruelty to Children. As a result of these controversies the boy is completely unadjusted emotionally and physically to his handicap. He is very sensitive cries easily and refuses to play with other children. The smallness of his brace undoubtedly causes him

some physical discomfort. The parents attitude of ignorance and stubbornness is surely the most important reason for his unhappiness.

CASE 4 M. K., a married man and the father of two small children suffered from a weakness of the right shoulder and leg. During the past four years there has been but little improvement. Because of his physical disability he has been unable to retain such employment as he could find during this period. At the time of the 1934 visit, this family was receiving welfare aid and the patient's state of mind could only be described as desperate. Economic insecurity as a result of infantile paralysis is the direct cause for this individual's unhappiness.

CASE 5 P B was badly crippled when only two and one-half years old. Both legs were left quite useless. Now he walks with great difficulty in braces. His mother never permits him out alone since his balance is so precarious. She hesitates to take him among people because he is very sensitive and shrinks from even the stranger's casual glance. This little boy's hypersensitiveness would seem to be the main cause of his unhappiness.

CASE 6 Five year old E. J. an only child of adoring parents suffered a paralysis of the right shoulder and arm. His condition has improved but little during the last four years. His parents took it so tragically and treated him as such an object for pity that some of their attitude was transmitted to the child until he now feels himself to be an irrevocably damaged person. His physical disability has grown to such proportions in his parents' minds and hence in his own that he can think of little else. His fear of this "terrible thing" which has happened to him is pathetic. Obviously an only child devoted parents and poor psychology are the determining factors in this child's emotional maladjustment.

## A METHOD OF REPAIR OF FEMORAL HERNIAE BY A FASCIAL STRIP FROM THE APONEUROSIS OF THE EXTERNAL OBLIQUE MUSCLE

BY GEORGE A. MARKS, M.D.\*

IT has been said that at least one hundred methods of repair of femoral herniae are recorded in medical literature. One hesitates to add another method to the list. The procedure to be described below is offered, therefore, as a slight modification on a method already existing in many variations.

It is true that many femoral herniae are repaired successfully by simple ligation of the sac without attempt to obliterate the femoral opening. Recurrences are reported, however, in series by Watson, Coley and Erdman to vary from 4.85 per cent to 17 per cent.

Strangulation is dangerous in this type of hernia because of the small diameter of the ring. The Richter's type of strangulation in which only a portion of the wall of the intestine is involved seems especially apt to occur in femoral herniae.

The femoral opening by virtue of its anatomical construction lends itself with difficulty to obliteration. It is bounded anteriorly by the inelastic ligament of Poupart, medially by the fixed knife-like edge of Gimbernat's ligament and posteriorly by the pectineus fascia and muscle. On its lateral aspect lies only the femoral vein. None of these structures may be displaced, in the average case, with the necessary ease to insure permanent approximation, nor are they capable of exerting the sphincteric action found in the structures surrounding the inguinal rings.

Prior to 1890 ligation of the hernial sac alone was done. In 1892 Berger and in 1894 Bassini, added the important feature of closure of the femoral canal and ring. They sought to accomplish this by suture of Poupart's ligament to the pectineal fascia (Cooper's ligament) and suture of the falciform process to the pubic portion of the fascia lata. Later, Coley em-

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ployed the purse-string suture of kangaroo tendon or chromic catgut to approximate these structures. Blake modified this by using a mattress suture for the same purpose, while Cushing placed two purse-string sutures in the same location.

Annandale, in 1876, had described the approach which splits the aponeurosis of the external oblique muscle, but this was not used extensively until Ruggi (1892), Lotheissen (1898), Gordon (1900) and Moschcowitz (1905) brought about various modifications.

Nelson's System of Surgery lists a number of curious procedures for the repair of this hernia, among them, the tacking of Poupart's ligament to the pubic bone by a metal staple and the use of heteroplastic flaps of fascia, periosteum, bone or muscle.

Two requirements must be satisfied to prevent the recurrence of a hernia repaired surgically, the defect must be obliterated by firm, relatively inelastic structures displaced from their original anatomical alignment as little as possible, these structures must be held in position by methods which interrupt as slightly as possible their viability and function. The principles of asepsis and hemostasis, of course, must be obeyed. In the methods described before, those which entail the approximation of Poupart's or Gimbernat's ligament to the pectineus muscle and fascia, attempt to displace an inelastic, firmly fixed ligament and anchor it to a structure which has very little strength. The resulting tension should defeat the purpose. If laxness in Poupart's ligament allows easy approximation to the pectineal fascia, this usually means a ligament of little durability.

Gall's technique of repair of herniae by the use of autogenous fascia removed from the thigh is widely recognized. McArthur's modification for inguinal herniae employs a strip of fascia from the aponeurosis of the external oblique muscle, left attached at its insertion in the rectus sheath.

Modification of this latter technique suggested itself as suitable for use in the repair of femoral herniae. By the modification described below, a sufficiently long fascial suture is available for obliteration of the femoral space without extending the operation to include removal of fascia from the thigh. While the latter maneuver is not a risk in younger patients, its avoidance is desirable in the older patients among whom the incidence of femoral herniae is high.

**Technique** An oblique incision through the skin is made parallel to Poupart's ligament and carried down to the fascia of the external oblique muscle. The position of this incision allows inspection of both sides of Poupart's ligament and exposure of the femoral opening

from below if it is found necessary. Small hernial sacs may be pulled up from inside if not incarcerated.

The fascia of the external oblique is then split in the direction of its fibres. The contents of the inguinal canal are gently separated from the medial aspect of the ligament of Poupart until the femoral ring and the hernial sac are exposed. Further gentle blunt dissection around the ring is usually enough to allow the sac and its contents to be drawn in. If this is difficult or entails unwarranted manipulation, pressure on the sac from outside may be applied. In the event that this does not reduce the hernia, a small incision through the medial aspect of the ring in the direction of Gimbernat's ligament may be made.

After reduction, the sac is opened, the excess excised and the peritoneum closed by a purse string, or running suture, reinforced by one or two mattress sutures.

A ribbon, five mm in width, is then split from the upper leaf of the divided external oblique fascia, leaving it attached at its insertion in the rectus sheath above the spine of the pubis. Its outer end is cut across and fixed to a fascial suture needle with silk.

The fascial suture thus constructed is then threaded along the inner aspect of Poupart's ligament until the medial arc of the femoral ring is reached. From this point of departure, the suture is passed across the opening two or three times, depending on its diameter, anchored below each time by a bite which includes pectineus fascia, muscle and the underlying investment of the ramus of the pubis. At each crossing of the opening, the needle should transfix the strand just laid, approximating the strands and tending to obliterate small clefts. The terminal portion of the strip is usually long enough to allow a final interweaving in a horizontal or oblique direction. The end of the strip is anchored firmly at any point of the ring formed by Poupart's ligament by silk sutures. Any of the interstices left in the weave at this time should be closed by interrupted silk sutures.

The split in the external oblique fascia is closed by interrupted imbricating stitches, the superficial fascia and subcutaneous layer approximated by a fine running stitch of plain No. 00 catgut and the skin edges plicated with silk.

Three cases, one bilateral, have been repaired by the writer and two others by another at his suggestion, using the technique described above. The small number of cases, and the brevity of the postoperative interval, prevent conclusions being drawn.

**Summary** A technique for repair of femoral herniae by the use of a strip of autogenous fascia from the external oblique aponeurosis, left anchored at its inner aspect, is described.

## NEW HAMPSHIRE MEDICAL SOCIETY

## CONGENITAL PYLORIC OBSTRUCTION\*

BY CHESTER F. MCGILL, M.D.†

**T**HE earliest reference to congenital pyloric obstruction was by George Armstrong in England in 1777. The case reported was the third similar one in the same family. All three died.

Again, Ezekiah Beardsley of Connecticut, in 1787, described in most interesting detail the clinical symptoms and postmortem findings in a five year old with symptoms dating from infancy. According to Garrison's History of Medicine, Beardsley's account appeared in the earliest volume of medical transactions issued in this country entitled "Cases and Observations by the Medical Society of New Haven County in the State of Connecticut." Dr Beardsley writes, "A child of Mr Joel Grannis a respectable farmer in the town of Southington, in the first week of its infancy was attacked with a puking, or ejection of the milk, and of every other substance it received into its stomach, almost instantaneously and very little changed. The faeces were in small quantity and of an ash color which continued with little variation until its death. For these complaints a physician was consulted who treated it as a common case arising from acidity in the prima via, the testaceous powder and other absorbents and correctors of acid acrimony were used for a long time without any apparent benefit. The child, notwithstanding it continued to eject whatever was received into the stomach, yet seemed otherwise pretty well and increased in stature nearly in the same proportion as is common to that state of infancy but more lean with a pale countenance and a loose and wrinkled skin like that of old people. Thus as nearly as I can recollect at this distance of time, was his appearance and situation when I was first called to attend him, he was now about two years old. I was at first inclined to attribute the disorder to a deficiency of the bile and gastric juices, so necessary to digestion and chvification, joined with a morbid relaxation of the stomach, the action of which seemed wholly owing to the weight and pressure of its contents, as aliment taken in small quantities would often remain in it, till by the addition of fresh quantities, the whole or nearly all, was ejected, but his thirst or some other cause most commonly occasioned by swallowing such large draughts as to cause an immediate ejection, and oftentimes before the cup was taken from the mouth. It did not appear

that he was attended with nausea or sickness at his stomach, but he often complained that he was choked and of his own accord would introduce his finger or the Probang so as to excite the heaving of the stomach and an ejection of its contents, the use of this instrument was generally necessary if the stomach did not of itself, in a few moments, discharge its contents. The choking would in that space of time become almost intolerable which by this discharge was almost entirely removed. In this situation, with very little variation of symptoms he continued until death closed the painful and melancholy scene when he was about five years of age. He was uncommonly cheerful and active considering his situation. A number of the most respectable medical characters were consulted, and a variety of medicines were used to little or no effect. His death, though long expected, was sudden which I didn't know until the second day after it took place. This late period, the almost intolerable stench, and the impatience of the people who had collected for the funeral, prevented so thorough an examination of the body as might otherwise have been made.

On opening the thorax the esophagus was found greatly distended beyond its usual dimensions in such young subjects, from one end to the other of this tube between the circular fibers which compose the middle coat, were small vesicles some of which contained a tablespoonful of a thin fluid like water, and seemed capable of holding much more. I next examined the stomach which was unusually large the coats were about the thickness of a hog's bladder when fresh and distended with air. It contained about a wine pint of fluid exactly resembling that found in the vesicles before mentioned and which I supposed to have been received just before his death. The pylorus was invested with a hard compact substance or scirrhus which so completely obstructed the passage into the duodenum as to admit with the greatest difficulty the finest fluid whether this was the original disorder, or only a consequence, may perhaps be a question. In justice to myself, I ought to mention that I had pronounced a scirrhus in that part for months before the child's death.

"On removing the integuments of the abdomen, I was struck with the appearance of the vesica fellea, which was nearly five inches in length and more than one in diameter, it lay transversely across the abdomen, and was bedded into the small intestines, which were sphacelated wherever they came in contact with it. Its con-

Read at the Annual Meeting of the New Hampshire Medical Society at Manchester, May 7, 1913.

†McGill, Chester F.—For record and address of this case see "This Week's Issue," page 545.



tents were rather solid than fluid and resembled flesh in a highly putrid state, its color was that of a very dark green, like the juice of a night-shade berry, and a fluid of the same color exuded through its sphacelated coats. The necessity there was of entering the body that evening, put a stop to any further examination.

"I should have been happy, gentlemen, if I had been able to have given you a more particular and accurate description of this very singular case, but the above-mentioned circumstances forbade."

About a half century later, Williamson of London, in 1841 and Dawosky in Germany in the year following, mentioned the projectile character of the vomiting and each reported a case with autopsy findings. In 1888, Hirschsprung awakened the modern interest in pyloric obstruction with his discussion of the clinical symptoms and presentation of two necropsy specimens before the German Pediatric Society. Following this, Ibrahim collected over four hundred cases about twenty years later. In 1896, Finklestein first called attention to the palpable tumor. The first surgical procedure was performed by Cordua in 1893 and was a jejunosomy. In 1898, Willyer of New York and Stern in Germany each reported a case of gastroenterostomy and this operation continued to be done for a number of years. In 1907, Fredet performed the submucous pyloroplasty by means of a linear incision down to the mucosa and suturing the longitudinal wound into a transverse one. Rammstedt, in Germany, in 1912, advised omitting the transverse suturing and leaving the wound gaping.

As to statistical data on the incidence of the condition, I can only cite the report of Hertz published in 1916, in which he states that 27 per cent of all children under one year show the condition. Walls, comparing appendicitis with pyloric obstruction, observed in a clinic of five thousand cases a year, less than five cases of acute appendicitis and thirty of pyloric obstruction, over a five-year period. There have been eight cases in the Portsmouth Hospital in the past five years.

A condition so common needs only mention of its cardinal symptoms: projectile vomiting, loss of weight, visible gastric peristalsis, with or without a palpable tumor, since the underlying pathology considered responsible for the symptoms is spasm of the pylorus with or without an accompanying hypertrophy. Also, the symptom of tumor may be so difficult to elicit, that failure to identify it ought not to militate against the diagnosis. In our small series of seven cases, the tumor was distinctly felt only twice. W. R. Meeker, quoting Strauss, states that "he has felt it in only twenty-five per cent of his cases and attaches no significance to it". In his own six operative cases, it was definitely

found in two. These babies so afflicted are always constipated and the x-ray if employed will show evidence of obstruction. At the Children's Hospital in Boston, roentgenology is rarely done because it is not considered necessary, and it is not desirable that the stomach be full of bismuth at the time of operation. These cases, by the way, are all treated surgically. Recently the observation of the cold extremities has been suggested in addition to the above symptomatology.

For years, a great source of argument was the question as to whether the hypertrophy preceded the spasm or the spasm caused the hypertrophy. The pathogenesis, discussed at considerable length in the literature, has, at least until quite recently, remained rather obscure. Numerous explanations, all unsatisfactory, have been given for the spasm theory. Among these are the following: that the spasm followed by hypertrophy took place in utero as the stomach tried to rid itself of swallowed amniotic fluid, hyperadrenalism in the mother, phimosis causing irritation and accounting for the condition occurring so much more frequently in males.

Thomson, in 1897, stated that pyloric stenosis is a functional disturbance of the nerves of the stomach and pylorus. Haas suggests a disturbance in the vegetative nervous system with hypertrophic pyloric stenosis, an advanced degree of pylorospasm, and the two the most marked features of a general hypertonicity. Stenosis of the pylorus has been produced experimentally in dogs by Elsesser and in rats by Hoelzel and DeCosta. The latter found that gastric retention occurred with low protein feeding. Autopsy findings: stomach large, pylorus markedly constricted, and when the digestive tract was filled with fixing fluid shortly after death, the pylorus acted as if it were spastic.

In various gastrointestinal studies, they had often injected formalin-Zenker solution into the intact stomach, either through the duodenum or the esophagus, and in rats that had been kept on diets that tended to produce gastric retention, the passage of the fixing fluid was often obstructed entirely at the pylorus, while in rats that had not been kept on such diets, the fluid passed the pylorus easily. A pyloric hypertrophy such as occurs in infants was, however, never seen.

The proponents of the tumor theory hold first, that there is a primary developmental hypertrophy of the pyloric ring and canal and that the reduction of the lumen of the canal by the thickened muscle causes the obstruction, and, secondly, that there is an incoordination between the pyloric sphincter and the muscle of the pylorus, and that failure of the sphincter to relax causes the resistance which leads to hypertrophy of the pylorus. Apropos of this, Alvarez says that there is no definite pyloric

ring of muscle, for the pyloric muscle is but the lower end of the thick layer surrounding the pars pylorica of the stomach

According to Sauer, the persistence of hypertrophy months after spontaneous recovery and in a cited case of a man operated for ulcer after a gastroenterostomy for stenosis, and in whom the thickened pylorus was seen to be still present, proves that the hypertrophy is not dependent on the spasm. On the other hand that the clinical picture is dependent on the spasm whether accompanied by hypertrophy or not, seems to be borne out by the behavior of some of our cases, one of whom in particular did not vomit at all for four days and was discharged from the hospital only to return some days later vomiting as on his previous admission. Another, on whom a Rammstedt operation was done, began to vomit three weeks after the surgical treatment, which I am certain was complete, and showed visible gastric peristaltic waves with the vomiting of the projectile type continuing for about two weeks.

Many writers believe that the spasm involves not only the pyloric ring but the entire pyloric end of the stomach and even the whole of the stomach. Though no studies leading to the foregoing beliefs had included the nerves controlling this portion of the gastrointestinal tract Moore quotes Ellrich as stating that "the majority of writers attribute the disorder to an imbalance of the autonomic or involuntary nervous system, which of course consists of two divisions, the parasympathetics and the sympathetics, the functions of which are opposing."

Here, the physiopathologic views of Eric Pritchard of London are of interest. He says "The pyloric sphincter does not obstruct the outflow of the stomach contents owing to organic stenosis—it stops it because the opening is actually occluded or shut and refuses to relax. The normal resting condition of all sphincters is one of tonus, in other words, they are closed. The whole question of the innervation of the sphincter mechanism is very obscure but it is agreed on all sides that when the sphincter is at rest it is closed and when it is in its active phase, it is open. But the exact manner in which the nervous system, or the pneumogastric nerve, controls the action of opening, is still in doubt. In the case of the pylorus, it appears that the peristaltic wave, controlled and initiated by the vagus, passes along the pyloric end of the stomach and finally terminates in relaxation of the sphincter proper. It commences in the muscles of the antrum and ends in an active phase of relaxation of the pyloric sphincter. The latter is a comparatively small structure, constituting an insignificant part of what is commonly known as the pyloric tumor in cases of hypertrophic pyloric stenosis."

With regard to the pyloric physiology, Gian turco of the Mayo Clinic reported in 1933 some results following experimental studies on the

pyloric mechanism in which he had outlined the two curvatures of the stomach, the pyloric ring and the contours of the duodenum, with lead shot placed under the visceral serosa. Then with roentgenograms he took records of every phase of gastric activity. He found that food leaves the stomach when the pylorus and the duodenum are relaxed at the same time, and that relaxation of the pylorus alone is not followed by the passage of food. Alvarez states that the pylorus is opened by a wave of relaxation that normally follows a wave of contraction, and material is pushed out by the next wave of contraction which follows at a distance of several centimeters. Food goes into the pylorus which is open much of the time but passes through only at intervals. Forces below evidently balance those above. The duodenum, if not stimulated and caused to contract actively, will allow the stomach to empty.

As previously suggested, no cause for "the disturbance of the physiological function of the vegetative nervous system" had been developed so it remained for Moore, Plymate, Brodie, Dennis and Hlope, working in the Nutritional Research Laboratories of the University of Oregon Medical School upon problems connected with the effect on the young of inadequate maternal diets during pregnancy and lactation, to make some remarkable observations and to produce the disturbance experimentally in albino rats. Their research work concerned the effects of the lack of the vitamin B complex. Laboratory animals on diets containing two per cent yeast produced ten cases of pyloric obstruction together with hemorrhage of both the young and the mothers, and a high percentage of deaths with terminal paralysis. In percentage obstruction occurred in 12 per cent of the young of the first generation and in twenty two per cent of the young of the second generation. Changing the method to the giving of 2 of a gram of yeast daily excessive hemorrhage stopped and no cases of pyloric stenosis appeared. Brodie reporting on the above mentioned cases, states that at autopsy the stomach was distended to at least three times its normal size by tightly packed curd. The pylorus was tightly constricted but patent to the extent that a small probe could be passed with difficulty. In some cases, the pylorus appeared grossly hypertrophic. In the cases in which the condition was mild or was cured by atropine, polyneuritis was later superimposed upon the original condition. The pyloric obstruction is therefore considered as one manifestation of vitamin B deficiency with a resulting defective myelinogeny.

As to this last point, C. O. Prickett following his studies on the effect of a deficiency of vitamin B upon the central and peripheral nervous systems of the rat, thinks that the conclusions of these and other investigators as to myelin degeneration of the peripheral nerves may be in error due to the inadequacy of their methods.

of preparation (March). He found, however, definite changes in the central nervous system.

It has been suggested that the extent to which the findings on rats are transferable to man is something of a question. However, rats are omnivorous like man, both species develop lesions with inadequate diets.

The familial incidence of this condition though unexplained is nevertheless interesting. As previously mentioned, the case reported by Armstrong in 1777 was the third in the same family. Sauer speaks of two families in each of which there were three cases and twin boys in whom the disease was shown at autopsy. Finkelstein described four cases in one family and three cases in each of two other families. Caulfield noted two cases in successive generations. Roche reports the case of a boy, the sixth birth in a family, in which the fifth, also a boy, had pyloric stenosis.

Koplik ascribed the condition to a neurosis and in some cases, heredity. He had two cases in sisters whose husbands were brothers and sufferers from gastric neuroses. Both of these sisters had babies with pyloric spasm and stenosis.

With their experimental work in mind, Moore et al. ask whether or not this phase of the condition may be dependent upon the fact that food habits run through several generations. They also suggest the possibility that "a varying demand for the antineuritic vitamin may be the hereditary factor."

Ernberg in Stockholm suggests a hypothesis based on clinical observation. He noted the occasional admixture of blood in the vomitus observed in chocolate-brown streaks or the whole material of this color. There never was fresh blood or violent vomiting. The first symptoms set in suddenly—explained by a sudden irritation of the pylorus. He says that the rapidity of increase in the quantity of breast milk taken during the third to the sixth week makes demands on the unaccustomed stomach and pylorus and a small rupture of the pyloric mucous membrane is his conjecture. He has been unable to prove it histologically.

The trouble develops in males much more frequently than in females, the ratio being three or four to one. In seven of our cases, five were males and two females.

This is also said to be true in beriberi due to vitamin B deficiency and in polyneuritis occurring in animals and due to the same cause.

This mass of experimental evidence, though perplexing, forces the conclusion that any modern conception of the probable cause of pyloric stenosis, whether one believes it to be vitamin B deficiency or not, precludes the idea that all cases are surgical from the beginning.

T. H. Lanman and Patrick J. Mahoney in

February, 1933 published a report of four hundred and twenty-five cases operated by the Friedet-Rammstedt pyloromyotomy at the Children's Hospital in Boston where it is the treatment of choice. The mortality was 63 per cent with 104 per cent in the early cases, reduced to two per cent in the later group. Since this report, however, they have done considerably more than one hundred cases with no mortality. In this connection, Haas says: "The reason the Rammstedt operation is superior to any other operation that has been attempted is that it does the same thing as medical treatment by severing the nerves through which the reflexes are produced. If the nerves are not severed, the results are incomplete after resection of the tumor."

That atropine affects the termination of the nerves and not muscles, accords well with the assumption that the spasm is produced as a reflex.

The usual treatment in this country has been atropine and thick cereal feeding and refeeding. Recently phenobarbital has replaced atropine to some extent. H. L. Moore says, "I believe the effects of this drug prove that the condition is also cerebral in origin and the phenobarbital inhibits emetic impulses carried by the gastric nerves to the vomiting center." Moore's cases average a week to ten days in the hospital, a shorter time than with surgery.

In addition, these babies must be given salt solution twice daily by hypodermoclysis and this must be done regardless of the control of vomiting.

J. B. Sidbury in 1927 described the good results in severe malnutrition, of blood transfusion in infancy. Blood increases food tolerance and resistance to infection. It has a food value and a vitamin content. It would seem, therefore, to be a most valuable addition to the usual treatment of these infants. It is obtained from the father—typing is not necessary—and it is given subcutaneously on the sides of the abdomen in amounts of 25 to 50 cc per kilogram of body weight.

The addition of vitamin B to the diet gave no striking results over those reported similarly treated by others but without the addition of vitamin B. However, in the presence of cold extremities, subnormal temperature and poor appetite, it is invaluable.

No one of the mothers to whom we have given brewer's yeast in the past five years has had a baby who has had either pyloric stenosis or hemorrhage of the newborn.

In conclusion, I believe that with the present status of our knowledge concerning the problem, medical management should first be tried with the weight curve, determination of the amount of fecal matter in each twenty-four hours, the general condition of the patient, as stated by Sauer, the criteria for determining how long the treatment should be continued.

## DISCUSSION

**PRESIDENT LORD** I will ask Dr Benjamin P Burpee of Manchester to open the discussion on Dr McGill's paper on "Congenital Pyloric Obstruction."

**DR. BURPEE** Dr McGill is to be congratulated on this paper for again bringing to our attention the fact that this is a condition that does occur not infrequently in early infancy and for stressing the fact that it is important that as early a diagnosis as possible should be made when the condition does arise, inasmuch as the treatment is always and completely surgical.

I believe that the history and symptoms of this condition are usually pretty clean cut and definite and that none of us will have much difficulty in the diagnosis if we will but remember that a sudden onset of vomiting at about the fourth week calls not for a tinkering with the infant's feeding but for a careful examination of the upper abdomen while the infant is taking its food to determine whether peristaltic waves are present.

I believe that the important points in diagnosis are three in number. First is the history. The onset is usually sudden. The mother can usually fix this onset almost to the hour that it began. This is between the third and fifth weeks. Vomittings beginning at birth are unlikely to be tumors although I have seen one case in which this did occur.

Secondly is the magnitude of the waves. In differentiating pyloric tumor and gastrospasm or pylorospasm I believe that when the waves are very definite and high often with more than one visible at a time, this is in favor of tumor. Peristaltic waves do occur in spasm but they are not so clean cut and definite.

The third point in diagnosis in differentiating tumor and spasm in doubtful cases is in the feeding of a thick cereal formula. If the infant persists in vomiting when this is fed the chances are overwhelmingly in favor of a tumor being present. Cases of spasm do not vomit thick cereal to any appreciable extent.

It has been my experience that feeling the tumor is difficult. As an intern on a service on which there was always at least one pyloric stenosis this did not seem so difficult. Of late I have not found it easy to feel the tumor. It is undoubtedly difficult, due to the location, but probably the answer is that it requires considerable time and patience in palpation.

Concerning the use of the x-ray in diagnosis this has always seemed to me to be an unnecessary procedure. It tells us nothing more than that we have stasis which we already knew.

In the after-care preference is decidedly for whey and glucose. This provides an easily assimilated non-card forming food. Reporting sixteen cases operated by Dr David W Parker it is of interest that the last six cases fed on whey and glucose with no mortality have shown an average gain of eleven ounces over a ten-day postoperative period. The previous ten cases, fed on various formulae mostly low fat mixtures and lactic acid milk had a mortality of thirty per cent and over a corresponding ten-day postoperative period those that lived showed an average gain of only five ounces.

**PRESIDENT LORD** I will ask Dr E. L. Levine of Portsmouth to continue the discussion on this paper.

**DR. E. L. LEVINE.** *Mr President and Gentlemen of the New Hampshire Medical Society*—I was greatly impressed with the report of the work done at the Children's Hospital particularly the mortality rate which is very commendable.

However a report which was made in 1934 in the *British Medical Journal* by Dr Wallace of the Edinburgh Clinic in Scotland is very illuminating to the extent that it goes to prove that surgery is not always the method of choice over medical treatment. Their mortality rate in that clinic is reported to be 24.8 per cent, which is practically twenty-five per cent. In other words one out of every four patients died of some complication or another.

Perhaps outside of Boston and in other clinics, the mortality rates are much higher than reported at the Children's Hospital. This is very interesting because the pediatrician and the profession at large always think of the surgical treatment and do not attempt medical relief consistent with the safety of the patient.

**PRESIDENT LORD** Discussion is now open to guests and members of the Society.

**DR. DAVID W PARKER.** *Mr President Ladies and Gentlemen*—I think that this group of men should be congratulated for their exposition of this very important and timely subject. There is no question in my mind but that this condition occurs very much more frequently than is recognized and that many of these cases are carried along as feeding cases until the disease or condition is far advanced and consequently the mortality raised.

This may be a bold statement, and I don't want you to take it in the way of criticism but I don't think there is any particular reason why these cases should be mislaid for any considerable length of time.

As has been brought out, the symptomatology the history etc. is quite striking and quite definite. It isn't necessary to diagnose a tumor in order to make a definite diagnosis. If I have peristaltic waves vomiting which has come on suddenly more or less and in a previously apparently healthy newborn and the ejection of thick cereal gruel, with loss of weight, etc. I think it is very strongly diagnostic. My feeling is that very little time should be wasted on these cases in fooling around with changing foods and trying to get them as feeding cases. If they eject thick cereals for any considerable time, for a period of days I am firmly convinced that we have a tumor at the pylorus and it should be investigated.

X-rays as Dr Burpee said are absolute nonsense they tell you nothing and are unnecessary.

It was rather interesting that Dr McGill spoke of the familial instance. We had three cases in one family.

Now the operation of choice is the Ramstedt operation without question. From time to time there have been articles published on modifications of the Ramstedt operation. It is like putting the momentum up over the raw surface making transverse cut at one end of your incision, that, to obviate the danger of getting into the duodenum. I incidentally might state that there is a distinct danger of that, because this tumor mass runs off very gradually into almost nothing as you might say into the mucous membrane of the duodenum and in spreading your incision into the pylorus great care must be exercised not to open the duodenum. It can be repaired but it is not nice. It is a nuisance.

Now the Ramstedt should be done very quickly and there I think, is one of the important things. These children are babies, are dehydrated and are poor surgical risks and it is necessary to get in and get out just as quickly as possible consistent with good work so the less technical procedure that is carried out, the better. A small incision in the right upper quadrant over the left of the liver identifies the tumor masses with your finger lift it into

the wound, incise, spread it with the forceps Close it, and do it in five minutes

There is another thing These operations, although possibly they are emergency in some cases, should be treated as actual emergencies, that is, they should be operated on within five minutes of coming into the hospital These children are dehydrated, almost mummified in the late cases, and if you are going to keep your mortality rate down, it is absolutely necessary to get fluid in Fill them up with salt solution before putting them onto the table I think that is one of the most important things connected with the operation Don't forget that

On transfusions, we have had no experience with them at all at the Balch, and so I don't think we would have saved any of our babies on that score

Another important thing is the after-care Dr Burpee has given you statistics about the last sixteen cases fed on whey and carbohydrates, they used to say that the salvation of these children lay in the feeding of breast milk, and I think that is true, but I don't think it is so true as it was before we got on to this whey feeding

DR WINOGRAD *Mr President*—I wish to congratulate the speakers on their very complete and excellent papers, especially Dr Burpee, for bringing out so clearly the difference between the two types of cases Pylorospasm might be called a local picture of a general syndrome, the hypertonic baby There are various degrees of hypertonicity When we have a very hypertonic baby, we begin to wonder whether we have a pyloric stenosis I feel, as they do at the Children's Hospital, that one must feel the tumor before operating for, after all operations are not the methods of choice, but especially in children the method of last resort When a child is brought in to the office, it is very easy to tell a hypertonic baby, one sees a wiry infant with spastic, crossed legs, the so-called colicky baby of a nervous mother Here heredity comes in, for the mother, also, is a high strung person in most cases

In those cases, great care, medically, may do much. In a small town like Nashua, with about 30,000 population, in the past two years, there have been only two infants operated upon for pyloric stenosis Those children, in contrast to the hypertonic baby, were not hypertonic at all A definite tumor was felt in both cases Of course, in many cases there may be a combination of both All the hypertonic cases have responded either with atropine or thick cereal I might say that with atropine one must be courageous and at the same time cautious in its use Some babies seem to have overdosage with a half drop of a one thousandth solution They will become red and show dilation of the pupils Other infants may stand twice or three times the adult dose, and may respond to large doses Then, if that doesn't work, the thick cereal feeding usually will.

Some cases may be very bad and may show, as Dr Burpee brought out, not the real wave that we see in the pyloric stenosis, but the suggestion of waves I remember the case of a baby four months old the child weighed eight pounds at birth, and at four months, it weighed six pounds The vomiting was projectile in character, but that infant did gain, with the use of atropine and milk, and is today a fine child

I might say this, too, that the simple things in infant feeding are much more important sometimes than the gross things and are often overlooked because of their simplicity For example, many babies find it difficult to digest fat, there may be severe vomiting with a great deal of cream Skimming

the milk might do more, sometimes, than some of the more radical procedures

PRESIDENT LORD Is there any further discussion of this subject?

DR LOUIS C AGEER My ideas on the subject of pyloric obstruction in infants are undoubtedly influenced by the fact that my knowledge of the condition goes back to the days when a posterior gastroenterostomy was the customary operation Naturally we waited a long time before undertaking a procedure which was followed by death in a large majority of cases

We ran through the gamut of feeding theories and when the thick gruel feeding was adopted we got very remarkable results in a goodly proportion of cases It was a troublesome and messy performance to shove the food down the infant's throat with a tongue depressor and we had difficulty in many instances in having the parents continue the method long enough for safety Statistics proved pretty conclusively that breastfed infants were fully as subject to the condition as bottle babies and it was generally believed too high fat in the breast milk was a causative factor, producing hyperacidity Hyperacidity and cyclic vomiting were the buggaboes of pediatricians in those days Perhaps the vitamins have corrected all that.

The Rammstedt operation was of course a tremendous step in advance but we had learned in the meantime that a very large proportion of the cases could be successfully treated without operation My belief that the primary condition is spasm and that the actual stenosis is a secondary hypertrophy due to spasm is merely strengthened by the statement made here today that the tumor usually shows up at about the fourth week The very definite symptoms of obstruction almost invariably appear in the second week after birth I agree absolutely with the previous speaker that, if the infant lives to the fourth week, operation is indicated, and I would go farther and say that in most cases surgical intervention should be made before that time

DR FRED B LUND We have just heard a little conservatism preached I think the definition of conservatism is really the kind of conservatism that saves life, and not the kind that avoids a simple and life-saving operation

After you have seen these cases, with a certain onset of symptoms in previously healthy children, if you wait until you can feel a tumor, you usually wait too long Children change so quickly, so much more quickly than adults They are growing fast, and they go off just as fast as they come on The idea of waiting until you have tried every possible thing strikes me as the very best way to get a high mortality, and the statistics that have been shown here today demonstrate that to be bold, if you can call it being bold, is really being careful, therefore, an early operation is really being careful

DR FRANK N ROGERS There is a danger point, beyond which it is not advisable to go Most doctors who are experienced with this condition will get this child into the hospital and operated upon as soon as possible

An economic point is this In large hospitals, there is a tendency to operate as soon as possible and send them home in about three weeks to avoid cross infections

The cases that we have had that I have observed in the city have been cases which were so early that it was impossible to feel the tumor on most of them

One case that Dr Parker mentioned that I had to do with had three in one family, they were all breast fed, and the mother carried the baby around

under her arm and fed it almost constantly. When the baby entered the hospital it would have made a gain if all things had been equal. But the vomiting was persistent and characteristic of hypertrophic pyloric stenosis and after going over the case thoroughly in the hospital and giving it sufficient time the case was operated upon and a sizable tumor was found. The baby was discharged in three weeks, on the road to recovery. And that has been the story as time has gone on.

Men are more alert in making these diagnoses today and I think that we are getting into the hospitals better risks than we ever had before.

I think the objection to surgery in the past has been that the cases were such poor risks when they entered the hospitals that the surgeon was almost discouraged from the start.

DR. HENRY L. TAYLOR. Cases of pyloric stenosis in children. I think render no difficulty in the matter of diagnosis and the treatment of course should be early and it should be prompt.

Cases of pyloric stenosis of course present two kinds they present a hypertrophic kind in which the circulatory muscular fibres are greatly enlarged and increased in number and you also have the form of pyloric stenosis in which it is simply a spasm of the pylorus. In that instance it is supposed to be due to some defect of the vagus nerve in that region.

#### THE AMERICAN PUBLIC HEALTH ASSOCIATION CONVENTION

Leaders of public health and preventive medicine from every state of the union and from several foreign countries are to be at hand for the sixty fourth annual convention of the American Public Health Association to be held in Milwaukee from October 7 to 10.

Workers in all fields of public health medical men, nurses specialists in research and others in allied activities are to be among the 3 000 delegates expected at the convention.

Important developments of the year in preventive medicine in the extension of public health work and in the constant war on contagious disease will be unfolded at the gathering.

Simultaneous with the association's sessions ten other closely related organizations are to convene. They are the Association of Dairy Food and Drug Officials American Association of School Physicians Association of Women in Public Health, Conference of State Sanitary Engineers Conference of State Laboratory Directors Conference of Wisconsin Health Officers State Registration Executives and State Directors of Public Health Nursing International Society of Medical Officers of Health and National Committee of Health Council Executives.

Over 400 papers are to be presented dealing with such widely varied subjects as mental hygiene diphtheria and scarlet fever immunization, poison in food public sanitation treatment of sewage and polluted waterways public health engineering planned milk control laboratory studies with toxins and vaccines tuberculosis milk borne disease water purification, new methods in reporting vital statistics industrial hygiene food and nutrition.

Sessions of the association itself are to be divided among its ten constituent sections—health officers laboratory vital statistics, public health engineer, industrial hygiene food and nutrition child

Of course, the treatment in the hypertrophic type is the Ramstedt operation which can be done very quickly under novocain and the results should be perfect in regard to the patient getting well if the case is done early.

The type of pyloric stenosis due to spasm often presents intermittency in the vomiting. They will vomit for a while, and then the child will go along apparently in perfect health again, and then start in vomiting. That is quite often the way with the type which is due to the spasm.

PRESIDENT LORD. If there is no further discussion I will ask Dr. McGill to close the discussion on his paper.

DR. CHESTER F. MCGILL. The paper was not offered with the idea that vitamin B deficiency is necessarily the panacea. I daresay however that seventy five per cent may in the future be treated successfully by medical management. The other twenty five per cent will require, some time or another the Ramstedt surgical operation.

I hoped that this paper would be provocative of greater interest on the part of all members of the Society particularly with a view to ascertaining if possible whatever information may turn out to be of value with regard to the mothers' diets. This of course, concerns the obscure etiological factor particularly with regard to vitamin B deficiency.

hygiene, public health education, public health nursing and epidemiology.

There will be authoritative presentations on amebic dysentery hemolytic streptococci whooping cough gonococcal infection tuberculosis and undulant fever. Papers are to be presented on all trable viruses and on prophylactic and therapeutic vaccination. Recent progress in biological products and research accomplishments of the year in the milk and dairy field will be on the program.

Among the outstanding physicians and health leaders who will speak at the convention are Dr. E. L. Bishop, President of the Association and Director of Health of the Tennessee Valley Authority; Dr. Walter H. Brown, President Elect of the Association and Professor of Hygiene at Stanford University in Palo Alto, Calif.; Dr. Herman N. Bundesen, President, Board of Health Chicago; Dr. W. G. Campbell, Chief of the United States Food and Drug Administration, Washington, D. C.; Dr. A. J. Carlson, Professor of Physiology, University of Chicago; Dr. Haven Emerson, Professor of Public Health Practice, Columbia University; Dr. John A. Ferrell, Associate Director, International Health Division, Rockefeller Foundation, New York; Dr. Morris Fishbein, Editor, *Journal of the American Medical Association*; Dr. Grant Fleming, Professor of Public Health, McGill University, Montreal; Dr. Iago Galatdon, Executive Secretary, Medical Information Bureau, New York; Dr. John P. Koehler, Milwaukee Health Commissioner; Dr. Carl S. Pederson, Chief in Research, Agricultural Experiment Station, Cornell University; and health commissioners of most large cities and research men on the staffs of foundations and major industries.

This congress is designed to appeal to members of the public health and medical professions alike. Headquarters are to be at the Milwaukee Auditorium. Scientific and educational exhibits will be staged. Entertainment and social events have also been planned.

## MEDICAL PROGRESS

## PROGRESS IN LARYNGOLOGY

BY LE ROY A. SCHALL, M.D.\*

**I**ONIZATION of the nasal mucous membrane has been given a new impetus by the work of Warwick and the enthusiastic attitude of the manufacturers of his electrical apparatus. Theoretically it is based upon the fact that the metallic solution placed in contact with the nasal mucous membrane, results in the precipitation of the proteins of the superficial cells. The method has been tried by Tobey<sup>1</sup>, Alden<sup>2</sup>, Hollender<sup>3</sup>, MacFailan<sup>4</sup> and others. Tobey frankly states that it has not been tried in a sufficient number of cases, nor has sufficient time elapsed to judge the relief adequately, which may be but temporary, given 85.6 per cent of his patients.

Whether the effect of ionization is anything more than a cauterization of the nasal mucous membrane is questionable. It remained for Palmer<sup>5</sup> to have the courage of his convictions and treat a group of thirty patients with vasomotor rhinitis by a local application of concentrated phenol. The immediate effect of this treatment was exactly that which was obtained by the ionization instrument of Warwick in that the mucous membrane showed a greyish, white discoloration followed by edema and obstruction with hypersecretion. Palmer had excellent cooperation from his patients, as they voluntarily permitted biopsies to be taken. The microscopic examination revealed that there was an increase in the connective tissue of the tunica propria with a diminution of the edema and vascularity. Of thirty cases treated by Palmer, twenty-four or 80 per cent showed definite improvement and twelve were free from symptoms for periods of from three to nine months.

McMahon<sup>6</sup> approaches the subject of ionization from the pathologic point of view, by determining its effect on the nasal mucous membrane of dogs. He found that ionization is followed by a desquamation of the superficial epithelial cells, by an increased fibrosis of the connective tissue and by multiple abscess formation deep in the stroma. There was also a polymorphonuclear leukocytosis and an extravasation of red blood cells free in the tunica propria.

Fenton<sup>7</sup> bluntly states that "ionization as such does not do anything more than damage the mucosal tissues of the sinuses."

The fact that hay fever is unknown in Japan, but that on American soil over three per cent of the Japanese population contract hay fever,

led to Hara's<sup>8</sup> investigations. He found that the concentration of pollens in the air in Japan was much higher than that in Los Angeles, where he made his American studies. He also found all the Japanese pollens to be large, heavy and non-spiculated. He believes that the high humidity and abundant rainfall in Japan prevent dissemination of the light pollens which are usually associated as the causative factors of hay fever.

For many years mucous nasal polyps were described as myxomatous tumors. It is now generally conceded that they are merely exuberances of the nasal mucous membrane. Kern and Schenck<sup>9</sup> believe that allergy is a constant factor in the etiology of all nasal mucous polyps. In their experiences all patients with mucous polyps have been found to have a general history of allergy, a family history of allergy, or positive skin tests, and usually all three.

## TONSIL

The tonsil problem has been revived. For many years a paper on the subject of tonsils would have no place on a scientific program. The subject was thought to have been exhausted. A few years ago Kaiser startled the pediatric world by a publication of a large set of statistics from the school children of Rochester. The result of his figures showed that in his locality, the operation of tonsillectomy, does not in all cases, accomplish what the medical and lay public believed it would. In other words, he found that deep respiratory infections, namely, laryngitis, bronchitis and pneumonia occur more frequently in tonsillectomized children.

In a recent paper, Kaiser<sup>10</sup> gives his findings following a reexamination of these children, ten years after operation. His statistics again show that the instance of bronchitis and pneumonia has not been lessened by the removal of the tonsils. He states, however, "My studies and end-results of tonsillectomy indicate that some physicians have underestimated the importance of the tonsils as a factor in disease. The outstanding problem with the physician is to discover a more accurate way of diagnosing diseased tonsils. There is no known therapeutic procedure that is of greater value to a child than the removal of diseased tonsils. The failures are largely due to the wrong diagnosis."

In the same symposium, Nissen<sup>11</sup> gives the result of his work, based principally on a survey of patients of the Robert B. Brigham Hospital. He found that of the arthritics, only 10

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per cent had tonsillectomy performed before the onset of their arthritis. Of the 90 per cent that had retained their tonsils, with the onset of arthritis, only 45 per cent had tonsillectomy after the onset. In other words, this statistical study, showing 55 per cent of a group of arthritics, having tonsils intact for many years after the beginning of their arthritis, should answer the accusation as to the wholesale removal of tonsils in arthritis. Nissen very clearly brings out the fact that there should be a relationship between the focal and systemic infection before operation is advised and that after an operation is decided upon, the proper time for this procedure is when, not only the tonsillitis but the arthritis is in the state of absolute quiescence. Under no circumstances should an operative procedure be undertaken if the patient's disease does not reach a period of quiescence with measurable improvement.

Mullin<sup>12</sup> also pleads for a very thorough study of the patient before deciding that a disease is due to focal infection. He says, "I can only reiterate the caution and advice not to operate at random on a patient with focal infection and let the failure to obtain results tell you that his case needed more study. First, do everything else that might help and then, after time and careful study, resort to surgical removal only if there are definite indications. I wish also to emphasize the fact that care must be taken in training specialists so that they become doctors and diagnosticians first and surgeons after wards, that they do not hold out a tonsil and adenoid operation as a panacea for all ills and perform this operation indiscriminately without due and weighty consideration."

This is exactly the same attitude taken by Coates<sup>13</sup> who very properly says, "It is usually possible for the painstaking laryngologist to determine the presence or probably absence of chronic sepsis of the tonsil. Where the tonsil is very definitely diseased, its removal for prophylactic reasons will often give striking results. When the tonsil is removed on mere suspicion, or after hasty and inadequate examination the guess may as well be wrong as right. When the septic tonsil is discovered in association with some systemic disorder, the diagnosis of tonsillar infection as the cause of this disorder can only be satisfactorily arrived at after meticulous study and consultation on the part of the laryngologist with the attending pediatrician internist or surgeon."

Newhart and his co-workers<sup>14</sup> have been studying the question of tonsillectomy in tuberculous. Of 324 tonsillectomies in tuberculous patients, only one operative case, prior to 1926 showed an unfavorable course clinically. They believe that this high percentage of favorable results can be obtained only by a very careful selection of patients and that the operation must be guarded by a very careful technique and by

following a very carefully planned program for after care.

Schall<sup>15</sup> analyzes a group of 230 cases of cancer involving the tonsil. The outstanding fact is that the majority of these patients endured their symptoms for from three to six months before consulting a physician. As a result of this analysis, it may be said that surgery has no place in malignant disease of the tonsil. The most encouraging results are obtained by radium implantation in conjunction with external radiation.

#### THE COMMON COLD

The common cold has continued to be a subject of study. Most investigators believe that the mucous coat which lines the nose plays an important part in the prevention of infection. Lucas and Douglas<sup>16</sup> believe that the normal mucous coat is composed of two layers, an inner one of fluid, fluctuated by the cilia and an outer layer of mucus which carries away debris and foreign particles. The inner layer flows with the vibrating of the cilia against the under surface of the inner layer. Therefore, they believe that the rate of flow of mucus cannot be used as a reliable measure of the ciliary movement.

It is Proetz's<sup>17</sup> opinion that where this mucous sheet is broken by a change in the surface epithelium, that bacteria can penetrate into the mucous membrane at these areas.

Hilding<sup>18</sup> found that these changed areas of epithelium are sterile and it is his opinion that a powerful bacterial enzyme, which he has designated as "lysozyme", acts as a protective agent.

It is suggested by Negus<sup>19</sup> that it is the changes of pH which paralyze the cilia and not the action of bacterial toxemias.

Tweedie<sup>20</sup> has studied the pH reaction of the nasal secretion by a colorimetric method and his findings suggest that the mucus of the normal nose can control pathogenic bacteria. It is not until the reaction becomes disturbed that the pathologic bacteria can retain a footing. However, Hilding<sup>18</sup> found that pH was but little disturbed by pathologic conditions.

#### SINUSITIS

American laryngologists are quoted freely by Tilley<sup>21</sup> in his Semon Lecture on nasal sinuses. He accepts Schall's histopathologic classification of sinus disease but adds an additional type one in which bone changes have taken place. In discussing the operative treatment of chronic maxillary sinusitis he advocates the Caldwell-Luc operation for all cases except for those of the simple edematous type.

In Goodyear's<sup>22</sup> experience, the intranasal operation in which a large opening is made beneath the inferior turbinate and the antrum packed with iodoform gauze which is left for three to nine days, produced as satisfactory results as the external operation.



Stevenson<sup>23</sup> reports seven cases of infection of the maxillary sinus in which fungus forms were found in the pus recovered from these sinuses. These fungus forms closely resembled those of *mucor histoides*. Four of the cases classed as chronic sinusitis had recurrent infections, while under observation, and in two of these cases fungus forms were also found in infections recurring after some months. The findings indicated that fungi were present as active agents, rather than as saprophytes.

From an analysis of his postoperative results, Hill<sup>24</sup>, theorizes as to the causes of failure in a certain percentage of sphenoid operations. Most of the older authorities considered the intranasal approach quite satisfactory. There is, however, a growing conviction that the external approach to the ethmoid-sphenoid is not only the safest, but that more thorough surgery can be done. Even with external surgery, subsequent contraction of the operative opening may occur following sphenoidectomy and nullify the effect of the operation, even after complete removal of the anterior wall, including the pars ethmoidalis.

#### PHARYNX

Kully<sup>25</sup> classifies cysts of the nasopharynx as (1) cysts of the mucous glands, the true retention cyst, (2) retention cysts of the pharyngeal bursa, described by von Luschka, Thornwaldt and others, (3) degenerative cysts, representing vacuolization of the germ centers with subsequent cyst formation and (4) bronchiogenic cysts, situated in the lateral wall of the nasopharynx beneath the ostium of the eustachian tube. The symptoms are postnasal discharge, posterior cervical adenitis, occipital headache, otalgia and unexplained fever. Kully pleads for a more careful and thorough examination of the postnasal space.

Mattick and Thibaudeau<sup>26</sup> found but nineteen plasma cell tumors of the upper air passages in the literature. They report their case of plasma cell tumor occurring simultaneously in the nasopharynx and hypopharynx. These tumors display characteristics ranging from inflammation to malignancy. Very few show lymphnode involvement of recurrence after removal.

Pollock<sup>27</sup> reports two cases of plasmacytoma from the Massachusetts Eye and Ear Infirmary. He emphasizes the fact that they must be differentiated from multiple myeloma which can be readily done by careful roentgen examination of the skeletal system.

#### LARYNX

Keinan and Schugt<sup>28</sup> discuss abscesses of the larynx. The symptoms are pain low in the throat, hoarseness and dyspnea. Local examination shows an obliteration and bulging of the pyriform sinus. The operation proposed and

carried out on eight cases by these authors is an external exposure of the thyroid cartilage with a trephine through the cartilage to reach the abscess.

Both Wilkinson<sup>29</sup> and Tucker<sup>30</sup> report a case of congenital web of the larynx.

An isolated amyloid tumor of the larynx without any demonstrable underlying local disease or general amyloid disease was reported by Kramer and Som<sup>31</sup>.

In the past year many papers have appeared on the treatment of cancer of the larynx. An increasing number of radiologists are reporting their results by Coutard's fractional method of treatment and laryngologists summarize their cases treated by surgery. All laryngologists plead for early diagnosis. The outstanding symptom in malignant disease of the larynx is hoarseness, yet this symptom is ignored for months and even years. All writers agree that biopsy does not produce metastasis if surgical removal takes place soon after the biopsy.

Hirsch and Baum<sup>32</sup> believe that in intrinsic laryngeal cancer, clinical cures can be obtained by roentgen ray treatment. In such cases surgery gives equally good results, but with a lesser degree of conservation of function and with an average operative mortality of about 15 per cent. In extrinsic cases, the prognosis is usually unfavorable, owing to the tendency to rapid spread and metastatic glandular involvement. In this group, surgery gives a high mortality and offers no assurance of cure. Roentgen therapy may produce a clinical cure in this group with cervical involvement, or if the case is hopelessly advanced, it may offer palliation, comfort and prolongation of life.

Clerf<sup>33</sup> in fifty-eight patients with cancer of the larynx treated by laryngofissure had five deaths from postoperative complications. Thirty-five of these patients, three years after operation, have been traced and are free from recurrence.

Jackson<sup>34</sup> reports on seventy-five patients treated by laryngofissure with 82 per cent alive and well for periods from five to twenty-one years.

Tucker<sup>35</sup> reviews 200 consecutive cases of cancer of the larynx. In fifty-eight of the cases laryngofissure was performed, in thirty-one, laryngectomy and in fifty-four cases x-ray and radium were used. Only three of these fifty-four cases are alive after three years.

Another review of cancer of the larynx is by Beck and Guttman<sup>36</sup> who summarize their results with 500 cases. Laryngofissure gave a cure in 80 per cent and laryngectomy in 59 per cent, at the end of five years.

Eguen<sup>37</sup> also writes a very good paper on cancer of the larynx, reviewing the symptoms

and urging early examination of the larynx in each case of hoarseness

The effect of radium on the laryngeal cartilages has been the subject of investigation by Arbuckle.<sup>18</sup> His study must be regarded as a preliminary report, as the amount of radium used was so small and the distance from the cartilage so great that proper evaluation of the effects of radium cannot be made

Nelson and Hirsch<sup>19</sup> warn radiologists that they should safeguard their patients against radiation injuries, especially when sensitive tissues, such as the neck, are being treated. They present an autopsy report of radiation reaction with necrosis of laryngeal structures following radiation of the larynx.

In view of these surgical results laryngologists are loath to try radiation on operable cancer of the larynx. Radiologists are treating only those patients who refuse surgery, therefore a just comparison cannot be made until a sufficient number of cases have been treated and sufficient time has elapsed to evaluate the end results properly

#### REFERENCES

1. Tobey, Harold G. Experiences in ionization of the nasal mucous membrane. *Ann. Otol. Rhin. & Laryng.* 44: 94 (March) 1935
2. Alden, Arthur M.: Year's work with ionization in treatment of hay fever. *Laryngoscope* 44: 741 (Sept.) 1934
3. Hollender, A. R. Ionization as a prolonged palliative in vasomotor rhinitis. *Arch. Otolaryng.* 81: 448 (April) 1935
4. MacFarlane, Douglas: Ionization. Circuit plan for an inexpensive unit. *Arch. Otolaryng.* 81: 486 (April) 1935
5. Palmer, Arthur: The effect of phenol in hyperesthetic rhinitis with tissue study of the nasal mucosa. *Ann. Otol. Rhin. & Laryng.* 44: 25 (March) 1935
6. McMahon, Bernard J.: Effects of ionization on mucosa of frontal sinuses of dogs. *Trans. Am. Laryng. Assn.* P. 35 1934
7. Fenton, Ralph A.: Discussion—Ionization on mucosa of frontal sinuses of dogs. *Trans. Am. Laryng. Assn.* P. 48 1934
8. Hara, H. J.: Hay fever among Japanese. *Arch. Otolaryng.* 81: 9 (Jan.) 1935
9. Kern, Richard A. and Schenck, Harry P.: Importance of allergy in etiology and treatment of nasal mucous polyps. *J. A. M. A.* 103: 1293 (Oct. 27) 1934
10. Kalser, Albert D.: Why and when the tonsils should come out. *Trans. Am. Acad. Ophth. & Otolaryng.* P. 102 1934
11. Nissen, H. Archibald: Tonsils as foci of systemic infection. *Trans. Am. Acad. Ophth. & Otolaryng.* P. 213 1934
12. Mullin, William V.: Present status of infection of upper respiratory tract in its relation to focal infection. *New Eng. J. Med.* 312: 59 (Jan. 10) 1935
13. Coates, George M.: Diagnosis of chronic infection of tonsils in relation to indications for operation in cases of chronic focal infection. *New Eng. J. Med.* 312: 53 (Jan. 10) 1935
14. Newhart, Horace Cohen Sumner S. and Van Winkle Charlotte C.: Tonsillectomy in the tuberculous—incidence and pathology of tuberculosis of the tonsils in adults. *Am. Laryng. Assn.* P. 123 1934
15. Schall, LeRoy A.: Carcinoma of tonsil: statistical study of 320 cases. *New Eng. J. Med.* 811: 937 (Nov. 29) 1934
16. Lucas, Alfred M. and Douglas Loren C.: Principles underlying ciliary activity in respiratory tract independence of tracheal cilia in vivo of drug and neurogenic stimuli. *Arch. Otolaryng.* 81: 295 (March) 1935
17. Prosser, Arthur W.: Nasal oedematous epithelium with special reference to infection and treatment. *J. Laryng. & Otol.* 49: 587 (Sept.) 1934
18. Hilding, Anderson: Studies on the common cold and nasal physiology. *Trans. Am. Laryng. Assn.* P. 253 1934
19. Negus, V. E.: Action of cilia and effect of drugs on their activity. *J. Laryng. & Otol.* 49: 571 (Sept.) 1934
20. Tweedie, A. R.: Nasal flora and reaction of the nasal mucosa. *J. Laryng. & Otol.* 49: 585 (Sept.) 1934
21. Tilley, H. L.: Chronic pyogenic inflammation of the antrum and other accessory sinuses: some clinical manifestations of its pathology. Semon lecture, 1934. *J. Laryng. & Otol.* 50: 1 1935
22. Goodyear, Henry M.: The treatment of chronic antrum infections by intranasal antrum operation and packing: clinical and experimental results. *Trans. Am. Laryng. Assn.* P. 81 1934
23. Stevenson, Holland N.: Mycotic infections of the maxillary sinuses. *Trans. Am. Laryng. Rhin. & Otol. Soc.* P. 12 (April) 1934
24. Hill, Frederick T.: Post-operative observations upon the sphenoidal sinus following ethmo-sphenoidal operation. *Trans. Am. Laryng. Rhin. & Otol. Soc.* P. 151 (April) 1934
25. Kully, B. M.: Cysts and retention abscesses of the nasopharynx. *Trans. Am. Laryng. Rhin. & Otol. Soc.* P. 135 (April) 1934
26. Mallick, W. L. and Thibodeau, A. A.: Extramedullary plasma-cell tumors of the upper air passages. *J. Cancer* 23: 513 (March) 1935
27. Pollock, Frederick J.: Plasmacytoma of nose and nasopharynx. *Arch. Otolaryng.* 81: 311 (March) 1935
28. Kerman, John D. and Schmitt, F.: Abscess of the larynx and its treatment. *Trans. Am. Laryng. Assn.* P. 130 1934
29. Wilkinson, Richard W.: Congenital stenosis of the larynx. *J. A. M. A.* 103: 1756 (May 25) 1934
30. Tuckey, Joseph: Congenital web of larynx. *Arch. Otolaryng.* 81: 17 (Feb.) 1935
31. Kramer, Rudolph, and Som, Max L.: Local tumor like deposits of amyloid in larynx; report of case with review of literature. *Arch. Otolaryng.* 81: 231 (March) 1935
32. Hirsch, L. E. and Baum, S.: The evaluation of roentgen treatment of laryngeal carcinoma. *Radiology* 24: 31 (March) 1935
33. Clerf, Louis H.: Carcinoma of larynx: analysis of 55 cases with treatment by laryngofissure. *Arch. Otolaryng.* 81: 853 (June) 1934
34. Jackson, Chevalier: Cancer of larynx; its curability by laryngofissure. *Surg. Gynec. & Obst.* 58: 421 (Feb.) 1934
35. Tucker, G.: Cancer of larynx: observations in 200 consecutive cases. *Arch. Otolaryng.* 81: 1 1935
36. Beck, J. C. and Guttman, M. R.: Carcinoma of the larynx—some conclusions derived from personal experience. *Laryngoscope* 45: 168 1935
37. Eagan, Murdoch: Treatment of cancer of larynx: laryngofissure vs. laryngectomy. *South. M. J.* 87: 778 (Sept.) 1934
38. Arbuckle, M. P., Cowdry E. V. and Votaw Robert: The effect of radium emanations on the laryngeal cartilage. *Trans. Am. Laryng. Assn.* P. 214 1934
39. Nelson, Peter A. and Hirsch, Edwin P.: Roentgen radiation necrosis of larynx and other structures of the neck. *J. A. M. A.* 104: 1676 (May 4) 1935

#### THE MORTALITY RATE

According to precedent, the beginning and ending of each year give the highest mortality rates in the returns from eighty-six cities of the United States. These figures are fairly representative of averages throughout the country.

Beginning with January 1935 the average rate in these cities has dropped from 13.2 per thousand of the population to 9.3 in the first week of September. This decline has been very close to that of the

preceding year except for a brief rise in the last week of July 1934 when it reached 12.2 but subsided quickly to 9.3 the last of August which is the same figure as that for the present year.

If the usual trend takes place, the mortality rate will now rise steadily through September and October with a more rapid increase up to January 1936.

It will be interesting to note whether the slightly higher rates of the years before the depression are to be repeated or whether there will be a lowering of mortality rates in the years to come.

# CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

## CASE 21381

### PRESENTATION OF CASE

A twenty-eight year old married American school-teacher entered complaining of exhaustion.

During the two years before admission she felt very tired upon completing her day's work. During the past five months her fatigue increased and a faint dark red mottling appeared on her face. Two weeks before entry a similar mottling appeared on her neck and legs and an ecchymotic spot about five centimeters in diameter on the right thigh. One week before entry she developed a sore throat and a cough which later persisted and was associated with grayish-green, occasionally blood-streaked sputum. She had some bleeding from her gums and a slight nosebleed. Her last period started nine days before entry and was marked by profuse flow and clots. She had very severe pain during the first day.

Her mother, father and three siblings were living and well. There was no history of bleeding. She had always lived in Massachusetts. She had the usual childhood diseases and a tonsillectomy and adenoidectomy fourteen years before admission.

The past history is non-contributory.

Physical examination showed a well-developed and nourished woman lying in bed in no acute distress. Her gums were bleeding and some blood was exuding from the left nostril. There were purpuric blotches over the legs and arms. Examination of the heart, lungs, and abdomen was negative.

The temperature was 100.8°, the pulse 108. The respirations were 20.

Examination of the urine showed a specific gravity of 1.012 and a very slight trace of albumin. The blood showed a red cell count of 2,260,000, with a hemoglobin of 56 per cent. The white cell count was 18,800. A smear showed the absence of platelets. No differential count is recorded. There was no clot retraction in forty-eight hours.

A splenectomy was performed soon after admission. She had an uneventful convalescence and was discharged approximately three weeks after admission. The last blood smear showed an increase in the number of platelets but was still within the limits of low normal.

## CLINICAL DISCUSSION

DR BETH VINCENT: Probably if they had taken the bleeding time on this patient it would have been delayed. I dare say it was done by Dr. Reynolds before she entered the hospital. There were one or two features of this case that were not so favorable as might be inferred from the history as given in this report. Before the patient came to the hospital she had more bleeding than is indicated in this history, because splenectomy was considered before she got to the hospital. Then the note on the physical examination says "a well-developed and nourished woman lying in bed in no acute distress." That hardly paints the picture. She came in at six o'clock. I was talking to the husband down stairs and was summoned to the eighth floor. She was lying on her side and blood was pouring out of the left nostril, so much so that while we planned to take the spleen out the next day we had to alter our procedure, pack the nostril, transfuse the patient and do the splenectomy that morning.

This is a case of thrombopenic purpura. It is reported that the mortality is higher if you take the spleen out during the attack of hemorrhage. That is true, but transfusion combined with splenectomy is the most effective procedure to control the bleeding. Therefore, the more acute the bleeding the more acute the necessity of operation in spite of the risk, but at the same time if you could be certain they would survive the bleeding you would be glad to postpone the operation until a quiescent period. It is like an appendix, if you avoid the operation in a very acute attack. There is one factor in the blood picture that Dr. Reynolds can comment on that is a little unusual.

DR GEORGE P. REYNOLDS: Certain things in the history are worth going over because the history as presented is not accurate. In the first place she had been flowing for twenty-one days when she was admitted instead of nine as the history states. Her menstrual history is worth going over in detail because it is significant, especially in view of later developments.

She started menstruating at thirteen, always had scanty periods, and had sometimes gone as long as four or five months without periods, particularly during trips to Europe or any changes in environment, but also she had often skipped periods at home. She never had a profuse period prior to the present illness. The last period before the present illness was distinctly scanty. The September period started twenty-one days before admission, and while it had never been really profuse as judged by normal standards, she flowed more each day than was customary for her.

For two months prior to operation she had noticed easy bruising, and had had frequent though not severe nosebleeds. Moreover, she

had had a little, constant oozing from her gums during this period which is of some significance since she had never had it before.

There are also certain other factors in the history that are worthy of our consideration. In the first place throughout life she had tended to be a very healthy person and was very active and rather high strung. For two years prior to the present illness she had been working extremely hard and was rather tired every night but in evaluating the amount she did this fatigue did not seem to be inconsistent with the degree of activity. During the last three or four months before admission, however, she had become abnormally fatigued, although doing less than usual. Throughout life she tended to be obese and periodically had gone on very extreme dietary restrictions. We do not know the cause of this disease, but the more I see of blood diseases, the more I wonder if semi starvation over a period of weeks does not do something to the bone marrow. This individual had frequently lived for days, or even weeks, on nothing but orange juice or a similar dietary insufficiency. Moreover, her diet for the last two years was inadequate in protein, although all of her extreme dietary restriction was before that time. She had usually taken one helping of meat a day, but because she thought meat was fattening, and moreover did not like it, the amount was extremely small. That is, of course significant in an anemia history, but I do not know if it is in this disease. There was no past history of abnormal blood loss.

When I first saw her two weeks before admission the red blood cell count was 3,800,000, the bleeding time was normal and there was no clot retraction in forty-eight hours. The clotting time, however, was not very much prolonged. The platelet count was recorded as 260,000 but I think we are often fooled by platelet counts which are at best inaccurate. The smear that I saw had very few platelets, approximately one to each high power field and I think that this is a more accurate estimation of her platelets than the count. As Dr. Vincent said we do not like to operate on these cases during the acute stage. At that time her flowing seemed to be decreasing. The bleeding from the gums was minimal, and there were no nosebleeds. We therefore felt justified in trying other measures before suggesting operation. We first gave her a well rounded diet with plenty of protein, including large amounts of whole liver. Occasionally even in fairly severe thrombopenic purpura whole liver has proved to be effective especially when there has been an antecedent history of dietary deficiency. In this case it had no effect.

The next thing we tried was transfusion. Looking back I think that possibly we might have anticipated the emergency a little earlier

by the fact that transfusions did not have any appreciable effect. I think also we were swayed somewhat by the fact that there was very little bleeding other than menstrual, and we rather counted on the belief that menstrual bleeding in this disease is of less serious significance than other abnormal blood loss. She had four or five blood transfusions without any definite decrease in the menstrual flow.

She was then brought to the hospital, and as Dr. Vincent said, on admission it was obvious that the situation was quite serious and that an emergency operation was definitely indicated. Almost immediately after removal of the spleen all signs of bleeding stopped, not only the acute nasal hemorrhage and the oozing from the gums but also the menstrual flow. This is what usually happens but the interesting feature in this case is that it was twelve days after operation before she showed any increase in platelets. There was no bleeding, no purpura, but repeated blood smears showed only from one to three platelets per high power field. We do not know how to account for that. It is as far as I know a unique situation.

Just a word as to the prognosis which we felt justified in making at that time. Simply because she stopped bleeding her immediate prognosis was thought to be good. But at operation there was some evidence of cirrhosis in the liver which makes our prognosis a little more guarded than in the ordinary case.

It so happens that I saw her the day before yesterday when she came in because of slightly excessive menstrual flow. Her blood examination at that time was as follows: red blood cell count 4,800,000, hemoglobin 105 per cent by the Sahli method, histological appearance of the cells normal, platelets estimated as normal or increased, white cell count 11,400. The differential count showed only 30 per cent polymorphonuclear cells, which Dr. Minot feels is not a good prognostic sign. In all previous counts both before and after operation she had at least 70 per cent polymorphonuclears.

She looked extremely well and I felt that her prolonged bleeding with this period was not in any way related to the blood situation. She was seen yesterday by a gynecologist who reported that the flowing had practically ceased, but that examination revealed an extremely small, immature uterus. A pelvic examination had been made at the beginning of the present illness and was reported as normal. I think if we had realized that the uterus was immature we might have paid more attention to the flowing and felt that it was more abnormal than we did. In thrombopenic purpura one should regard any evidence of bleeding with a good deal of apprehension, and one always hopes to postpone operation until the acute phase is over. In this case we were less apprehensive than the subsequent course proves we should have been because she looked so well and because the bleed

ing was largely menstrual rather than from other parts of the body. If we had known that the reproductive organs were so immature we might have regarded the uterine bleeding as distinctly abnormal and have been a little more concerned.

#### PREOPERATIVE DIAGNOSIS

Thrombopenic purpura

#### PATHOLOGIC DIAGNOSIS

Hyperplasia of the spleen

#### PATHOLOGIC DISCUSSION

DR TRACY B. MALLORY: This woman went through the very typical course of thrombopenic purpura with splenectomy. I do not believe Dr. Reynolds would want to guarantee that she would not have a recurrence of the disease, however. This is a disease that has aside from the multiple hemorrhages no anatomical picture. The spleens are not characteristic. They ordinarily show a rather marked degree of lymphoid hyperplasia but not necessarily. As far as I know, no one has ever recognized any diagnostic criteria by which the spleen of a case of purpura can be recognized microscopically, in contrast to hemolytic anemia where it is easy to recognize the situation. Likewise at autopsy, where it has been possible to study the bone marrow, nothing specific to the disease has been recognized. Even though there may be some diminution in megakaryocytes the findings again have been inconsistent. Cases do die from time to time and that is one definite reason for not putting off operation too long. I think the single most serious danger is that of cerebral hemorrhage which is by no means infrequent. We have four or five cases on record here with single or multiple cerebral hemorrhage as the immediate cause of death.

DR VINCENT: It is only fair to say that the cerebral hemorrhages have all taken place after the spleen was out.

#### CASE 21382

#### PRESENTATION OF CASE

A seven week old American male infant was admitted with a skin eruption of two weeks' duration.

The baby was apparently well at birth except for "sniffles" which persisted until admission. Two weeks before entry the mother noted a rash which began on the soles of the feet gradually involving the legs, thighs and face. The condition became progressively worse. In spite of the fact that the baby had never nursed very well because of the sniffles the mother believed that he had gained weight.

The father, two brothers and four sisters were living and well. When the mother was three months pregnant with the patient she had

a rash on the palms of her hands, soles of her feet, thighs, genitalia and scalp. At this time a great deal of her hair fell out and she also had a sore throat. The rash and sore throat persisted for about four months.

Physical examination showed a poorly nourished but fairly well-developed infant. There was a maculopapular type of rash over both extremities from the soles of the feet to the upper thighs. There was much scaling over the soles. Around the nose and mouth the skin was fissured and crusted with some oozing. There were numerous rhonchi and râles throughout both chests, especially in the left lower lobe, but no signs of consolidation. The liver was felt two fingerbreadths below the costal margin in the right midclavicular line. The spleen was just palpable. There was some swelling of epiphysis of both radii.

The temperature was 100.8°, the pulse 130. The respirations were 25.

Examination of the blood showed a red cell count of 2,550,000, with a hemoglobin of 40 per cent. The white cell count was 45,600. Hinton and Wassermann tests were strongly positive.

Immediately after admission the baby received 0.5 grams of neoarsphenamin intravenously with no immediate reaction except for a temperature rise to 104° the following day. On the third day he developed a stiff neck. The Kernigs were positive. No signs of pneumonia could be demonstrated but he had many râles throughout the chest. He rapidly failed and died that day.

#### DIFFERENTIAL DIAGNOSIS

DR RICHARD S. EUSTIS: When I first saw this history, long before I reached the end of it, I had a diagnosis which I think you all have by now. It is an unusually typical history of congenital syphilis, with infection of the mother probable early in pregnancy. She had a perfectly definite case of lues which was transmitted to the fetus. There is no mention of whether the baby was full term or premature. The birth weight is not given so we cannot even make a guess from that as to whether it was premature, although the phrase "well developed" in the description of the physical examination at least indicates that the infant was not very premature.

The physical examination is very characteristic,—the eruption on the extremities, the scaling of the soles of the feet, the fissures and crusting around the nose and mouth. There is no mention of the anus. There might have been condylomata present there, presumably not, or they would have been mentioned. The liver was apparently slightly enlarged although not much so, as it is usually palpable in a baby of this age. Presumably the infant had some interstitial hepatitis due to syphilis. He also presumably has had an osteochondritis of the epiph

ribs, the long bones, showing up particularly in the radii. That is a very characteristic finding. What shall we make of the rhonchi and râles in the lung? I very much doubt if at this age, seven weeks, we have what is described as a white pneumonia, a syphilitic pneumonia. It seems much more likely that it is an extension of the process around the nose and mouth reaching down to the larynx and the trachea and giving us originally a syphilitic tracheitis and then secondary infection and probably bronchopneumonia, although on examination they could not find the spot or spots of consolidation.

The child had a definite secondary anemia undoubtedly due to the syphilis. The high white cell count is probably a polynuclear leucocytosis and probably indicates acute infection. There is no differential count reported.

At admission we have a seven week old infant with an active congenital syphilis. A sick infant because he is described as poorly nourished. The treatment he was given was perfectly proper. The only thing to do was to start treatment at once. I do not know whether they tried to get a dark field examination of any secretions from the fissures around the mouth. That probably would have confirmed their diagnosis. But in a situation like this treatment should be started without waiting for a Wassermann test. The day following the injection of neosarsphenamin something happened to this infant. His temperature went up and shortly after the temperature went up he developed meningeal signs. The first thought that came to my mind was whether they were rash enough to give that injection into the longitudinal sinus. I regard that as a dangerous spot and I made inquiry about that and was told it went into the jugular so we cannot trace our meningeal symptoms to treatment that was meant for the longitudinal sinus and did not hit it. I do not think the injection of neosarsphenamin had anything to do with the rise in temperature, the meningeal symptoms and the death. I think it is much more likely that it is a terminal infection in an already sick infant with a secondary infection of the respiratory tract. There is no record of whether his respiratory rate went up at that time. That would help us to come to a conclusion. Meningeal signs occurring in the presence of an acute infection in an infant may mean meningitis, may mean otitis media, may mean "meningismus," and may mean of course, any kind of meningitis.

In trying to sum up this picture without any information as to the state of the baby's ears, as to the appearance of the spinal fluid, knowing merely that it was a syphilitic infant who died very shortly after admission with a high temperature and with some stiffness of the neck and Kernig, it seems to me that the simplest diagnosis to make one that will cover all the

signs that we have described, is a diagnosis of congenital syphilis and probable bronchopneumonia. With the information we have we can not exclude otitis media, and we cannot exclude a meningitis.

DR. HAROLD L. HIGGINS. About twenty five per cent of congenital syphilitic babies have involvement of the central nervous system. We shall have to consider as a possible cause of death in this patient syphilis of the central nervous system, possibly syphilitic meningitis or syphilitic encephalitis.

Another very common cause of death in the syphilitic baby is respiratory obstruction the respiratory obstruction is obstruction of the nose. The child has a rhinitis with a thick and possibly bloody discharge. The baby of seven weeks does not know how to breathe through his mouth and will not do so except when he cries. With his nose stopped up he will have difficulty inspiring, and may show as much retraction of the chest as a child with laryngeal diphtheria, when there is obstructed breathing in a child with a heart damaged by the spirochetes, myocardial failure and death of the patient may result. The râles in the chest may have been transmitted from the nose rather than be emanating from the bronchi or alveoli.

The syphilitic baby is likely to be premature and may present a nutritional problem. It is quite important that the baby receive proper nourishment and as good a feeding as one can give, this is best accomplished through the breast milk. One problem that came up with this baby was the question of keeping it with the mother so that the mother would be able to nurse the baby.

The giving of the arsphenamin may have started up the syphilis, especially the cerebral syphilis as the rise in body temperature suggests. However, I still think that the treatment that was given the child was the correct treatment. One or two injections of neosarsphenamin given to a child like this will usually clear up the symptoms surprisingly. In a great many cases after a few days one may not recognize the child as sick. The rash disappears, the snuffles clear up and the patient seems very much better. I do not see how in this case we can decide on the data given whether the death was from cerebral syphilis with damage to vital cells in the brain.

DR. AUSTIN W. CHEEVER. I think the situation has been very well covered. I certainly think that there was ample evidence on which to make a diagnosis without waiting for blood tests and to start treatment immediately. I am inclined to believe that the death was a Herxheimer reaction but I cannot be at all sure. If so I do not think one should be disturbed about it because if the child was in such bad condition that one injection of neosarsphenamin would light up the Herxheimer seriously enough to cause death, in all probability if milder treat

ment had been started, such as mercury, in the hope of preventing a Herxheimer reaction, the child would have grown rapidly worse from the syphilis and would probably have died from lack of sufficiently energetic treatment. The Herxheimer reaction in adults with late syphilis is something to be watched for and avoided if possible. But that is a different problem. With syphilis in the adult it is not so overwhelming as it usually is in babies. I feel this was a death from syphilis probably all the way through.

DR HIGGINS: Do you not think it is rather unusual that the symptoms of what we may call secondary syphilis appeared when the child was five weeks old instead of being present when the child was born?

DR CHEEVER: No, I do not. I rarely have seen any evidence younger than two or three weeks. The books give one the idea that the child is frequently born with early syphilis and has the wizened old man look, but I have seen only one or two. As you look back I think you have not seen very many. I think from two to three weeks is about the time these rashes start.

#### CLINICAL DIAGNOSIS

Congenital syphilis

DR RICHARD S. EUSTIS'S DIAGNOSES

Congenital syphilis  
Bronchopneumonia  
Meningitis?

#### ANATOMIC DIAGNOSES

Congenital syphilis  
Bronchopneumonia

Luetic meningitis?

Cirrhosis of the liver, syphilitic

Fibrosis of the adrenal cortex

Septicemia, streptococcus hemolyticus

#### PATHOLOGIC DISCUSSION

DR TRACY B. MALLORY: I think the post mortem can only answer a few questions, certainly not all the interesting ones in this case. There is no doubt that the child had congenital syphilis, of course. The most striking features at autopsy, confirming what was found on clinical examination, were the conditions of the liver which showed diffuse cirrhosis of the type that is found only in congenital syphilis, and a uniform fibrosis running throughout the lobules. The epiphyseal lines showed very slight changes. I would not be able to make a flat-footed diagnosis from them alone, but on the basis of the liver there can be no question that we are dealing with congenital syphilis. The autopsy was restricted and we did not examine the head. A postmortem lumbar puncture was done and that gave a fairly turbid fluid with some increase in lymphocytes. A Wassermann was done and was anticomplementary.

I do not know any way of making a post mortem diagnosis of a Herxheimer reaction. The child did have a fairly extensive bronchopneumonia, both upper lobes were consolidated and the sections look histologically like a perfectly ordinary bronchopneumonia of the secondary infectious type. The blood culture showed hemolytic streptococcus. It certainly was not a syphilitic pneumonia.

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## ACUTE LYMPHOCYTIC MENINGITIS

FIRST clearly described by Wallgren in children and by Viets and Watts in adults, a syndrome, variously called "aseptic", idiopathic, epidemic and acute lymphocytic meningitis has been thought by some to be a clinical entity in spite of its unknown etiology. The disease, self limited in character, with a mild lymphocytic formula in the cerebrospinal fluid showed many constant signs that suggests a single causative agent. Only recently, as the result of Armstrong's investigations in the laboratory of the National Institute of Health, United States Public Health Service, the probable etiology has been disclosed.

The cause of this malady is a filtrable virus, recovered by Armstrong and Lillie and reported by them in 1934. The disease has not only been developed in monkeys but protective antibodies have been found in the blood serum of recovered human cases, both by Armstrong and by Rivers and Scott.

It is therefore felt that the symptom com-

plex is a disease entity, that the etiology is a filtrable virus and that the term "aseptic", as used by Viets and Watts, ought, in the light of more recent knowledge, to be replaced by an other designation such as the one suggested by Armstrong, "acute lymphocytic choriomeningitis", or, more simply, "acute lymphocytic meningitis".

If the work of Armstrong and the co-workers is upheld, as it appears to be by the report of others, a new disease should be added to medicine. This suggestion, made first by Wallgren in 1926 and again by Viets and Watts in 1929 and 1934, is now made more certain by the finding of a filtrable virus as the etiological agent.

## REFERENCES

1. Armstrong Charles and Lillie, R. D. Experimental lymphocytic choriomeningitis of monkeys and mice produced by virus encountered in studies of 1923 St. Louis encephalitis epidemic. Pub Health Rep 49: 1619 (Aug 21) 1934.
2. Armstrong, Charles and Woolley J. G. Studies on the origin of a newly discovered virus which causes lymphocytic choriomeningitis in experimental animals. Pub Health Rep 50: 537 (April 18) 1935.
3. Armstrong, Charles and Dickson, Paul F. Benign lymphocytic choriomeningitis (acute aseptic meningitis). Pub Health Rep 50: 631 (June 21) 1935.
4. Rivers, T. M., and Scott T. F. M.: Meningitis in man caused by a filtrable virus. Science 81: 439 (May 3) 1935.
5. Viets, Henry R. and Watts James W. Aseptic (lymphocytic) meningitis. J. A. M. A. 63: 1553 (Nov 14) 1919.
6. Viets, Henry R. and Watts James W. Acute aseptic meningitis. J. Nerv & Ment. Dis. 50: 263 (Sept.) 1934.
7. Wallgren, A. A peculiar form of epidemic meningitis (acute aseptic meningitis). Wien Arch. f. Inn. Med. 131: 297 (Feb) 1924.

## CANINE DAYS

ONE did not have to sense the heat or to read the reports of drowning and week-end motor casualties to realize that we have passed through another summer. A glance through our public prints told us that it was the silly season in newspaperdom. We know that that is the time of year when space-fillers are required, so we do not object to the trivial and banal notices that round out many a column. We pass over with a deprecatory smile accounts of "human icicles" and their mock heroism in subjecting themselves to bizarre experiments although we frown a little when such publicity exploits are described as "aids to science". We wonder what specialty is practiced by the "special correspondents" who by cable would startle the world by telling us that the scientists assembled in Moscow have at last discovered that crinism and some nervous disorders are due to dysfunction of the thyroid gland. Those uninformal readers who like this sort of mental pabulum are welcome to it.

Our objection is directed not against these cheap and stale items but against the avidity with which the agents of the large press services hunt out and report untried remedies and unproved medical theories. We object not because our complacency is disturbed but because



of the lamentable and tragic sequels of such stories

We remember with sorrow the despair that followed the highly exploited visit of a Berlin physician, who, a large advertising syndicate would have us believe, held in his notorious "turtle bacillus" a cure for tuberculous infections. We recall the renewed hopes of tuberculosis sufferers at this announcement, how they deserted their physicians, then sanatoria and health resorts, only to return poorer in pocket and in health, with hopes crushed and frequently with cold abscesses for full measure. It was an outrageous affair.

Only recently we read in our esteemed *New York Herald Tribune*<sup>6</sup> an account with the arresting headline, "Cancer Arrest by New Liquid Product." It related how an Ontario physician had, from harmless tiny organisms, produced a preparation which arrested the development of "carcinoma cancer." We know of the wave of eagerness which must have swept over the ranks of cancer victims when they read this "news", we know of their rush to secure some of this precious "Enesol", and, unless all precedents fail, we can foresee the cruel disappointment which may await them. If they lost faith in the medical news of their daily newspaper we would applaud, but, instead, they lose faith in medical science.

Our reproach is not directed against the Canadian doctor who gave in to the insistence of newsmongers, although it is a human possibility, if not a modern human tendency, to resist high-pressure reporters and their cameramen. Our sympathy goes to him. Our resentment is directed against the large news-gathering associations that serve our newspapers, and against the editors who not only accept these premature reports but give them bold display in their sheets. There is the "Science News Service" which gives to those publishers who desire it reliable accounts of scientific progress, but these accounts are not sufficiently florid to satisfy the present-day craving for "hot" news. The New York Academy of Medicine offers the daily papers wise estimates of medical events and discoveries. In its conservative comment (by Doctor Goldstein) on Doctor Connell's reported cure, he sounded the warning that "bitter experience has taught us to accept all announcements of discoveries on the cause or cure of cancer with utmost caution." The *Herald-Tribune* in its caption "Academy of Medicine Here Calls Report Remarkable," omitted Doctor Goldstein's "if correct." It would have pulled their punch.

We have had previous occasion to inveigh against the unscrupulous newspaper advertisement of nostrums, and now, for the public's sake and in the interest of the practice of medicine, we beg for expert supervision over the stories

of medical affairs that go into our newspapers. We cannot rid our memories of the tragedies that have been caused by this cruel exploitation of alleged cures.

## PHYSICIANS AND VITAL STATISTICS

To the physician in his practice, vital statistics seem remote, and since, in Massachusetts they are collated for the Commonwealth by the Secretary of State and not by the Commissioner of Public Health, they may appear almost irrelevant. He forgets that among other things they give a picture of what he is doing.

It may not be of general interest that last year one person died in each of the towns of Gosnold, Middlefield and Rowe or that even six were so recorded in Gill, but the charts which appear in the Annual Report should be studied not only by every physician, but by every person interested in the health of the people of the Commonwealth. There are shown graphically the rapid increase since 1930 of the number of deaths from heart disease and from cancer and from diabetes, a continuing upward swing in these figures. The appalling number of deaths from automobile accidents rose sharply in 1934. There is a little improvement in dealing with appendicitis, the mortality from which one would expect to find diminishing instead of increasing as it has in recent years. The figures for tuberculosis and for "infant mortality" are the most encouraging.

This statistical presentation is fascinating in spite of the well-known inaccuracy of the method because in the case of each group it makes insistent for the thoughtful physician the question "Why?" The multiplicity of challenges is a little disconcerting.

There are two obvious errors associated with the statistical method: errors of fact and errors of interpretation. Concerning errors of fact the Report says: "The chief element of error in mortality statistics lies in the inaccuracy of the statement of the cause of death as reported by the attending physician", and the mitigation of the severity of this condemnation follows: "who may not have been in a position to feel reasonably certain as to the nature of the terminal illness."

It is not that the physician has any intent to deceive. Too often he is unaware, in the nature of things, of the exact changes which have taken place in the body of his patient and his statement of the cause of death is an approximation toward a final diagnosis. It behooves every physician, in the interest of science, that pole star of practice, to use every effort to make his approximation as close as possible to the actual facts, and be not satisfied with merely meeting the minimum requirements under which a death certificate will be accepted by the town clerk.

## THE COMMONHEALTH

## TUBERCULOSIS

A VALUABLE issue of the *Commonhealth* (Vol 22, No 1) the quarterly bulletin of the Massachusetts Department of Public Health is devoted to the subject of Tuberculosis and is made up of articles by eminent authorities on such subjects as Tuberculosis in the Practice of Medicine The Differential Diagnosis of Tuberculosis, The Diagnostic Dispensary, The Cure of Tuberculosis, The Role of Surgery in Pulmonary Tuberculosis, Hospitalization of Tuberculosis in Massachusetts, Diet in the Home Treatment of Tuberculosis, Extra-Pulmonary Tuberculosis, Tuberculosis in Children, The School Tuberculosis Clinic Program, Chadwick Clinic Results Tuberculosis Case-Finding in Children of School Age, Summer Health Camps, Teaching the Etiology of Tuberculosis, Policies and Routines for a Tuberculosis Nursing Service and Social Work for the Tuberculosis Patient. An article by Dr Alton S Pope, Director of the Division of Tuberculosis, shows the decline in the death rate from pulmonary tuberculosis from approximately 460 for females and 324 for males in 1849 to approximately 40 for females and 60 for males in 1933.

Certain definite advances have been made in recent years in the attack on tuberculosis. In the treatment of the adult type of pulmonary tuberculosis, collapse therapy has become widely accepted and has been responsible for the saving of many lives, and the shortening of the course of the disease in innumerable instances. Our new conception of the distinction between primary tuberculosis as it occurs in the child in the non sensitive individual, and reinfection giving rise to the adult type in the sensitized individual, either adult or child, has clarified the picture of the course of the disease and the part that allergy plays in that picture. We realize now that childhood tuberculosis, important as it is, is fundamentally a benign infection, but that, instead of immunizing the individual, as was formerly believed, it actually renders his tissues susceptible to the tubercle bacillus so that a reinfection will give rise to the adult type of phthisis.

In Massachusetts, particularly, a fundamental concept in tuberculosis control has been put into effect with the Ten Year Program of case-finding in the public schools of the state. In this ten years, just ended, 400,000 school children have been examined by tuberculin test and x ray of reactors and the work will continue under the control of the regional sanatoria. In Massachusetts also, the tuberculosis summer health camp has reached its fullest development under the joint agency of the tuberculosis associations and the county sanatoria, ever mindful of the doctrine that "a camp is as good as its follow up."

The treatment of tuberculosis must continue, but in prevention lies the way to its eradication, and prevention depends on case-finding and follow up.

## THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

MUNRO DONALD A.B., M.D. Harvard University Medical School 1916 F.A.C.S. Assistant Professor of Neurological Surgery, Harvard Medical School Surgeon in charge of the Neurosurgical Service, Boston City Hospital, Boston. His subject is "The Treatment of Compound Fracture of the Skull" Page 551 Address 818 Harrison Avenue, Boston

BOWMAN, KARL M. A.B., M.D. University of California 1913 Assistant Physician, Bloomington Hospital 1915 1921 Chief Medical Officer, Boston Psychopathic Hospital 1921 Assistant Professor of Clinical Psychiatry, Boston University School of Medicine Special Instructor in Social Psychiatry, Simmons College School of Social Work Address 74 Fenwood Road Boston Mass. Associated with him is

HOWARD, PAUL M. B.A., M.D. University of Pennsylvania School of Medicine 1933 Intern, Methodist Episcopal Hospital Philadelphia, Pa., 1933-1934 Intern Boston Psychopathic Hospital, 1934-1935 Intern, Neurological Service, Boston City Hospital, 1935 Address Boston City Hospital, Boston. Their subject is "Report of a Case of Lead Encephalitis Due to Tri Ethyl Lead" Page 559

BARDOUR, ELLEN H. Graduate, Simmons College School of Social Work Social Worker at Clinic for "Study of Growth Development of Normal Child," Harvard School of Public Health. Her subject is "Adjustments During Four Years of Patients Handicapped by Poliomyelitis" Page 563 Address 54 Hancock Street, Lexington, Mass.

MARSH, GEORGE A. A.B., M.D. Harvard University Medical School 1928 Assistant in Surgery Massachusetts General Hospital Junior Visiting Surgeon, Chelsea Memorial Hospital Surgical Assistant, Huntington Memorial Hospital Assistant in Surgery, Tufts College Medical School, and the Cambridge Hospital. His subject is "A Method of Repair of Femoral Herniae by a Fascial Strip from the Aponeurosis of the External Oblique Muscle" Page 565 Address 198 Commonwealth Avenue, Boston.

MCGILL, CHESTER F. M.D. Tufts College Medical School 1915 His subject is "Congenital Pyloric Obstruction" Page 567 Address 82 Congress Street Portsmouth, New Hampshire

SCHALL LEROY A MD Jefferson Medical College of Philadelphia 1917 FACS Instructor in Laryngology, Harvard University Medical School Surgeon, Massachusetts Eye and Ear Infirmary Assistant Laryngologist, Huntington Memorial, Palmer Memorial and Robert Breck Brigham Hospitals His subject is "Progress in Laryngology" Page 574 Address 270 Commonwealth Avenue, Boston

## The Massachusetts Medical Society

### SECTION OF OBSTETRICS AND GYNECOLOGY\*

C J KICKHAM, M.D., R S TITTS M.D.,  
*Chairman* *Secretary*  
524 Commonwealth Ave., 472 Commonwealth Ave.,  
Boston, Mass Boston, Mass

#### THE ANEMIAS OF PREGNANCY

Thanks to the excellent work of Strauss, Castle and others, the hitherto vague subject of anemia in pregnancy has been clarified, its etiological factors ascertained and correlated, and the treatment made sure and simple. Recent studies have shown that a large percentage of pregnant women show a varying degree of anemia from no apparent cause, i.e., in the absence of hemorrhage, sepsis or chronic disease. These "anemias of pregnancy" are divided into two types. The hypochromic anemia (corresponding to simple secondary anemia) and the macrocytic anemia of pregnancy (corresponding to pernicious or Addisonian anemia). It should be noted here that this is not the true pernicious anemia and differs from it in the fact that it clears up after pregnancy is terminated and does not recur.

Hypochromic anemia has its etiology in several factors (1) defective diet, principally a lack of sufficient iron, (2) disturbances in gastric secretion, i.e., a lowering or absence of free hydrochloric acid. This gastric inefficiency has been shown to occur in more than fifty per cent of all pregnant women. (3) Inasmuch as the fetus draws its blood-forming materials from the mother, this represents a "chronic blood loss" to the mother.

The blood picture in these cases is that of simple secondary anemia, the decrease in hemoglobin is greater than the decrease in the number of red blood cells. The patient shows varying symptoms: pallor, fatigue, edema, dyspnea, digestive disturbances, etc.

The administration of iron in the form of iron and ammonium citrate, ninety grains a day, or of ferrous sulphate, nine grains a day, will

cure this condition and restore the patient to normal health.

Macrocytic anemia of pregnancy is fortunately not so common. This is frequently referred to as the primary anemia of pregnancy. It has its etiology in similar factors: (1) Dietary insufficiency (principally a lack of animal protein [vitamins] B) (2) Gastric insufficiency or lack of a specific factor in the gastric secretion necessary for the formation of blood cells. Experiment has shown that both these factors are essential for normal hematopoiesis.

The blood picture in these cases is like that of pernicious anemia. The decrease in the number of red cells is greater, proportionately, than the decrease in hemoglobin content, giving a color index of +1. Macrocytes and microcytes abound. The symptoms are more severe, weakness, nausea, vomiting, diarrhea, sore tongue, etc.

Liver or liver extract by mouth or injection will cure these patients. Relapse does not occur. Inasmuch as these patients have the same deficiencies that cause hypochromic anemia, iron must be added to the treatment.

As a matter of prevention, the diets of pregnant mothers should be sufficiently rich in iron and animal protein. Small doses of iron in either of the forms mentioned should be given prophylactically to every patient.

## MISCELLANY

### DR. GEORGE BURGESS MAGRATH HAS RESIGNED

The resignation of Dr. George Burgess Magrath, for many years medical examiner of Suffolk County, has been announced.

Dr. Magrath has occupied an enviable position in the confidence of the medical profession and the courts not only in Massachusetts but throughout the country, for he has played a prominent part in the development of the Medical Examiner System in supplanting the old coroner practice.

His reputation for profound knowledge of the problems incident to homicide has led to his employment in many prominent trials. Like many eminent persons in public life, he has survived the opposition of those who on occasion have tried to prevent his reappointment. A long list of governors has continued Dr. Magrath in office, which is a tribute to his standing.

It is hoped that he will have the comfort and enjoyment of a serene release from the controversies of public life. The *Journal* congratulates Dr. Magrath on his honorable retirement.

### ANTERIOR POLIOMYELITIS CASES FOR 1935

WEEKLY LIST, SEPTEMBER 9 TO 14

City of Town

Dartmouth

Fall River

1  
6

\*A series of short selected articles by members of the Section will be published weekly.  
Comments and questions by subscribers are solicited and will be discussed by members of the Section.

Lakeville	1
Somerset	2
Taunton	1
Westport	2
Brockton	1
Dedham	2
Franklin	1
Milton	1
Quincy	1
Weymouth	2
Boston	56
Brookline	1
Cambridge	6
Chelsea	1
Everett	3
Lexington	1
Malden	5
Medford	1
Melrose	1
Newton	3
Somerville	6
Watertown	1
Winchester	1
Andover	1
Beverly	1
Gloucester	1
Groveland	1
Haverhill	7
Lowell	3
Lynn	2
Newburyport	1
North Andover	1
Reading	1
Salem	3
Fitchburg	1
Leominster	1
Milford	1
Westminster	1
Sterling	1
Springfield	1
Dalton	1
Hinsdale	1
Pittsfield	1
TOTAL	143

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died

Sept. 11 1849  
ae. 20 yrs. 10 mo. 12 d.

Reader, if your friend breathes too frequently, however mild the other symptoms, rest not easy under the fallacious idea that "It is nothing but a cold."

One may infer that this son was the victim of pneumonia, and that the epitaph aimed to prevent a similar catastrophe among his friends and neighbors. Since the father died five months after this son's death, it is possible that the epitaph was written by his surviving brother, Dr. Charles Lorenzo Knowlton (1824-1898), who attended at Berkshire Medical Institution in 1843-44 and graduated at Jefferson Medical College in 1845. He practiced for over fifty years, the greater part of this time at Northampton, Massachusetts. He was a member of the Massachusetts Medical Society from 1851.

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Lakeville	1
Somerset	2
Taunton	2
Westport	1
Brockton	2
Dedham	1
Franklin	2
Milton	1
Quincy	1
Weymouth	2
Boston	56
Brookline	1
Cambridge	6
Chelsea	3
Everett	1
Lexington	1
Malden	5
Medford	3
Melrose	1
Newton	3
Somerville	6
Watertown	1
Winchester	1
Andover	1
Beverly	1
Gloucester	1
Groveland	1
Haverhill	7
Lowell	8
Lynn	2
Newburyport	1
North Andover	1
Reading	1
Salem	3
Fitchburg	1
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## DR. BURWELL'S POSITION ON THE STAFF OF THE PETER BENT BRIGHAM HOSPITAL

Dr Charles S Burwell, Dean of the Harvard University Medical School, has been appointed to the position of Physician on the Staff of the Peter Bent Brigham Hospital

## RECENT DEATHS

**GOODELL**—GEORGE ZINA GOODELL, M D, of 5 Williams Street, Salem, Massachusetts, died at his home September 9 after a long illness. He retired from practice several years ago. Dr Goodell was born in Salem in 1859 and after graduation from the high school studied at and graduated from the Harvard University Medical School in 1881.

He joined the Massachusetts Medical Society in 1881 and retired in 1933. He devoted his major activities to diseases of the ear, nose and throat. He served on the staff of the Salem Hospital from 1883 to 1894 and in 1889 and 1890 was Superintendent of that institution.

He was treasurer of the Essex South District Medical Society for twenty five years and was a member of the New England Society for Physical Therapeutics, Essex Lodge of Odd Fellows and the local lodge of United Workmen.

Dr Goodell is survived by his daughter, Mrs Raymond H. Odell, two brothers, Frank T and Oliver W Goodell, and two sisters, Mrs George E Patter son and Mrs Walter P Pratt, all of Salem.

**HALE**—EDWARD P HALE, M D, of Lenox, Massachusetts, aged seventy five, died at his home September 9, 1935. Dr Hale was born in Danvers, Massachusetts, and graduated from the Bellevue Hospital Medical College in 1881. He practiced in Vermont and also was resident physician at the Danvers State Hospital for a brief period before settling in Lenox.

He was president of the Lenox Savings Bank, a trustee of the Lenox Academy and a member of the Massachusetts Medical and local Societies.

Dr Hale is survived by his widow, Mrs Anna P (Walker) Hale.

**CRONIN**—THOMAS JOSEPH CRONIN, M D, of 29 Forest Street, with an office at 36 Pleasant Street, Worcester, Massachusetts, died at the Memorial Hospital, Worcester, September 10, 1935.

Dr Cronin was born in 1865 at Braidwood, Illinois, the son of Mr and Mrs Henry D Cronin. Early in his life the family moved to Millbury, Massachusetts, where his preliminary education was acquired, later he attended the College of Pharmacy in Boston. He graduated in medicine from the Baltimore University School of Medicine in 1898. Before settling in Worcester, he practiced for several years in Webster, Massachusetts. For many years he was eye, ear, nose and throat consultant

at the Fairlawn Hospital. He joined the Massachusetts Medical Society in 1898 and was also a Fellow of the American Medical Association.

Dr Cronin was prominent in Masonic circles, the Worcester Economic Club and the Central Congregational Church, Worcester. He is survived by his widow, Mrs Louise (Schwegler) Cronin, two daughters, Miss Dorothy Cronin and Mrs Frank L Harrington, a brother, John D Cronin, and a sister, Mrs Nellie Feehan, both of Millbury.

## NOTICES

### IMPORTANT ANNOUNCEMENT TO PHYSICIANS AND HOSPITALS

Due to physicians' unfamiliarity with Government requirements in submitting charges, more than 50,000 accounts submitted by physicians and hospitals in Civil Works Administration injury cases were returned for correction, or held for further information, necessitating undue delay in payment, because of one or more discrepancies.

As a former supervising auditor of the U S Employees' Compensation Commission, I have condensed to a four page booklet under the title "Instructions to Physicians and Hospitals for Submitting Charges in Federal Injury Cases," the numerous requirements scattered throughout 60 detailed pages of the Government's regulations, each point being separately paragraphed and headed for the most convenient reference.

The following points are covered

- Authority for treatment
- Medical and x ray reports
- X ray films
- Charges in disease cases
- Postmortem examinations
- Dental charges
- Charges for drugs
- Charges for appliances
- Physicians owning hospitals
- Payment for personal property
- Submission of x ray charges
- Charges for blood
- Itemization of accounts
- When to submit charges
- Joint accounts
- Required signatures
- Hospital charges
- Nurses' charges
- Assistants and consultants' services

In addition to the foregoing the booklet covers several important points such as inquiry as to payment of accounts, time required for receipt of remittances after payment is authorized, how charges may be expedited for payment, and other valuable information to physicians and hospitals having charge in Federal injury cases.

This booklet is neatly prepared, has a durable cover, and is convenient for pocket or office use.

It is an accurate and ready reference, covering every requirement, a guide to coöperation and the avenue to correct submission and the earliest possible payment of accounts. This guide will save time money worry and waiting.

With an increasing number of people being employed subject to Government compensation benefits, and with the near possibility of an added number of physicians being called upon to serve their Government as a result of recent social legislation every physician should familiarize himself with Government requirements in respect to charges.

Price \$1.00 the copy postpaid. The price is negligible in comparison with the booklet's practical and beneficial value. Order now.

C. B. RIDDLE.

Washington D. C., P. O. Box 442

#### DR WILLIAM P MURPHY ASSUMES INDEPENDENT PRACTICE

Dr William P Murphy formerly associated with Dr Edwin A. Locke and Dr George R. Minot, will continue his office and consultation practice independently at his present address 311 Beacon Street, Boston Massachusetts.

#### DR S F MARSHALL JOINS THE LAHEY CLINIC

Dr Frank H. Lahey wishes to announce that Dr Samuel Frederick Marshall who for the past ten years has been associated in surgery with the Henry Ford Hospital in Detroit, Michigan has been appointed as one of the surgeons to the Lahey Clinic.

#### WORCESTER NORTH CANCER CLINIC Burbank Hospital Fitchburg Massachusetts

#### NOTICE TO MEMBERS OF THE WORCESTER NORTH DISTRICT MEDICAL SOCIETY

September 11 1935

My dear Doctor

There will be a consultation cancer clinic September 24 at the Burbank Hospital 9:30 a.m. to 12:30 p.m. The consultants are Dr Grantley W. Taylor visiting surgeon to the Massachusetts General Huntington Memorial and Pondville Hospitals and Dr Charles C. Lund visiting surgeon to the Boston City and Huntington Hospitals.

We hope you will use this opportunity to be present with or refer by note any of your patients having cancer or suspicious of a malignant condition.

In order to facilitate the clinical routine we would appreciate the patients arrival at 9 o'clock. It has proved in other consultation clinics of value to have available any history regarding the patients condition. For your convenience in this matter we would be very glad to have you telephone at any time Fitchburg 4607 to give information to the clinic clerk Miss Irma Holmes.

We will appreciate your active participation with the clinic.

Very truly yours

WORCESTER NORTH CANCER COMMITTEE

DR. F. H. THOMPSON SR., Chm.

DR. WALTER F. SAWYER, Secy.

DR. HERVEY B. FITCHER

DR. ERSKINE R. PICKVICK

DR. CHARLES J. LASNETT.

#### ANNOUNCEMENT

CLARK W. HEATH M.D., has opened an office at 319 Longwood Avenue Boston Mass.

#### REPORT AND NOTICE OF MEETINGS

##### THE FOUR COUNTY MEDICAL SOCIETY

An interesting day was spent by the men who attended the meeting of the Four County Medical Society in Greenfield on Wednesday September 11. A series of case presentations was made by Greenfield doctors at the Franklin County Hospital and the following papers were presented:

Hyperthyroidism Dr. F. B. Sweet of Springfield  
Some Problems in Gall Bladder Surgery Dr. I. S. F. Dodd of Pittsfield

Some Observations on the Use of Evipal and Avertin by Dr. E. A. Knowlton of Holyoke

Femoral Hernia—The Inguinal Approach by Dr. F. Hagler of Springfield

The State Pneumonia Program by Dr. R. Heffron of Boston

The President of the Massachusetts Medical Society Dr. Charles Mongan, addressed the gathering in his usual pleasing manner. He stressed the importance of public-minded physicians and outlined the transactions taking place in Washington relative to the Social Security Law. Doctor Mongan placed especial emphasis on the need of coöperation and felt that we could best use our abilities in educating and molding public opinion on matters of socialized medicine.

An excellent luncheon was served at the Hotel Weldon and many of the doctors attending took advantage of the invitation of the Greenfield Golf Club to play on its links during the afternoon.

J. A. WHITNEY Secretary

#### THE CARNEY HOSPITAL

##### CLINICAL MEETING

September 23 1935 3 P.M.

The Clinical Diagnosis of Jaundice Dr. Howard M. Clute. Lantern Slides

The Technique of Arthroplasties Dr. W. R. MacAusland. Motion Pictures

Physicians and medical students invited.



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# The New England Journal of Medicine

VOLUME 213

SEPTEMBER 26, 1935

NUMBER 13

## EXPECTED LAGS BETWEEN CLINICAL DIAGNOSIS AND X RAY CONFIRMATION\*

BY HENRY A. CHRISTIAN, M.D.†

IN the great progress that has been made in the application of roentgenology to diagnosis, and none would fail to acknowledge this progress to have been a tremendous one clinicians often lose sight of certain inevitable limitations to this valuable method of diagnosis. Limitations inevitable by reason of the relationship between the x ray and its penetration through different tissues in the body and through different substances that can be introduced into the body. As a result of this they may accept a negative x ray report as contra-indicating a diagnosis made on clinical grounds. With proper understanding of the matter this should not occur.

Until certain structural changes which are demonstrable by x ray, have occurred, there is nothing that can be demonstrated by x ray. In some diseases such structural changes never occur; in others they occur only after well marked symptoms have developed; in still others structural changes demonstrable by x ray and symptoms appear almost simultaneously, not infrequently the changes demonstrable by x ray antedate the development of definite symptoms. In the first group come diseases like typhoid fever, Bright's disease, cirrhosis of the liver, many diseases of the central nervous system etc. in which x ray gives no help in diagnosis. It is the second group to which at this time I will direct attention for reasons already indicated in earlier sentences of this paper, giving some examples of what I term expected lag between clinical and x ray confirmation.

Severe, persisting backache is a common condition. As probable causes we recognize, among others, osteoarthritis of the spine and neoplasm of the vertebrae. The aid of roentgenology is sought. Clinically there is strong suspicion that neoplasm is the causative factor. The roentgenologist reports no evidence of neoplasm involving the bone, or he may report evidences of osteoarthritis. Does such report justify the clinician in giving up his diagnosis of neoplasm? No. I have observed patients with such x ray reports in whom the pathologist soon could dem-

onstrate neoplasm or in whom later on the x ray showed tumor, if arthritis was present, it was not a cause of pain. I will cite briefly such a patient.

A woman of fifty-two came to the hospital complaining of pain in the back of four months duration, recently very severe. The right lobe of the thyroid was enlarged, irregular and very hard. The diagnosis of malignant tumor of thyroid with metas-

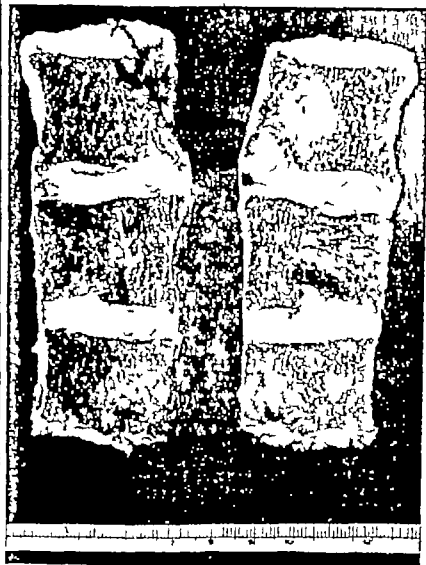


FIGURE 1 1st, 2nd and 3rd lumbar vertebrae showing tumor metastases.

tases in the spine was made and this patient was demonstrated by me as such at a clinic held on November 22. The x ray report on November 8 was as follows: "Anteroposterior films of thoracic and lumbar spine and pelvis show no evidence of metastases. There are only slight arthritic changes." X ray repeated on November 20 was reported as follows: "Anteroposterior stereo of the spine and lateral shows no definite evidence of metastasis. Vertebrae appear slightly decalcified, and there are changes in the articular processes of fourth and fifth thoracic but these probably are

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arthritic" The patient died December 17, and at autopsy there was found carcinoma of the thyroid with metastases to regional tissues, mediastinum, liver, lungs, vertebrae, ribs, left iliac bone and in tercostal muscles. What particularly interests us in this connection are the findings in the vertebrae not revealed by x-ray but obviously of a nature to be the cause of the pain in the back that the patient complained of. "On examining the vertebral column the second lumbar vertebra is seen to be involved by tumor growth. It is extremely soft and presents a reddish gray color instead of white. It is so soft that slightest pressure causes a compression of the vertebra. A saw cut made through the first, second and third lumbar vertebrae (fig 1) shows that the entire anterior half of the second lumbar vertebra is completely destroyed by tumor tissue. The bone is extremely soft, reddish gray in color, almost fluid in consistency. The posterior half also is involved by tumor. Here the tissue is firmer and has a more whitish gray aspect. The first lumbar vertebra also shows a large tumor nodule approximately  $1\frac{1}{2}$  cm. in diameter, which is reddish gray in color and shows a central area of necrosis of approximately 1 cm in diameter. Here the tissue is fluid in consistency. The third lumbar vertebra shows a similar area of metastasis, which is approximately  $1\frac{1}{2}$  cm in diameter, the larger portion of which is necrotic and fluid in consistency."

It is well to remember in this connection that after the age of fifty, osteoarthritic changes in the spine are very frequent, they may be symptomless, even when very marked as shown by x-ray.

Pleural fluid, recurring several times following paracentesis, in a patient without evidences of cardiac insufficiency justifies a clinical diagnosis of neoplasm as the cause even when the roentgenologist reports no evidence of tumor. The interval between such clinical diagnosis and x-ray confirmation may be a long one as shown by the following history:

A man, aged 49, was admitted to the hospital on October 24, 1932 with the physical signs of right-sided pleural effusion. He had previously been in the Out Door Department and on October 6, 1932 an x-ray showed the right diaphragm obscured by fluid which rose in the axilla, the right chest appeared flattened and the right lower border of the lung was atelectatic, fluoroscopy showed a collection of fluid in the septum between the upper and lower lobes on the right, the posterior mediastinum was clear.

On the day of admission to the hospital 1,400 cc of fluid was removed from the right chest with a specific gravity of 1.018 and a cell count of 24 lymphocytes and 41 red blood cells. No bacteria could be found either microscopically or on culture. On November 3, 1,100 cc fluid was removed from the same chest on November 15, 1,050 cc. and on November 25, 700 cc.

He remained in the hospital until November 29, 1932. On November 26 the sixth x-ray examination of his chest gave the following: "Stereo x-ray still shows mottling of the right lower lobe but only a small amount of fluid. The process in the right upper posteriorly is unchanged. There is no essential change since previous examination." The previous examination contained the statement "there is no evidence of neoplasm."

During his stay in the hospital this patient was

demonstrated by me in a clinic as an example of pleural effusion due to neoplasm though x-ray had failed to show any evidences of this.

He was readmitted to the hospital on February 28, 1933 and remained until March 4, 1933. During this stay his chest was tapped twice, once with the removal of 1,600 cc and once with the removal of 400 cc. Careful study of various fluids showed no cells suspicious of tumor origin.

On March 3, 1933, a ninth roentgen examination of the chest was reported to show only slight further clearing of the right base. There was still enough fluid to obliterate the diaphragm and costophrenic angle. Fluoroscopy gave no additional information. Five months after the first x-ray showing fluid in the pleura there was still no x-ray evidence of tumor.

This patient was lost sight of until, on March 15, 1934, in a letter from Dr. E. D. Churchill of the Massachusetts General Hospital in regard to him the following statement is made: "Several weeks ago I explored this man's chest and found a primary carcinoma of the lung situated in the upper lobe with metastasis to the visceral pleura in the upper mediastinum. Microscopic section of a biopsy from this metastasis showed adenocarcinoma." This operation was almost a year and a half after pleural fluid had developed and nearly as long since the patient had been presented in a clinic as an example of pleural fluid due to tumor.

Prolonged fever often is difficult to explain. In the absence of demonstrable causes of various sorts, neoplasm should be considered as the cause and diligently sought for by all possible methods of examination including of course x-ray studies such as may be applied. Sometimes such x-ray studies are negative, when later they demonstrate a neoplasm, in other words, a neoplasm causing the symptoms of prolonged fever may fail to show in x-ray until further time has elapsed for the neoplasm to progress to x-ray visibility. Bone metastases may become demonstrable later and explain such a fever, just as has been indicated in the instance of back pain. Lung tumor similarly may become demonstrable as in the following patient.

A woman of sixty-four came to the hospital on February 3 with the story that for some four months there had been progressing fatigue, some cough, fever, a marked change in personality with depression and with recent confusion and disorientation. On December 22 she had been seen by a colleague, who could not make an adequate diagnosis, physical examination gave no definite findings. A week before he saw her, an x-ray examination of her chest, made on account of cough, had shown only slight peribronchial enlargement at the right hilus. When she came to the Peter Bent Brigham Hospital on February 3 the liver was considerably enlarged, and there were signs of fluid, small in amount, in each pleural sac. X-ray of the chest showed a small, rounded mass in the right hilus, 3.5 cm in diameter, suggesting to the roentgenologist a metastasis rather than primary carcinoma. There was a small amount of fluid in each costophrenic angle, slightly more on the left. She died on February 14, and autopsy showed primary bronchiogenic carcinoma at hilum of right lung with extensive metastases. Neoplasm was the cause of the fever and other symptoms.

A patient's history may be strikingly indicative of pulmonary abscess following tonsillectomy.

tomy, extraction of teeth or pneumonia. There is fever, sputum may be abundant, sometimes foul, physical signs indicate a local pulmonary process, a clinical diagnosis of lung abscess is made, x ray shows no evidences of abscess but does show a localized shadow from infiltration of the lung, a pneumonic consolidation, later a repeat x ray shows a suggestion of abscess the next x ray shows an abscess cavity, probably with fluid level. The x ray lag in such cases may be very long as in the following patient (42970) but it averages in my experience about ten days.

A Negro man aged forty was admitted to the hospital May 8 1933 giving the following history. For approximately one month the patient has had a paroxysmal cough productive of large amounts of foul-smelling sputum. During this period he has had drenching night sweats. On the morning of admission during a paroxysm of coughing he had a sensation of something giving away in his left upper chest, and immediately thereafter he raised a large quantity of extremely foul-smelling sputum. There is no history of aspiration of foreign body or previous cold in the chest. Two years ago the patient had a tooth extracted and he has had dental caries for years.

Physical examination of the lungs showed a normal right lung. On the left side behind from the mid portion of the scapula half way down to the base there was moderate dullness in an ill-defined area. Over this area breath and voice sounds were slightly diminished, but breath sounds were harsh in character and at times suggestively tubular. There were numerous coarse râles on both inspiration and expiration. The rest of the left lung seemed normal. The clinical diagnosis of lung abscess was made.

On May 9 stereo x ray of the chest showed the right lung to be clear. There was diffuse clouding through the middle third of the left lung with a slight increase in the markings extending toward the base. "The process is apparently in the posterior portion of the chest and is probably in the upper portion of the lower lobe. No definite cavity formation seen. Impression pneumonic process in the left lower lobe."

Two weeks later on May 23 reexamination of the chest showed a definite spread of the process in the left lung which now involves the upper two-thirds most marked around the hilus. "There are now several indistinct small clear areas posteriorly which may be beginning cavities. Heart and trachea are not displaced. Impression pneumonic consolidation, probably beginning pulmonary abscess."

A third x-ray examination on June 10 a month after the first one, showed the extent of involvement slightly less than at previous examination with clearing of the lower portion. "There is now a definite cavity rather deep in the lung in line with the first interspace anteriorly fifth rib posteriorly 6 cm. from the midline. There is definite clouding of the pleura over the left upper lobe. Left diaphragm is elevated and slightly limited. Impression pulmonary abscess."

Additional x-rays were taken and on July 14 the fifth x-ray examination of the chest showed marked clearing of the process in the left upper lobe, and the cavity had disappeared. "There is now only slight consolidation around the left hilus extending into the left upper lobe. Right lung remains clear."

It might be put thus, something in the lung that is not, namely a cavity is not roentgenologic

cally demonstrable, if the surrounding exudation in the pulmonary tissue in relation to the cavity is relatively extensive, or if the cavity is filled with exudate similar to that in the surrounding parenchyma. These are conditions which exist almost always in some stage of lung abscess and hence the delay in their demonstration by x ray.

Bronchial stenosis often gives definitive physical signs when x ray may show no positive evidences of change in the lung parenchyma. X ray obviously, may fail to show anything to indicate the obstructing lesion in the bronchus, if there is no peribronchial lesion at the point of the partial stenosis. Later on, when obstruction becomes more marked, x ray will demonstrate the partial or complete airlessness of that portion of the lung.

Osteomyelitis is another condition in which there should be recognized a very considerable lag between symptoms and x ray confirmation of diagnosis, whether we are dealing with long bones or flat bones. In mastoiditis, not realizing this may cause serious delay in performing the needed operation. Cause of symptoms indicating septicemia may be missed by reason of x ray not showing osteomyelitis, let us say in the femur. The lag in osteomyelitis is variously stated as one to several weeks.

Arthritis is still another example. It is surprising often how little the x ray can demonstrate in a very obvious disabling rheumatoid arthritis after a long duration of symptoms. Gouty changes in joints notably may give no evidence of gout when the joints are studied roentgenographically. The roentgenologist is not justified in saying, as he sometimes does, by x ray this condition is chronic osteoarthritis not gout. Often one sees deposits of uratic material on the cartilaginous surfaces of joints which in no way could be evident in the x ray film.

I have proved a pulmonary tuberculosis, suspected from history including recent hemoptysis and from the hearing of a few localized râles, by finding tubercle bacilli at a time when the x ray showed no lesion, later x ray revealed a parenchymal lesion in the region where râles had been heard. Of course far more frequent is it for the x ray to reveal pulmonary tuberculosis, only suspected from history, of whose occurrence no other evidence could be found.

Also there may be a lag between symptoms and x ray demonstration of cancer of the stomach or bowel. Sometimes the clinical story is so suggestive as to point definitely to the diagnosis and yet x ray is not confirmatory, much more often the clinical picture is only definite enough to suggest some disturbance of stomach or bowel. I have seen some definite examples of failure of the x ray to show the lesion in stomach or bowel in such patients when repeat x rays a few weeks later showed unmistakable

evidence of cancer, this has occurred oftenest with cancer of the stomach, less frequently with cancer of the intestine

Very probably other examples might be offered, but I am not attempting a full category of conditions in which a lag between clinical diagnosis and x-ray confirmation can occur. I am merely pointing out that it not infrequently does occur.

In the above I have sought to present by a few examples a phase of the problem of x-ray in diagnosis, all too often not sufficiently realized by clinicians and not appreciated by poorly trained roentgenologists. For him who understands the fundamental principles of x-ray in diagnosis, and this of course includes all well-trained roentgenologists, it is not necessary to point out that in some conditions a lag between clinical diagnosis and x-ray confirmation is to be expected, a lag which lengthens with the increased experience and diagnostic acumen of

the clinician, and which shortens with the increased experience and skill of the roentgenologist and with improvement in the apparatus with which he works. As clinicians, we should not demand the impossible of roentgenology. The possible, however, is of the very greatest help in diagnosis, and this clinicians should acknowledge.

From the above discussion the superficial reader might draw the conclusion that the author is belittling the value of the x-ray in diagnosis. This is not the case, both positive and negative x-ray findings are of the very greatest value in diagnosis in confirming or ruling out suspected lesions as well as in not infrequently revealing lesions totally unsuspected from history and physical examination. However, it needs to be recognized that there are definite limitations to what x-ray methods can show, and these limitations should be better recognized by both clinicians and roentgenologists.

## ELECTROSURGICAL CHOLECYSTECTOMY\*

### I Experimental Observations

BY LESTER R. WHITAKER, M.D.†

**H**EMORRHAGE is the primary consideration and the chief danger in section of the tissues. Before the days of anesthesia attention was paid only to gross bleeding which was controlled by the tourniquet or mass ligation. The surgeon had no time to spend clamping and tying small vessels. He worked with utmost speed in the effort to finish his operation before the patient died of pain, hemorrhage, and shock. The old tradition of haste still exerts a surprising influence on surgical technique. Even though anesthesia gave the operator a quiet patient and time in which to do careful anatomical dissection, individual ligation of vessels, and other refinements, many to this day rush through even a simple operation as if they expected the patient to die before they could finish. Among surgeons of past generations there was a dictum that no major abdominal operation should consume more than one hour of time, if it approached two hours, there was danger of losing the patient. These surgeons acted accordingly. They made large incisions, handled the tissues hurriedly and roughly, exposed viscera to chilling and drying, and ligated only the vessels which spurted in their faces. After an hour of this of course the patient was almost invariably in a condition of shock.

Gradually a school was developed, of which

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Halsted was a leader, where men began thinking for themselves with regard to the adaptation of treatment to conditions, rather than learning technique in an apprenticeship manner. These men took advantage of the extra time allowed by anesthesia to handle and pack away viscera carefully, make anatomical dissections, ligate individual bleeders, and in closure of the wound to obtain apposition of tissues. These methods had the advantages of producing the least trauma and disturbance of the anatomy, and allowing less opportunity for collection of blood and serum in the wound, thus favoring primary healing and rapid recovery of the patient. Any surgical operation is an insult to the human frame, it should be made as light as possible.

*The great advantage of electrosurgery is in control of hemorrhage.* The cutting current (acusection) seals the capillaries and small vessels, preventing oozing, and allowing the "spurters" to be more easily and accurately clamped. Medium-sized vessels can be snapped and the tissue in the jaws of the clamp coagulated by holding in contact with the active electrode. Larger vessels, however, should not be treated in this way because the coagulum loosens after a day or two and there is risk of secondary hemorrhage. Tissue to be removed, such as tumors, may be handled either by direct attack with the cutting current, using a loop electrode, or after electrocoagulation en masse. The former can be used only in case the tissue is not too vascular. *In very vascular tumors, or organs such as the liver, kidney, and spleen, masses of tissue must be treated first with the coagulating cur*

*rent by insertion of a needle electrode at intervals, reducing the tissue to a firm coagulum which can then be removed by the cutting current without hemorrhage.*

Pribram in 1928, published a method of treating the acutely inflamed, gangrenous, or sclerotic gall bladder with the cautery to dispose of it and at the same time reduce the danger of hemorrhage. By sterilizing the infected mucous membrane and tissues of the gall bladder with the actual cautery Pribram felt that he had avoided the necessity for drainage. The description of Pribram's method follows:

"In order to avoid injury to the liver tissue in cases where subserous resection (shelling out) was not successful, I have tried another way in order to be able to close the abdominal cavity. The vesicle is completely emptied of its liquid contents by the water pump then split through the middle with the scissors from the fundus to the cystic duct, and the stones removed. The exposed cystic duct is cut between two ligatures. Then the mucous membrane is completely charred with a cautery down to the serosa. In this way any abscess of the wall penetrating the liver is completely destroyed. Then the two edges of the gall bladder are sewn exactly together. To this procedure I have given the name '*mukohlase* (destruction of mucosa). It has proved entirely satisfactory in all the cases where I have used it and is the method of choice for making a complete wound closure in complicated cases."

Pribram recommends the procedure in cases of shrunken gall bladder where resection is difficult because of sclerosis, also in badly infected and gangrenous stone-containing vesicles, and in empyema. He has had only three deaths in two hundred cases, a remarkable record. He attributes the rapid convalescence and low mortality partially to the absence of drainage, avoiding, as he believes, peritonitis, acute dilatation of the stomach, erosion of blood vessels with secondary hemorrhage, postoperative pulmonary and cardiac complications.

The first impression from reading a description of Pribram's method was that the use of an actual cautery deep in the abdominal cavity was rather heroic, especially in close proximity to such vital structures as the bile-duct and associated vessels. The second thought was that a great deal of dead tissue was left to be absorbed. And thirdly, it seemed rather doubtful that this could be done safely without drainage. However, in favor of the method were Pribram's remarkable results, statistics which compared favorably even with those where only a slightly diseased gall bladder had been removed by the usual dissection method.

#### EXPERIMENTS WITH OBLITERATION OF THE GALL-BLADDER BY DIFFERENT MEANS

Where possible of adaptation every radically new technical procedure in abdominal surgery should be tried first upon the dog. The originator of a method may be very skillful in its use but an imitator naturally cannot be until he has had considerable practice. Let this risk be taken by the dog. For several years I have been concerned with methods for removing or obliterating the gall bladder with the greatest safety and the least possible disturbance to the patient. William J. Mayo, in 1900, presented a method for removal of the mucous membrane of the gall bladder as a substitute for cholecystectomy. He considered that if the mucous membrane were removed the gall bladder would become obliterated. I tried the removal of the mucous membrane in gall bladders of dogs but found it extremely difficult to make the dissection, and came to the conclusion that cholecystectomy would be more easily performed, particularly the subserous removal described by Doyen. By using a headlight and special retractors a gall bladder not too sclerotic can be removed subserously through a very small incision, allowing the patient to make an extremely rapid recovery. With one patient having gall stones who was a poor risk for cholecystectomy a method of destroying the mucous membrane of the gall bladder was tried by chemical cauterization. Although several attempts were made to obliterate the sinus with formalin, carbolic acid, and alcohol, the mucous membrane would regenerate each time and the opening remained until the patient died of cancer of the rectum about a year later. The difficulty with all operations upon the mucous membrane is the achievement of total destruction. Experiments upon dogs have shown that even a small section left near the cystic duct will regenerate.

#### AN ATTEMPT TO OBLITERATE THE GALL-BLADDER BY CAUTERIZATION OF THE CYSTIC DUCT

The publication of Pribram's method renewed my interest in these safer and less traumatic methods for removal of the gall bladder. It seemed possible to go a step farther than Pribram. By his method considerable tissue of the gall bladder had to be sloughed and absorbed, yet good results were obtained. The lymphatics and veins of the gall bladder are in the wall of the cystic duct. Why could not one by destroying this vital part of the gall bladder produce necrosis of the vesicle, allowing it to slough away through a drainage tract, thus accomplishing its removal in patients who were poor risks by an easy technical procedure with little trauma? A piece of iron was fashioned to fit the outlet of the cystic duct in a dog. Then with a small abdominal incision and the gall

bladder opened at the fundus the iron was heated, not red hot, but enough to produce some searing of the tissue. When applied inside the cystic duct it had a tendency to stick to the mucous membrane, requiring considerable force to tear it away. After cauterization a soft rubber tube was placed in the gall-bladder, taking care not to press it down into the duct enough to produce necrosis of the wall. This method was tried in three dogs. One of them, sacrificed after one day, showed the gall-bladder collapsed around the drainage tube, edematous and inflamed, with a slight injection of the surrounding peritoneum. Another dog, sacrificed after eight days, had peritonitis, the gall-bladder was necrotic, and cystic duct leaking. The third dog made only a fair postoperative recovery for three days but was lost, no autopsy being performed. These poor results led us to discard the method of destruction of the gall-bladder by cauterization of the cystic duct.

#### AN ATTEMPT TO OBLITERATE THE GALL-BLADDER BY CAUTERIZATION OF THE MUCOSA

With ten dogs the whole mucosa of the gall-bladder was cauterized to varying degrees, a soft drainage tube being placed inside. In four, light cauterization was done. These made good immediate postoperative recoveries. One dog, sacrificed after one day, showed a gall-bladder collapsed about the tube and inflamed with adhesions to the omentum. Two, sacrificed after six and eight days, showed no peritonitis, but adhesions of omentum to a sloughing gall-bladder, with one of them, however, the slough was small, and it was considered that the gall-bladder would have been obliterated. Another dog, sacrificed after eleven days, showed peritonitis with omental adhesions around a necrotic gall-bladder.

Out of the six dogs in which moderate cauterization was done, three had peritonitis, one with a hole from the gall-bladder into the peritoneal cavity. The three other dogs, sacrificed after one to twelve days, had necrotic gall-bladders covered by omental adhesions, one with damage to the liver.

In two additional dogs the gall-bladder was damaged by clamping eleven days previous to the cauterization, the gall-bladder was rendered slightly thickened and sclerotic thereby. In these two the whole mucosa of the gall-bladder was cauterized by the hot iron and a soft drainage tube was placed inside. Both dogs made good immediate postoperative recoveries, one showed slight damage to the liver about the gall-bladder, with adhesions, the other, no adhesions, neither had peritonitis, and the ducts were normal. Apparently the actual cautery worked better in the slightly sclerotic gall-bladder.

In two cats the mucosa of the gall-bladder was cauterized and collapsed by stitching as with the Pribram method. Autopsy after eight

days showed marked peritonitis with leaking, necrotic gall-bladders in both. A cat which had a tube placed in the gall-bladder (removed the third day) showed, after eight days, an excellent result—apparent obliteration of the gall-bladder.

A summary of results with use of the actual cautery on the mucosa of the gall-bladder in twelve dogs and three cats reveals good recoveries, after six to eight days, in six dogs and one cat. There was liver damage in two dogs, peritonitis, after eight to twelve days, in three dogs and two cats, necrotic gall-bladders, after eight to twelve days, in six dogs and two cats. In general, light cauterization of the mucosa gave better results than heavy, but necrosis resulted even with that. Heavy cauterization produced liver damage. The difficulty with a hot iron is in limiting its action to the mucosa without causing too rapid necrosis of the gall-bladder or damage to the liver. The best results were obtained with gall-bladders rendered slightly sclerotic by previous mechanical damage.

#### THE USE OF THE HIGH FREQUENCY ELECTRIC CURRENT FOR OBLITERATION OF THE GALL-BLADDER

It is obvious from the foregoing experiments that the difficulty with the actual cautery is to control the degree of destruction of the tissues. The best results were obtained with light cauterization. The high frequency current from the electrosurgical unit allows much better adaptation. For these experiments the Bowie Unit, old style, was used.

The tissue dissolving current, the "cutting current", was employed with six dogs. The ball electrode with the power control set from fifteen to twenty-five, low voltage and light dehydration, was run around over the mucosa of the gall-bladder, a drainage tube then being placed inside. Generally too much tissue destruction was produced. Good results were obtained in three of the dogs, those in which light treatment to the mucosa was given. The other three had necrosis of the gall-bladder, and two of these, peritonitis.

In two dogs the gall-bladder was damaged previously by clamping over the surface, which resulted in considerable inflammatory thickening with adherent omentum. In both cases the mucosa was treated moderately with the cutting current. The gall-bladder was first split to the cystic duct which was tied with silk. The ball electrode was run over the mucosa and the gall-bladder collapsed with a continuous stitch, no drainage being employed. Autopsy after several weeks showed a good result in obliteration of the gall-bladder in one of the dogs, in the other it was only partly obliterated, having reformed somewhat from the cystic-duct end. This tissue-dissolving current, as well as the actual cautery, apparently worked better with thickened, inflammatory gall-bladders, but likewise

it seemed to be too difficult of control for safe use.

#### TREATMENT OF THE MUCOSA BY THE COAGULATING CURRENT

The method of Pribram was used with seven dogs, simply substituting the coagulating current (biterminal) from the electrosurgical unit for the actual cautery. The gall bladder was split to the cystic duct by using the cutting current, with heavy dehydration to help control hemorrhage. The spurting bleeders were snipped in the edge of the cut wall of the gall bladder and tied. The cystic duct was dissected free and tied. The mucosa was treated by fulguration (sparking) making occasional contact of the needle with the tissue. Treatment was rather thorough to prevent regeneration. Then according to Pribram's method the leaves of the gall bladder were sewn together and the cavity obliterated. No drainage was used.

Three of the seven dogs made good postoperative recoveries. One of them, sacrificed after four days, showed only slight sloughing of the gall bladder which probably would have been resolved. Another, sacrificed after two weeks, showed an excellent result, the remains of the gall bladder being fibrous and covered with omental adhesions. This is the ideal, and the best that can be expected after leaving so much dead tissue in place. The third dog was in excellent condition after two weeks.

In the other four of the seven dogs poor results were obtained. One of them died of peritonitis five days after the operation, three died of intraperitoneal hemorrhage, after one two and eight days respectively, two of them showed a sloughing gall bladder.

With two additional dogs the gall bladder was damaged by clamping nine days before the Pribram method was applied. Good results were obtained in both these animals, sacrificed after ten and eleven weeks. In one, however, the gall bladder had regenerated to about one-half its normal size, again emphasizing the necessity for complete destruction of the mucosa with this type of operation. In the other dog there were numerous adhesions of the omentum and adjacent viscera to the gall bladder fossa, thus being the expected result.

It is to be noted that the use of fulguration upon the non sclerotic gall bladder is liable to result in hemorrhage. The probability is that the vessels are so little supported that they bleed when the charred tissue is dissolved. It will be remembered that with the sclerotic gall bladder the cutting or tissue-dissolving current was safer and more effective. The same is observed with the use of fulguration from the coagulating current.

In two dogs the uniterminal coagulating current (desiccation) was applied through the flat

blade electrode which was rubbed over the mucosa rather lightly, the gall bladder being sutured according to the regular Pribram procedure. Both these dogs died, one the same day, and the other after six days. Both showed hemorrhage into the peritoneal cavity, one of them bile leakage. Probably with the uniterminal current the tissue destruction is too great, weakening the walls of large vessels, or the depth of coagulation is not sufficient to seal off the vessels for a period long enough to allow a firm clot to form in them before the ends open.

#### MODIFIED PRIBRAM OPERATION, USING COAGULATING CURRENT (BITERMINAL)

Following these experiments, while observing a cholecystectomy at the Massachusetts Memorial Hospitals upon a chronically thickened and subacutely inflamed gall bladder I saw the surgeon, W. K. S. Thomas, split the vesicle to the cystic duct along the front with scissors, and then trim off the two leaves a short distance from their attachment to the liver, clamping and tying the bleeders encountered. This suggested a modification of the Pribram operation by removing the redundant parts of the gall bladder for the purpose of reducing the amount of dead tissue to be disposed of by autolysis.

In four dogs a combination of this method and that of Pribram using the electrosurgical unit, was tried. The gall bladder was split to the cystic duct using the cutting current, heavy dehydration, then the leaves of the gall bladder were cut away about one centimeter from the attachment to the liver, clamping and tying the bleeding vessels. The cystic duct was dissected free and tied. The mucosa of the part of the gall bladder left attached to the liver was thoroughly fulgurated with the coagulating current. In three of the four dogs the edges of this coagulated tissue were whipped over with a continuous stitch, *no drainage* was employed.

Two of the four dogs made good recoveries, one of these being the subject in which the gall bladder edges were not stitched after the coagulation. These two dogs were sacrificed after two months. In one of them the gall bladder had reformed to the size of a walnut, again emphasizing the necessity for tying the cystic duct low down and of being sure to kill all the mucosa of the gall bladder with the coagulating current. The dog in which the remainder of the gall bladder was not stitched after the coagulation showed an excellent result. The stomach at the pylorus, however, was fixed to the gall bladder fossa with pronounced adhesions. The two other dogs died the first day after the operation, from hemorrhage into the abdominal cavity. One of them showed a large clot of blood in the gall bladder fossa. Probably with some of the larger vessels the coagulum dissolved rapidly and allowed bleeding. This suggests that larger vessels should be tied and the tissue



about them should not be treated with fulguration

In three additional dogs the gall-bladder had been damaged previously, in one of them, nine days before the cholecystectomy, by clamping, and in the others, three months before the operation, by the application of ninety-five per cent phenol. In the first, the gall-bladder was acutely inflamed, and in the other two slightly sclerotic. At the operation the gall-bladder was split to the cystic duct with the cutting current, using heavy dehydration, the bleeders were clamped and tied. Then the redundant portions of the gall-bladder were cut away with the same current about a centimeter from the attachment to the liver, the bleeders again being clamped and tied. With the coagulating current, using *both fulguration and contact coagulation*, for thoroughness, the whole surface of the portion of the gall-bladder left attached to the liver was treated, *taking care to avoid the points where vessels were tied*. The dogs were sacrificed from two to six months after the operation, having been in perfect health and showing at autopsy only a few adhesions of omentum and duodenum to the gall-bladder fossa.

#### DISCUSSION

The object of this set of experiments was to develop a method whereby the risk of operation upon the acutely inflamed or sclerotic gall-bladder would be diminished. The chief danger in these cases is hemorrhage, which treatment with cautery or electrosurgery helps to control. It is reasonable to suppose that if hemorrhage could be prevented with the markedly diseased gall-bladder it would be with the less damaged vesicle, but this does not appear to be true. The coagulating current, which is best for controlling the hemorrhage in extremely vascular tissue, must be selectively used with the gall-bladder for the best results. For instance in treatment of thirteen non-sclerotic gall-bladders by the modified Pribram method, using the coagulating current, seven of the dogs died of hemorrhage from the operative site. Apparently the coagulated tissue of the vessel wall and that about it dissolved too rapidly. The uniterminal coagulating current is probably more offensive than the biterminal in this respect. It must be concluded that all the larger vessels should be ligated and the tissue in their immediate vicinity not coagulated.

Thorek<sup>9</sup> has drawn a distinction between important types of electrocoagulation for cholecystectomy. Fulguration, or treatment by sparking without contact of the electrode, produces a more superficial, yet intense effect, resulting in carbonization. On the other hand, real electrocoagulation, obtained by inserting the needle into the tissue, or by holding a flat electrode in contact, leads to the formation of a

firm coagulum, which, though more effective in disposing of the gall-bladder with little disturbance to the patient, will not dissolve so readily and lead to secondary hemorrhage. Even so, it seems preferable to tie the large vessels rather than to treat them electrosurgically by any method.

In these experiments results with electric current of different types were all better in the sclerotic gall-bladder—of seven dogs, none died from hemorrhage.

#### CLINICAL EMPLOYMENT OF ELECTROSURGERY FOR CHOLECYSTECTOMY

Since experimental results indicated that treatment of the severely inflamed or sclerotic gall-bladder with the coagulating current was a safe procedure, and since in these cases dissection by the ordinary method is rather hazardous, it seemed that the clinical use of electrosurgical cholecystectomy in selected cases was warranted.

This was accordingly carried out by the following technique, which was an outgrowth of our experimental observations. "After carefully packing away other viscera and placing self-retaining retractors the gall-bladder is aspirated and split longitudinally to the cystic duct, or near it, using the cutting current with high dehydration. Fluid and stones are removed by the aspirator and spoon. Then by the same means the tissue of the gall-bladder is cut away at about a centimeter from its attachment to the liver, the bleeding vessels being snapped and tied. The section of gall-bladder adherent to liver is not removed, avoiding danger of serious hemorrhage there. This tissue is thoroughly coagulated and dehydrated by fulguration. If any considerable portion of mucosa is left it may regenerate, resulting in a persistent sinus. If the cystic duct can be readily located it is tied or drained as indicated, if not it is ignored. The region is well drained, omentum being packed in to protect other viscera and prevent crippling adhesions. Stones may be left behind, either in the cystic or common duct, but this is better than risking death of the patient or doing irreparable damage in attempts at their immediate removal, since they can be handled by a secondary operation after the acuteness of the disease has subsided. The chief advantage of the method, however, is that since the main infective focus is removed, secondary operations are less often required than after simple drainage of the inflamed viscus."<sup>10</sup> Note the statement "this tissue is thoroughly coagulated and dehydrated by fulguration." The method employed was to treat the remaining tissue of the gall-bladder both by contact with the needle, and by sparking. This method was published before I learned of Thorek's work which took account of the difference between contact coagulation and fulguration. I am grateful to Thorek for the distinction, and wish to emphasize the

necessity for employing real contact coagulation in electrosurgical cholecystectomy. A second article dealing with results in clinical cases will be published later.

## SUMMARY

1 The great advantage of electrosurgery is in control of hemorrhage. It has been shown by others that vascular tumors and organs, such as liver, kidney, and spleen, may be treated first by deep coagulation, and then removal with the cutting current, without hemorrhage. Our experiments have confirmed this finding: large sections of the liver having been removed safely in this way.

2 As an outgrowth of Pribram's "mukoklase" a method was tried for destruction of the gall bladder simply by cauterization of the cystic duct. This proved to be unsatisfactory on account of bile leakage and sloughing of the gall bladder. Cauterization of the whole mucosa by the Pribram method in the non sclerotic gall bladder was likewise unsatisfactory. In the sclerotic gall bladder it worked fairly well but we believe that any treatment of the gall bladder by the actual cautery is too dangerous and difficult for general use.

3 The tissue-dissolving or "cutting current" was also too difficult of application for obliteration of the gall bladder. Its use for "mukoklase" was unsatisfactory in the non sclerotic gall bladder, the chief danger being hemorrhage. With the sclerotic gall bladder the results were better. However, it is not recommended.

4 The uniterminal coagulating current (desiccation) is too highly destructive of tissue and the effect too superficial, to be safe. In our experiments its use was followed by secondary hemorrhage.

5 The method of preference finally developed. Aspirate the gall bladder and split it

to the cystic duct with the cutting current. The duct is dissected free and tied. The leaves of the vesicle are then trimmed away about a centimeter from the attachment to the liver, clamping and tying the bleeding vessels. Then the section of gall bladder left attached to the liver is thoroughly treated with the coagulating current, by contact with the needle and fulguration, avoiding the points where the vessels are tied. The method of Thorek employing contact coagulation to considerable depth seems preferable to fulguration.

6 Drainage was not employed except in three of the experimental dogs. We have felt, however, that drainage is preferable in cases where there is considerable dead tissue to be absorbed. In the article\* on clinical application of these experimental results (drainage being employed) the question will be discussed.

7 Electrosurgical cholecystectomy is best adapted to the markedly inflamed, or the sclerotic gall bladder.

## REFERENCES

- 1 Kelly, H. A., and Ward, G. B.: Electrosurgery. Philadelphia: L. R. Saunders Co. 1922.
- 2 Pribram, B. O.: Mukoklase und Drainageklase Gallenchirurgie. Zentralbl. f. Chir. 85: 778 (March 31) 1928.
- 3 Mayo, W. J.: Cholecystectomy with Especial Reference to the Removal of the Mucous Membrane of the Gall Bladder as a Substitute. Report of a Case in Which the Gall Bladder was Removed for Malignant Disease. Philadelphia and London: W. B. Saunders Co. 1: 355 1912.
- 4 Doyen, R.: Surgical Therapeutics and Operative Technique. New York: William Wood and Company 3: 121 1929.
- 5 Whitaker, L. B.: Subperitoneal cholecystectomy. Surg. Gynec. Obst. 48: 351 (June) 1928.
- 6 Whitaker, L. B.: Subperitoneal cholecystectomy: preliminary clinical report of new method. Am. J. Surg. 18: 273 (Aug.) 1921.
- 7 Whitaker, L. B.: Surgical management of gallbladder disease. New Eng. J. Med. 203: 718 (Oct. 9) 1930.
- 8 Thorek, M.: Cholecystelectrocoagulation without drainage in treatment of gall bladder disease. Illinois M. J. 64: 428 (Nov.) 1933.
- 9 Thorek, M.: Electrocautery obliteration of the gallbladder. J. A. M. A. 103: 169 (July 21) 1934.
- 10 Practitioner's Lib. of Med. & Surg. New York: Appleton Century Company 41 Ch. 16: 763 1933.

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## ANTERIOR POLIOMYELITIS WITH REFERENCE TO THE OCCURRENCE OF TWO ATTACKS IN THE SAME INDIVIDUAL\*

(With Report of Two Cases)

BY LOUIS COHEN, M.D.†

A SECOND attack of anterior poliomyelitis occurring in the same individual is very rare. To date there have been reported thirteen such proved cases. In over three thousand cases of anterior poliomyelitis seen in the Department of Orthopedic Surgery at the University Hospitals of the State University of Iowa there have been only two cases which have definitely represented a second attack of the disease.

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Flexner, in his experiments on monkeys, could in no case produce a second attack of anterior poliomyelitis in an animal, once that animal had been infected and had survived. He injected the second dose of virus at intervals varying from eight days to four or five months after the onset of paralysis resulting from the first dose. In no instance was the monkey rendered ill or was there a recrudescence of the paralysis. He concluded that, "These results indicate what will probably be found to be equally true of human beings, that one undoubted attack of poliomyelitis even when unaccompanied by def-

uite paralysis, produces a state of refractoriness in reinoculation with active virus that endures for months and probably for years, if not throughout the life of the affected individual." He was also able to demonstrate by animal experiments that human beings who have been infected with anterior poliomyelitis and have survived contain in their blood for two or more years certain neutralizing principles for the virus causing the disease

comparatively not rare. The second group comprises those cases in which the second attack occurs two or more years following the first attack, and until now only thirteen such proved cases have been reported. Only the latter group of cases can be considered as representing a true second attack and the former is explained as follows

The immunity acquired by man as a result of one attack of anterior poliomyelitis occasionally

Case No	Date report Author	Sex	Age of Attacks	Interval between attacks	Parts affected
1	Caudouin 1879	M	1) 17 mos 2) 16 yrs	14 yrs	1) lt. leg 2) rt. leg
2	Ballet and Dutil 1884	F	1) 3 yrs 2) 12 yrs 3) 14 yrs	9 yrs 2 yrs	1) lt leg 2) arms 3) legs
3	Eckert 1911	Not ment		5 yrs	1) lt leg 2) rt leg
4	Lucas and Osgood 1913	M	1) 2 yrs 2) 5 yrs	3 yrs	1) feet & rt. leg 2) rt arm, legs weak
5	Sanz 1915	F	1) 1 yr 2) 15 yrs	14 yrs	1) lt leg 2) rt. leg
6	Taylor 1916	M	1) 3 yrs 2) 6 yrs	3 yrs	1) rt leg 2) lt leg
7	Francis and Moncrieff 1919	F	1) 3 yrs 2) 18 yrs	15 yrs	1) rt arm 2) legs
8	Peremans 1923	F	1) 2¾ yrs 2) 4¾ yrs	2 yrs	1) lt leg 2) one arm
9	Still 1930	F	1) 1¾ yrs 2) 7½ yrs	5¾ yrs	1) lt leg 2) rt should
10	Neal 1932	F	1) 4 yrs 2) 8 yrs	4 yrs	1) rt leg 2) rt leg
11	Comm Study of Inf Par Baltimore 1932	M	1) 16 mos 2) 21 yrs	20 yrs	1) lowers 2) lt. thigh
12	Quigley 1934	F	1) 5 yrs 2) 7 yrs	2 yrs	1) lt. sh 2) died before onset
To this must be added Moore's case, since reported					
13	Moore 1934	M	1) 10 mos 2) 7 yrs	6 yrs	1) lowers 2) arms and trunk

Lucas and Osgood, in 1913, reported a case illustrating a second attack of acute anterior poliomyelitis. Four months following the onset of this second attack the virus present in the nasal secretion of the patient was of such active virulence that when injected intracerebrally into a monkey it produced a typical and fatal attack of poliomyelitis in that animal. This is to be kept in mind when we consider that there are two groups of recurrence of anterior poliomyelitis which are definitely distinct from each other. One group comprises those cases in which the second attack occurs within four months after the first attack and which are

is slow in developing. The active virus may remain in the nasopharyngeal secretion of the individual for a period up to four months following an attack, as shown by Lucas and Osgood. Therefore, any relapse occurring within this period can be explained as an auto-infection of the individual by the active virus present in his own nasopharyngeal secretions, this occurring before the full development of immunity following the first attack. This does not, of course, completely eliminate the possibility that the second attack may be a reinfection from a new external source.

When the interval between the two attacks

is two or more years the reinfection is undoubtedly a new one from an external source, as the active virus has experimentally never been found to be present in the nasopharyngeal secretion of a patient later than four months after the termination of the acute febrile stage of the disease in such virulence as to reproduce the disease in a monkey. There have been no cases of a second attack reported, whether it be a recrudescence or a reinfection, occurring in the interval between four months and two years every following the first attack.

It is thus logical to conclude that immunity to anterior poliomyelitis once it is fully developed, either as a result of an attack or a recur-

red attack, and that the right arm was not affected by the second attack.

His family history and marital history were non-contributory. His past history was also negative except as mentioned above.

His physical examination was negative except for the following:

He walked with the aid of a cane.

He had a moderate lordosis, ankle valgus on the left, equinus of the right foot, and two inches shortening in the right lower leg.

Reflexes	Patellar reflex reinforced	Rt. absent. Lt. slight.
	Tendo-Achilles reinforced	Rt. absent. Lt. slight.

Case No.	Date report Author	Sex	Age of Attacks	Interval between attacks	Parts affected
14.	Cohen 1935	M	1) 6 yrs. 2) 31 yrs	25 yrs.	1) rt arm rt leg 2) lt. arm rt leg weak
15	Cohen 1935	F	1) 12 yrs. 2) 30 yrs.	18 yrs	1) rt. arm lowers 2) arms, legs trunk

descence of an initial attack, is absolute only up to a period of two years.

The thirteen proved cases of reinfection with anterior poliomyelitis in the literature are shown in the large table, taken from Quigley<sup>17</sup> and Stall<sup>18</sup>.

In no case was there reported a complete recovery following the first attack.

To the table, reporting cases 1 to 13 inclusive must also be added the author's two cases.

The following are the two cases seen in this clinic:

#### CASE 1

H. L. D., a thirty-one year old married white male, came to the Out Patient Clinic on January 5, 1934 complaining of general debility and weakness in the region of the left biceps both of four months duration. He stated that he had had infantile paralysis involving the right arm and right leg in 1908 and had, at that time, remained off his feet for one year following which he used crutches for one year. The disease was epidemic at that time. Following this he improved. He retained some residual paralysis but has been able to get about with out the aid of a cane or crutches. He worked in a garage and could do a full day's work easily until September 2, 1933, when he had what was diagnosed as a gall bladder infection and was put to bed for three days. When he got up his legs and arms were so weak that it was necessary for him to go to bed again and remain there for two weeks. He had difficulty in moving his arms and legs. He had pain in his neck and back, ached all over had some elevation in temperature did not eat well for one week, but did not vomit. His strength has gradually returned but he is still unable to walk without the aid of a cane.

He states very definitely that the left arm was not affected by the first attack and that the right leg is now somewhat weaker than before the sec-

ond attack.

Sensations were normal. The muscles of the left leg were normal. There was practically complete paralysis of all the muscles of the right leg and there was marked atrophy of both the right thigh and calf. There was a moderate lordosis and a positive Trendelenburg test on the right.

The muscles of the upper arm showed considerable paralysis bilaterally; those of the lower arm were unaffected.

In this patient an arthrodesis of the right shoulder was indicated. He did not desire an operation and was discharged until such time as he might consent to one.

#### CASE 2

E. K., a thirty-year old white married female entered the hospital because of inability to use the right arm and both legs. She was seen in the orthopedic Out Patient Clinic on January 7, 1935. She states that she was perfectly well until November 4, 1934, except for a very slight sore throat during the three to four days preceding that date. On the following afternoon (Monday) her right shoulder ached and her neck was stiff. She had no fever and continued with her usual activities. On the next day (Tuesday) her legs began to ache. On the following day (Wednesday) her "right arm became completely paralyzed." The legs continued to ache and were "weak" but she was able to be up and continue with many of her usual activities. She called an osteopath that night who told her that she had "neuritis" and gave her a salve. She remained in bed and the next night she called a physician who told her she had "infantile paralysis" (Thursday, November 8).

Her physician states that she then had a temperature of 104, pulse 136. He further states, "There was practically a complete paralysis of the right arm and a general weakness of the left arm and both legs. The reflexes were absent or very weak."

Two days later her legs became completely par-

alyzed. She could, however, move her feet. Two to three days later the left arm became paralyzed. She remained in bed for three weeks. During this period the pain in the right shoulder was at times severe enough to require codeine for relief and the pain in the legs gradually disappeared. She has had no pain since then. The left arm improved considerably during the first week and has been improving gradually since then so that she could, on admission, practically feed herself. The right arm remained about the same until two weeks before admission since which time it has improved only slightly. The right leg has improved to about the same degree as the right arm. The left leg has shown no improvement.

During the three weeks prior to admission she also received some massage.

She was admitted to the neurological service on January 3, 1935. There lumbar punctures were done, a diagnosis of anterior poliomyelitis was made, and she was referred to the orthopedic service.

She knows of no other case of anterior poliomyelitis in her neighborhood.

At no time did she receive serum.

She states that she had infantile paralysis eighteen years ago (October, 1916), with involvement of both legs and her right arm. This is corroborated by the physician who treated her at that time. "She could not lift her right arm or right leg off the bed, and could barely raise the left leg." There were two other cases in the immediate neighborhood. She received no serum.

At present her main disability is inability to use the right arm and both legs.

Marital history, family history and past history are non-contributory except as mentioned above.

Physical examination revealed a young female whose only positive findings were as follows:

The knee jerks, ankle jerks, and biceps, triceps and radial periosteal reflexes were absent bilaterally.

The right arm and both legs were almost totally paralyzed. The left arm also showed marked involvement of a considerable number of muscles. There was also a marked involvement of the trunk.

This patient has been receiving bed rest and physical therapy, also splints to prevent the development of deformities.

The interval between the two attacks in the first case here reported was twenty-five years. The recovery following the first attack was incomplete. Although the right leg, in which there was a residual paralysis following the first attack, became somewhat weaker following the second attack, the part affected most in the course of this second attack was the left upper arm, which had not been affected in the first attack. Thus we see that, except for the fact that the interval between the two attacks in this case was longer than the interval in any of the other cases reported, it presents no feature unusual to them.

The second case here reported does, in some respects, differ from any of the other cases reported. First, there was a more extensive involvement as a result of the first attack than in any of the other cases, i.e., total paralysis of two extremities and almost total paralysis of a third. Secondly, in no other case was there a

complete recovery following the first attack. Thirdly, the three extremities which were affected as a result of the first attack were affected to practically the same degree during the course of the second attack. The fourth extremity, i.e., the left arm, which was also completely paralyzed during the course of the second attack and which was not affected during the first attack, is the only one which has recovered to any appreciable degree.

#### CONCLUSIONS

1 It has been impossible to produce a second attack of acute anterior poliomyelitis in monkeys. It is thought that one attack confers upon them a lasting immunity to the disease.

2 There are two groups of recurrence of anterior poliomyelitis in man which are definitely distinct from each other. One group is due to a recrudescence of the infection, occurs within four months of the first attack, is not rare, and is not a true reinfection. The second group is a true reinfection, occurs two or more years after the first attack, and is rare.

3 Immunity to anterior poliomyelitis, once it is fully developed, is absolute only up to a period of two years.

4 Two cases are reported here, one of which presents unusual features.

#### REFERENCES

- 1 Flexner S and Lewis P A. The transmission of acute poliomyelitis to monkeys. *J. A. M. A.* 53: 1639 and 1913 1909.
- 2 Flexner S and Lewis P A. The nature of the virus of epidemic poliomyelitis. *J. A. M. A.* 53: 2095 1909.
- 3 Flexner S and Lewis P A. Epidemic poliomyelitis in monkeys. *J. A. M. A.* 54: 45 and 535 1910.
- 4 Flexner S and Lewis P A. Experimental epidemic poliomyelitis in monkeys. *J. A. M. A.* 54: 1140 and 1780 1910.
- 5 Flexner S and Lewis P A. Experimental poliomyelitis in monkeys. *J. A. M. A.* 55: 662 1910.
- 6 Flexner Simon. The contribution of experimental to human poliomyelitis. *J. A. M. A.* 55: 1105 1910.
- 7 Flexner S. Experimental poliomyelitis. *Pediatrics* 22: 477 1910.
- 8 Flexner S and Lewis P A. Experimental epidemic poliomyelitis in monkeys. *J. Exper. Med.* 12: 227 1910.
- 9 Batten F E. Acute poliomyelitis. *Lancet* London. 1: 809 1915.
- 10 Eshner A A. A possible second attack of acute anterior poliomyelitis in the same patient. *M. Rec. N. Y.* 78: 526 1910.
- 11 Ballet, G. et Dutil A. De quelques accidents spinaux. *Rev. de med. Paris* 4: 18 1884.
- 12 Eckert. *Deutsche med. Wchnschr.* 37: 1 1911.
- 13 Lucas W P and Osgood R B. Transmission experiments with the virus of poliomyelitis. *J. A. M. A.* 60: 1611 1913.
- 14 Taylor E W. Recurrent poliomyelitis: second attack after a period of three years. *J. Nerv. & Ment. Dis.* 44: 207 1916.
- 15 Francis F D and Moncrieff W F. Second attack of poliomyelitis after an interval of fifteen years. *J. Nerv. & Ment. Dis.* 49: 273 1919.
- 16 Still G F. Second attacks of acute poliomyelitis and the minimal duration of immunity. *Arch. Dis. Childhood.* 5: 295 1930.
- 17 Quigley T B. Second attacks of poliomyelitis. *J. A. M. A.* 102: 752 1934.
- 18 Moore Thomas A. Second attack of acute poliomyelitis. *Brit. M. J.* 2: 166 1934.
- 19 Peremans Gaston (Bruxelles). Attaques repetees de paralysie infantile. *Le Scalpel* 76: 1319 1923.
- 20 Caudouin. *These de Paris* 1879.
- 21 Sanz, E F. Un caso de paralysis espinal infantil recidivada. *Siglo Med. Madrid* 62: 530 1915.

## TORSION OF THE PREGNANT UTERUS

## Report of Two Cases

BY HILBERT F. DAY, M.D.\*

**T**ORSION of a pregnant uterus is undoubtedly a rare and may cause a real surgical emergency. It is my object in the following pages to bring the literature up to date and to report two personal cases.

A study of the literature shows that the largest number of cases reported have been by French and German physicians rather than in English periodicals. I have found that the most satisfactory English article on the subject is that by Robinson and Duvall, published in 1931 in the *Journal of Obstetrics and Gynecology* of the British Empire. Their review is so complete and their abstracts of twenty five cases by other writers so satisfactory that there is no reason for the writer to review the articles they have abstracted. Therefore, I am accepting their bibliography of fifty two references and adding to it about thirty new references with abstracts of twelve.

**General Statement.** Torsion of the pregnant uterus has for many years been reported in journals having to do with veterinary obstetrics and is not a too rare complication of a cow's labor. In the human being it has been more recently reported and is far more rare. Many writers in speaking of torsion of the uterus have described the mechanics underlying this accident and have reported some cases which seemed to have occurred in a normal uterus, but from my experience and from examining the literature I am inclined to feel that the uterus does not become twisted unless there is some abnormality in it. Symptoms may be absent, slight, or very acute, according to the rapidity with which the torsion occurs. Unquestionably, the most common causes of torsion of a pregnant uterus are the following:

- 1 A fibroid or fibroids.
- 2 An ovarian tumor
- 3 The gradual contraction of a chronic inflammatory process on either side of the uterus
- 4 Postoperative scar contraction
- 5 A combination of the above causes

Practically all of the cases the author has been able to review have shown torsion toward the right. It is difficult to state what starts torsion in these cases, for the history of most of the cases does not give this. Some authors think that the twisting from left to right is more common because of the fact that the descending colon fairly well fills the space on the left side.

It is possible to conceive that some sudden movement in a case which has one of the predisposing causes might start the rotation. In one of the author's cases, it followed a too long automobile ride.

**Diagnosis.** In practically none of the cases described in the literature was the diagnosis of torsion of a pregnant uterus made before operation or death. Truly this rare disease has no single characteristic symptom on which to base a competent diagnosis. The surgeon who knows of this condition should at least consider it among others when he has to treat a pregnant woman, suffering from an acute abdominal crisis, whose condition is obscure. To make such a diagnosis, there should be a careful general history, menstrual history, description of recent symptoms, a complete general physical examination, including rectal examination, and ordinary laboratory findings, particularly a white count. Most important of all is a painstaking gentle abdominal examination.

**History.** The chief symptoms which recur often in the cases reported in the literature are the following:

- 1 Abdominal pain
  - a Gradual onset increasing to such severity that only a large dose of morphia will relieve it
  - b Sudden pain most generally localized on the right side of the abdomen which may be so severe that only a large dose of morphia will give any relief.

- 2 Shock

In some cases the shock is so severe as to cause collapse. It is very difficult to differentiate this and shock of a sudden peritonitis or a partially separated placenta.

- 3 Abnormal findings
  - a The uterus may seem of atypical shape. For instance a large fibroid on the side may feel like an additional fetal head when partially obscured by a very tense abdomen
  - b The abdomen has not the ordinary resistance of general peritonitis, but is extremely tense. Tenderness is not uniform over the abdomen, but is more marked above the pubes and on the side toward which the torsion has occurred. With the administration of a little ether the signs of collapse recede and the abdominal spasm dis-

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appears. Then the uterus and possible fibroid can more easily be defined.

#### 4 No external hemorrhage

Practically nobody has reported any vaginal bleeding in these cases. Occasionally there has been found some internal hemorrhage.

#### 5 Tenderness on rectal examination

- a Generally, a hard cervix is felt with tenderness in the vault
- b All necessary information can be obtained by a rectal examination
- c The author thinks that cases revealing the above recorded symptomatology should not have a vaginal examination because of the probability of a laparotomy and the possibility of either carrying infection up into the vaginal canal or stimulating labor by examination of the cervix.

*Treatment* The author believes that manipulation in an attempt to reduce torsion is usually unsuccessful and therefore unwarranted and that operative interference should be resorted to as speedily as possible. As said before, the condition of shock seems to be relieved as soon as the anesthetic is started and he believes that the cause of a torsion can only be relieved surgically. What can be or should be done at the time of operation can only be determined by what the operator finds. If it is possible to do myomectomies and then reduce the torsion as in one author's cases, that method should be practiced. It may be necessary besides this to do a hysterotomy or section, a hysterectomy if the uterus does not seem to be viable.

The above statement that manipulation is unwarranted, is not absolute as is shown by the following case.

Dr David Rose, of Cambridge, told me that he was called to see a woman at the end of the first stage of labor, who was suddenly seized with a severe abdominal pain and was in beginning shock. The doctor who was attending her told him that during her pregnancy he had noticed a fibroid on the left side of her uterus. On examination, Dr Rose found this fibroid on the right side and by manipulation was able to shift it back to its original position. The patient's pain disappeared and she delivered spontaneously a few minutes later. Thus undoubtedly was another case of torsion of the pregnant uterus in its initial stage.

#### REPORT OF AUTHOR'S CASES

In the following paragraphs, I wish to describe two personal cases of torsion of a pregnant uterus. The first case presented no problem but proved to be a curiosity. The second case presented a very difficult diagnostic prob-

lem and entailed a moderately serious operation. The twisting of the uterus generally takes place from left to right, as it did in both of my cases. The most common cause of such twisting is due to a tumor attached to the fundus of the uterus.

**CASE 1** Mrs M C was operated on January 6, 1922 at a small hospital in the suburbs of Boston. She was a twenty-two year old Jewess, 4 ft. 10 in tall, weighing 105 lbs., who had never had any menstrual disorder. She had been married three years. She had a justo-minor pelvis and had been previously delivered by Caesarean section in a Boston hospital after fourteen hours of ineffectual labor. The baby of that delivery died at the hospital.

Despite her previous Caesarean section and the fact that her measurements were so low as to be absolute indications for delivery from above, plus a good sized baby in this pregnancy, she was allowed to have twenty-four hours of labor and, previous to my seeing her, had had a vaginal examination.

**OPERATION** Perpendicular abdominal incision to left of umbilicus four inches long, two-thirds below the level of the umbilicus. Abdomen opened, uterus inspected and the scar of the previous Caesarean section could not be found, but a tube and ovary were seen slightly to the right side of the midline of the uterus. The uterus was of normal color and it was impossible to rotate it one way or the other, and, therefore, although I suspected that the posterior surface of the uterus was presenting, I opened it through that surface and delivered a healthy seven-pound boy. The uterine wall was closed in three layers after the delivery of the placenta. Then on examination after some shutting down of the empty uterus, I found that there was a firm band of scar tissue from the anterior surface of the uterus to a point low down in the right pelvis. This I separated between clamps and tied off, and then discovered that the torsion of the uterus had been caused by a large ovarian cyst which had fallen into the pelvis. This tumor was removed. (The histological examination reported by Dr William A Hinton of the Harvard Medical School was as follows: "Histologic examination shows tissue of mesothelial origin presenting no evidence of malignancy.") After the removal of the band and tumor, the uterus returned to a normal position, rotating from right to left side. My line of uterine sutures entirely disappeared as they were through the posterior surface of the uterus. This patient's puerperium was normal. The patient was examined two months later by me and was found to have a strong scar and to be in excellent physical condition.

**CASE 2** Mrs C was seen in consultation in a hospital during August, 1933 at the request of Dr S M. As the patient was in considerable shock, the following history was obtained from him and the patient's husband. She had been married three years and had had no pregnancies, and during that period had led a very active life. In the past month she and her husband had taken an automobile trip in Nova Scotia. She was perfectly well up to four days previously, when she had some abdominal pain and consulted a doctor in St John, N B., who advised her to get home quickly. Following his advice, she returned by the next boat instead of driving down. Immediately on getting home she called a doctor who found her in bed complaining of such severe abdominal pain that he gave her  $\frac{1}{2}$  gr of morphia. This doctor reported to the physician with whom I saw her that at the time of his examination the abdomen was fairly soft, but that he felt a larger mass slightly above the level of the umbilicus on the right side. He described it as a tumor the

size of a full term baby's head. He said he thought of pregnancy particularly because the patient's husband said that he thought his wife's last period was about four months ago but that he did not find any signs in the breasts to substantiate this idea. He made no vaginal examination. The next day Dr S. M. saw her and, finding her in a serious condition, took her immediately to a hospital where I examined her with him.

When I examined the patient in the hospital I found a woman in shock who looked very sick and was actively nauseated. Quite evidently she was suffering considerable abdominal pain particularly in the lower abdomen. She complained considerably of this pain and said that it was much worse if she had to lie on her back therefore she preferred to lie on her right side. Her temperature was 98.4 her pulse 120 of rather poor quality her leucocyte count was 20,000, systolic blood pressure was 102. A catheter specimen of urine was found to be normal.

The patient was a well-developed and nourished woman weighing 145 lbs. and was 5 ft. 8 in. tall, blonde type. Eyes ears throat normal. Tongue was slightly coated. Heart area normal, action regular rapid with no murmurs. The lungs were clear. Breasts seemed to me to be slightly enlarged and to suggest pregnancy although no fluid could be expressed from the nipples. The abdomen was distended throughout, rigid, tense and tender and there was a suggestion of a mass to be felt in the right upper quadrant. A pelvic rectal examination revealed a slightly softened cervix with a tender mass in the posterior culdesac.

Because of the patient's general condition and the above findings it was decided that she had an abdominal condition warranting immediate surgical investigation.

#### Preoperative diagnoses

- Pregnancy plus ovarian cyst with twisted pedicle.
- Pregnancy plus fibroid with twisted pedicle.
- Extra uterine pregnancy ??

**OPERATION** Patient was given morphia grs 1/4 and atropine grs 1/100 immediately and taken to the operating room after emergency preparation. In the operating room the patient was given ether anesthesia and as is the case in so many patients in shock as soon as she became anesthetized the condition of her pulse improved and the abdominal spasm let up. We were then able to palpate the abdomen and we felt a large mass on the right side slightly above the level of the umbilicus which we had been unable to feel definitely with the abdomen rigid. Either iodine alcohol preparation to skin. An incision about 8 inches long was made running from pubes upward to 1½ inches above the umbilicus slightly to right of midline. On opening the abdomen, there was an escape of considerable abnormal straw-colored fluid. The examining hand showed that the mass previously felt was a fibroid tumor as large as a coconut, intimately connected with the uterus, not really pedunculated although the base was about one-half the size of a cross section of the tumor. The uterus itself was found to be about the size of a four months pregnancy and the uterine muscle seemed slightly darker than normal in color. On careful examination it was found that the fundus was twisted halfway about to the right, and that, when this was corrected the fibroid described above had arisen from the left side of the uterus. The mass previously felt by pelvic examination in the posterior culdesac was another fibroid about the size of a navel orange attached to the uterus which had been forced down into the pelvis when the uterus was twisted to the right. It was, undoubtedly an additional cause for the patient's pain. After short deliberation it seemed

best to try to do myomectomies rather than a hysterectomy. The large fibroid was removed first. In so doing we cut down almost to the endometrium and there was considerable difficulty in sewing up the large defect. Three layers of sutures were employed and the bleeding finally controlled. The first two layers of sutures were continuous the last ones were interrupted figure of eight sutures. No 3 chromic catgut being used. The smaller fibroid from behind the uterus was removed in the same manner. After the removal of the tumors we kept the uterus under observation for about ten minutes to see whether there would be any serious bleeding. There was some oozing but as it seemed to be gradually diminishing we decided to close the abdomen. The abdominal wall was closed in layers in the usual manner. Patient left the operating room in fair condition. (The pathological report of the tumors removed was "leiomyomata.") For the first four or five days postoperatively the patient was kept absolutely quiet with morphia. After that, narcotics were omitted and the patient made an uneventful hospital convalescence. The abdominal wound healed by first intention and the patient was out of bed on the thirteenth day. On this day she first felt life.

Before the patient left the hospital she was advised to return for Caesarean section in January. That type of delivery was recommended because of the fear that large defects in the uterine wall repaired during a well-advanced pregnancy might leave a weak place in the uterus with the possibility of rupture during active labor.

On January 10 1934 a classical Caesarean section was performed and a large, healthy male baby weighing 7 lbs. 14 oz. was delivered. When the abdomen was opened some omental adhesions were found at the site of the myomectomy scar on the left side of the fundus, but the scar itself seemed fairly strong. The postoperative course following this Caesarean section was essentially normal the only variation being a rather sharp postoperative hemorrhage about ten hours after delivery.

I believe the two cases reported above are of interest. Both are cases of torsion of the uterus from left to right. The first one apparently occurred so gradually as not to have caused pain and the second so rapidly as to have caused very severe pain. I also believe that in the second case if it had been impossible for me to control hemorrhage after the myomectomies an emptying of the uterus by section plus myomectomies should have been considered rather than a hysterectomy since the uterus was evidently viable.

#### BIBLIOGRAPHY WITH SYNOPSIS OF TWELVE ARTICLES

- Bulletin De La Société D'Obstétrique et de Gynécologie De Paris. No. 2 novembre 1932. P. 712  
Myome roux à évolution rapide, tumeur axiale de l'utérus dans les suites de couches.  
Trilist case: A twenty three year old woman with torsion of the uterus occurring three days after delivery. At operation no tumor found. Subtotal hysterectomy performed. Recovery.
- Same Bulletin: No. 8 October 1932. P. 574  
Torsion d'un volumineux fibrome au cours de la grossesse.  
ALBI, Hamant et Hartmann.  
Andre's case: A sixty seven year old woman always regular examined 1931 before her marriage and found normal. Period Feb. 14. In March had some pain. Operation in April. Fibroid tumor found turning up to the right. Myomectomy and interruption of pregnancy. Stormy convalescence. Final recovery.
- Brussels Medical Journal De Neve and Imbsbracht. September 1931.  
Pedunculated Fibroid During Pregnancy: A twenty seven year old woman, pains in stomach, two normal deliveries before. Last period May 18 that is, four months before. For four days pain in the back. Mass in hypogastrium, pain on pressure. Dry aft. r. admission operation. Serous fluid in the abdomen, peritoneal reaction. Fibroid size of new-born child's head from anterior surface of th. ut. Found behind the uterus. Myomectomy. Recovery. Subsequent normal delivery.



- 3 They may occur as often after spinal as after inhalation anesthesia
- 4 Long operations tend to increase the incidence of severe gas pains
- 5 Gas pains are only slightly more common after upper abdominal than after lower abdominal operations
- 6 Gas pains are not infrequent following hernia operations
- 7 Long preoperative hospitalization does not reduce the incidence of gas pains
- 8 Manipulative trauma plays an important rôle in the production of gas pains
- 9 The nervous type of patient is much more likely to have gas pains than the phlegmatic type
- 10 Gas pains can be greatly reduced by giving no fluids by mouth for twenty-four to forty-eight hours following any laparotomy
- 11 It is felt, by way of conclusion, that routine postoperative treatment should be abandoned

If the surgeon is aware of the relative importance of the various factors contributing to gas pains, it may be possible for him so to individualize his postoperative treatment as to have a minimum of gas pains

## REFERENCES

- 1 Ochsner Alton Metalaparotomy function Ileus Surg. Gynec. Obst. 59: 826 (Nov) 1934
- 2 Bonney Victor The functional derangement of the intestine that follows abdominal operations Lancet 2: 1322 (Dec. 15) 1934
- 3 O Keefe Charles D The cause and prevention of post operative gas pains Am J Obst. and Gynec. 8: 745 (Dec.) 1924
- 4 Potter Philip C and Mueller R. Sterling Posterior plasty extract in the prevention of post operative intestinal distension a preliminary report. Ann Surg 96: 364 (Sept) 1932
- 5 Cunningham S P The cause and prevention of post operative gas pains Anesth and Analg 7: 376 (Nov Dec.) 1928
- 6 Cutting R. A Principles of preoperative and postoperative treatment. Am J Surg 12: 561 (June) 1931
- 7 McIver M. A. Benedict E. B. and Cline J. W. Jr Postoperative gaseous distention of the intestine. Arch. Surg. 13: 583 (Oct.) 1926
- 8 Ochsner Alton and Gage I. M. Adynamic Ileus Am. J. Surg. 20: 378 (May) 1933

## INCARCERATED BLADDER IN A SCROTAL HERNIA

## Case Report

BY FRANCIS J. PETRONE, M.D.,\* AND EDWIN VIEIRA, M.D.\*

**B**LADDER herniations are relatively frequent, incarcerations less frequent, but incarcerations in the scrotum are found to be very rare. Because of the scarcity of such cases reviewed in the literature, a report of a case recently observed is hereby submitted for record with a survey of vesical hernias.

Vesical hernias are not uncommon as has been revealed by Erdman when he collected 8600 cases of hernias of various types and found that in four cases out of every thousand the bladder was involved in the hernia. Scrotal vesical hernias are however, rare, as Makkas in 1933 stated in a report of a case of a large bladder hernia on the right side. Quivy and Yvon also reported such a case in 1934. These workers were fortunate in making a diagnosis by cystogram, showing the greater portion of the bladder in the right scrotal sac. The anamnesis in their case revealed that the patient had a hernia since the age of fifteen, and that in later years he noticed that he began to urinate in two stages, first normally, and finally by manipulating the scrotum. Pfizner in 1930 reported a right irreducible hernia in the scrotum. The bladder was freed and returned to the abdomen and the hernia repaired in the usual manner.

Bladder herniations as already stated are not uncommon. In 1923, 406 cases were collected

from the literature and it was found that they occur twice as frequently in men as in women. In 359 cases 130 were on the right side 103 were on the left side, five were bilateral, and forty-two were not specified as to side. Femoral vesical hernias were included in the series, forty three were on the right and twenty-one on the left side, two bilateral and thirteen were not classified as to side. Other varieties of vesical hernias occurred, such as perineal, sciatic, ventral, and obturator, these types were however, very rare.

Preoperative diagnosis of bladder hernia is very low. In 347 cases the diagnosis before operation was made in only twenty-five cases, 279 were diagnosed during operation and forty-three recognized after operation. It has been noted that injuries to the bladder during the operation seem to be a very frequent incident. In 406 cases of vesical hernias 194 were injured during operation, nearly 50 per cent. This complication naturally aggravates the condition, especially if not recognized during the operation. Resultant fistulas lasted from one day to one year or more. The mortality has been found to be higher in those cases in which injury was not recognized during the operation.

## REPORT OF CASE

- Chief Complaint** Pain in the right lower quadrant for the last six hours radiating to the groin
- Family History** One son and one brother have large inguinal hernias

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**Past History** Patient has enjoyed good health for the past twenty years. Has no history of serious ailments, accidents or operations.

**Present Illness** The patient was perfectly well up to the onset of his present condition at 8 A.M. He got up and on doing chores about the house began to notice severe lancinating pains in the right lower quadrant which radiated down to the right groin. Severity of the pain became worse until he was obliged to call his physician for relief. The patient noticed that he had been constipated the last few days consequently took an enema without effect save for the passage of some gas. He had noted some difficulty in passing urine but never any retention requiring catheterization, nor has he had dysuria or passed blood. With the onset of the present condition a lump appeared in the right groin and gradually became larger. This swelling was in the right scrotal sac. It was tender to palpation and non-reducible. This lump had appeared in the past without symptoms and was always readily reduced on pressure.

#### PHYSICAL EXAMINATION

The patient was a large framed, obese Portuguese farmer weighing about 200 lbs. in evident distress with pain ruddy faced but slightly cyanotic and dyspneic. Temp 99 pulse 55 resp 20 W B C. was 15,000 and the differential showed 80 per cent polys. The Wassermann test was negative and urine analysis showed a slight trace of albumin a few leucocytes a rare hyaline cast and rare red blood cells. The tongue was heavily coated, mouth hygiene was poor and the throat was injected. The chest was barrel shaped excursions small but equal. The lungs showed the presence of sibilant rales throughout, with increased resonance and diminished breath sounds. Heart sounds were snapping in quality a soft systolic murmur at the apex was heard but not transmitted. A 2 was accentuated. B P 210/100. Abdomen obese. A large swelling the size of a small grapefruit was noted in the right inguinal area extending down to the right scrotum. This mass had the feeling and resiliency of a tennis ball, and was very tender to palpation. The right lower rectus was rigid. The extremities showed no edema or deformities. Reflexes were normal. Patient was admitted to the R. I. Homeopathic Hospital September 15 1931 and was operated on the same day.

**Preoperative Diagnosis** Incarcerated Inguinal Hernia. (Right.)

**OPERATION** The patient was not considered a good surgical risk but surgical intervention was deemed imperative and avertin anesthesia supplemented with ether was used. In ten degrees Trendelenburg position the operative field was prepared with benzene-triiodine. A four inch long incision was made one inch above Poupart's ligament down to the pubic spine over the mass. This mass was located inside the scrotum and outside the external abdominal inguinal ring. The primary incision extended down to the external oblique fascia. All bleeding points were clamped and tied. A marked constriction band was cut just outside the external inguinal ring and when this was done the sac which was the size of a large orange collapsed. The cord was isolated from the sac to which it was firmly bound by adhesions. The sac was peculiar baggy and felt as though its contents consisted of omentum firmly adherent to the sac. This sac came di-

rectly out of the abdomen and did not follow the cord up the inguinal canal. It emerged from Hesselbach's triangle down through the external ring. By gentle dissection an attempt was made to get to the inside of the sac. It was disappointing to find that the bladder had been exposed and opened evacuating about four ounces of clear straw-colored fluid. It was realized that this was an unusual case of incarceration involving the bladder in the right scrotum. The bladder was immediately sutured with catgut. The redundant sac or tissue was clamped ligated and cut. The bladder was then pushed into place behind the pubis and several interrupted chromic catgut sutures placed from the conjoined tendon to Poupart's ligament. The external oblique fascia was sutured with continuous chromic catgut and the skin sutured with interrupted silkworm catgut. A dry sterile dressing was applied and a retention catheter was placed in the bladder for continuous drainage. The patient took anesthesia very well except for moderate cyanosis at various intervals and the general condition at the end of the operation was considered fair.

**Postoperative Diagnosis** Incarcerated Scrotal Hernia of the Bladder (Direct Right)

**Progress in the Hospital** On the fifth postoperative day the retention catheter was removed and he began to void voluntarily but with some pain which gradually cleared up during the next few days. His urinary output increased his appetite was good his abdomen was soft and elimination was satisfactory. For several days he was troubled with general urticarial eruption. This was felt to be due to a throat infection as the urticaria cleared up when the throat improved. He was discharged from the hospital October 2 1931 improved. The patient urinated in normal amounts without pain and stated he was feeling well.

**Pathological Diagnosis** Hernial sac with fat tissue

**X-Ray Report of Bladder** Cystogram showed a large filling defect of the right side of the bladder which diminished the capacity of the bladder to less than one-half. The defect was probably due to the repair of the hernia of the bladder into the scrotum. No part of the organ protruded below Poupart's ligament.

**Progress of the Case Since Hospital Discharge** Examination of patient six months after discharge shows a well healed right inguinal incisional wound with no recurrence of hernia. Patient has had no urinary symptoms of frequency or dysuria. He is feeling well and doing work about his farm.

#### COMMENT AND SUMMARY

From a survey of the literature incarceration of a bladder hernia into the scrotum is rare, while at the same time herniation of the bladder in various positions is not an uncommon finding in lower abdominal hernias. In conclusion it is obvious that in repairing any hernia in the lower abdominal region the bladder should be constantly kept in mind. Injuries to the bladder in these cases are too frequent a complication and are not even recognized at the time of operation. More attention should be paid to the history and particularly to the genitourinary aspect of the history. Whenever suspicious or

doubtful as to the presence of this complication the bladder should be catheterized and a cystogram made

## REFERENCES

- 1 Erdman S Hernia of the bladder Nelson Loose Leaf Surgery P 603
- 2 Makkas M Eine grosse Blasenhernie Beitr z. klin Chir 157: 636 1933
- 3 Pätzner H Eingeklemmter Harnblasenbruch Zentralbl f Chir 57: 712 (March 22) 1930
- 4 Quivy and Yvon Un cas de hernie scrotale de la vessie. Bull et mém Soc. de radiol méd de France 22: 169 (March) 1934
- 5 Watson Leigh F Hernia Its Anatomy Etiology Symptoms Diagnosis Differential Diagnosis Prognosis, and Operative Treatment. St. Louis C V Mosby Company 1924

## THE ARTERIOGRAPHIC COMPARISON OF THROMBO-ANGITIS OBLITERANS AND ARTERIOSCLEROSIS\*

BY EDWARD ALLEN EDWARDS, M D †

**T**HE arteriogram of normal arteries shows three characteristics which are changed in both arteriosclerosis and in thrombo-angitis obliterans. These characteristics of normal arteries have been noted by Allen and Camp as follows: first, the smooth and uninterrupted contour of their lumens, secondly, the direct course of the vessels, thirdly, the presence of no more than a minimum of collateral circulation<sup>1</sup>

Examination of arteriograms of diseased arteries show striking deviations from the normal. In both Buerger's disease and in arteriosclerosis one finds varying degrees of blockage of the lumen, tortuosity of the entire vessel, and an increase in the number and size of the collaterals. I have observed, however, in common with Leriche, Fontaine, and Friehe<sup>2</sup>, and with Sgalitzer, that one can nevertheless distinguish between the pictures of the two conditions.

The arteriosclerotic vessel (figure 1) may show not only abrupt blockage of the lumen, but also multiple eccentric rounded filling defects in the segments of the artery above the blocked portion. This gives a serpiginous outline to the image of the vessel lumen. Secondly, the lesser arteries and sometimes the main artery may be irregular or tortuous in their course. Thirdly, the number of collaterals are markedly increased.

The arteriogram in Buerger's disease is a different one (figure 2). The totally blocked areas of lumen are usually more extensive. Above these totally blocked areas one usually finds a lumen of smooth outline, with absence of the eccentric filling defects noted in arteriosclerosis. Secondly, the arteries are less apt to be tortuous. Thirdly, the visualized collaterals are fewer in number than in the arteriosclerotic.

The difference between the irregular lumen of arteriosclerosis and the smooth appearing lumen of Buerger's disease, can be explained by the occurrence of localized atheromata in the former disease, and their absence, in uncomplicated cases, in the latter. While discrete areas of proliferative thickening of the vessel wall may

occur in Buerger's disease, the process is more apt to be one involving the entire circumference of the lumen, giving the lumen a reduced but regular outline.

Furthermore, we know from clinical and post-mortem observations that the blood stream tolerates localized atheromata well, thrombosis occurring late in arteriosclerosis. In thrombo-angitis, however, even a small extent of involvement is quickly followed by thrombosis. In this way the arteriogram of an arteriosclerotic vessel may show atheromatous changes in outline, with or without occlusion, whereas in Buerger's disease it is almost an "all or none" proposition, i.e., as soon as the artery is involved more than a very little, it is apt to be thrombosed, and show abrupt loss of its lumen up to the normal part of the artery.

Concerning the fewer collaterals in thrombo-angitis, it is possible that it is to some extent a matter of time. That is, if the duration of the process were as long as in the arteriosclerotic, the collaterals might gradually develop to the same extent.

Previous work by Lewis and Reichert<sup>3</sup>, and by Horton<sup>4</sup>, indicated that the collateral circulation is much richer in thrombo-angitis obliterans than in arteriosclerosis. This finding is contrary to that of Leriche, Fontaine and Friehe, and to my own findings. I believe the conclusions of the former observers are open to question because their arteriograms were made from amputated limbs, while those of Leriche, Fontaine, and Friehe, and of mine, have been made during life.

### CONCLUSIONS

The arteriograms of arteries injected during life show characteristics which are seemingly distinct for arteriosclerosis and for thrombo-angitis obliterans. In arteriosclerosis the arteriogram may show complete occlusion of segments but in addition shows eccentric filling defects in the other segments. They may also show a more tortuous course than normally, and the collateral circulation is greatly increased.

In thrombo-angitis obliterans the arteriogram shows a varying extent of thrombosis, with smooth-walled segments above the occluded segments. The course of the vessels is less likely

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FIGURE 1. Arteriogram of a femoral artery involved by arteriosclerosis (made during life and later confirmed by pathological examination).

For the technique of arteriography see the author's previously published articles:

1. Edwards, Edward A. The status of vasography. New Eng. J. Med. 209: 1237 1932.
2. Edwards, Edward A. and Bignura, Fernando. A comparison of skiodan and diodan as vasographic media, with special reference to their effect on blood pressure. Ibid. 211: 559 1934.

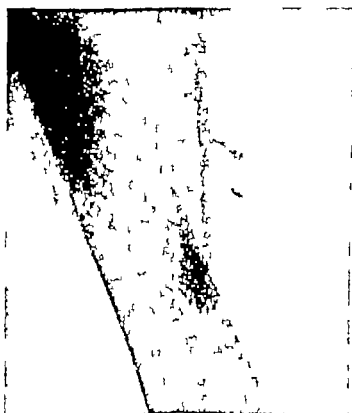


FIGURE 2. A radiogram of a femoral artery involved by thrombo-angiitis obliterans (made during life and later confirmed by pathological examination).



to be tortuous, and the collaterals, though increased in number above the normal, are yet fewer than in the arteriosclerotic.

## REFERENCES

1. Allen, E. V., and Camp, J. D.: Arteriography. A roentgenographic study of the peripheral arteries of the living subject following their injection with a radiopaque substance. *J. A. M. A.* 104: 613 (Feb. 23) 1935.

2. Leriche, R.; Fontaine, R. and Fiesh, P.: Indications et résultats de l'angiographie dans les artériites. *Presse Méd.* 41: 1189, 1932.
3. Lewis, D., and Reichert, F. L.: The collateral circulation in thrombo-angiitis obliterans. An indication for ligation of the femoral artery just distal to the profunda. *J. A. M. A.* 87: 302, 1924.
4. Horton, D. T.: A study of vessels of the extremities by injection of mercury. *Proc. Staff Meet. Mayo Clin.* 3: 141, 1918.

## ALLERGY TO LIFE AN INTERPRETATION OF NEUROTIC CONSTITUTION\*

BY ELI MOSCHCOWITZ, M.D.†

**D**ISPASSIONATE observers are fully aware that the neuroses are not only distressingly abundant, but that they are increasing in the United States. This, in itself, although serious, is made more alarming because certain common, sometimes fatal, maladies which I believe are in whole or in part of psychogenic origin, are increasing with prodigious speed. I refer especially to hypertensive disease, Graves' syndrome and gastric ulcer. We cannot flatter ourselves that all this increase is only apparent and that it is due to finer precision in diagnosis.

It is agreed that a neurosis is the result of a conflict between the environment and the individual and that it represents in a large measure failure to achieve the security for life or the satisfaction of the lust for power or of love, that is instinctive in human kind. Nor mality of conduct and behavior may be defined as an equation in which the forces of the environment are in delicate balance with the forces within the individual. The determination of the cause of the increase of neurotic illnesses therefore depends upon the answers to the questions as to whether the environment has become more onerous or the individual more sensitive or both.

It would be idle to deny that our environment has grown more onerous. It did not require an economic depression to make this apparent. Long before this event, life was becoming increasingly complex and was attended by a swiftness of pace so great that the human mind and frame were finding it difficult to keep in adjustment.

It is beyond my purpose and capacity to analyze completely the forces that made up the complex of our modern swift-paced civilization. Briefly as I see it, these forces are in some measure economic but for the greater part are psychologic. The unequal and unjust distribution of wealth is but one of the economic forces involved. Sufficient recognition has not been given to the fact that the progress of civilization has brought in its train a host of evils. If

one looks into the mouth of the gift horse of progress one finds that this progress has been material rather than spiritual, that it consists for the most part in inventions that enable us to do two things where we could do only one before, so that the life pattern has become more compact, a person today lives two lives within the space of one.

Of greater import, I believe, in the increased production of conflict is the enhanced sensitivity of the individual to life and it is to the analysis of this influence that I now turn.

The most important as well as the earliest influence which sensitizes the individual is the family, and of this hierarchy the mother is the most dominating member. One of the important contributions of the Freudian psychology has been the study of the effect of maternal influences on human behavior. The emphasis that has been placed on the so-called mother complex, whether it is hate or love, and its effect upon the sex life of the individual is hardly exaggerated. The range of influence is far wider than upon sexuality. Other instincts and senses may be affected and through these conduct and behavior.

The mother exerts the devastating influence which, to a large extent, sensitizes the individual by the mechanism of overprotection. Overprotection does less harm when the mother's fears are against physical insult or illness, but it is bad enough here because it may create the habit of introspection. The tragedy is when there is an overmastering fear of self-determination, which from birth begins a desperate mental moulding, a mental transference that is unrelaxing. It is because of the fear of self-determination that some mothers cultivate within the child an absolute dependence for every decision, no matter how trivial, and so the child reaches the years of discretion unable to meet the ordinary stresses of life. Such children remain infantile and their subsequent existence becomes a series of desperate attempts to escape realities. Mother love in its highest ecstasy can blight or even crush the human soul with a cruelty akin to that of the Inquisition. And the irony of it is that this is all done in blissful innocence and with intentions furthest re-

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moved from those of hate. These mothers are not necessarily ignorant, many are well educated and some even consider themselves cultured. The state correctly demands licenses from those who are responsible for human lives, but it makes no provisions for the privilege of rearing children. One wonders whether such enlightenment will be attained in the future state. Bearing children and rearing them may some day be regarded as entirely separate callings. In recent decades due to economic pressure small families have become necessary, which probably accounts in some degree for the increase in the number of highly sensitized individuals, for it is obvious that the smaller the number of progeny, the greater the hazards of maternal domination. When a child is a single one, the chances of sensitization are almost certain. A single child starts life with almost insuperable handicaps.

Fathers are less responsible, first, because they have no nutriment-giving breasts, secondly, because they see infinitely less of their children than the mother, and thirdly, because only too often the mother is jealous of paternal influence. If a child could select the best atmosphere in which to be sensitized it would be a household with a fussy and dominating mother, a father whose interests are in everything except the rearing of children, and a horizon in which no or few rivals are visible, especially of his or her own sex.

Relatives, other than parents, have their scope for harm but only when they substitute as parents and the victim is still within the impressionable age.

There are other protective mechanisms. One of the characteristics of advancing civilization is the invention of means to soften the edges of the tools of living and the "bludgeonings of chance." Consider our subtler and swifter methods of communication, the expansion of industrialism, the enormous refinements in comfort, the vast conquest of the forces of nature.

The slow disappearance of the frontier, which Truslow Adams regards as so important in checking our economic development, has at the same time checked the pioneer spirit, the lust of adventure and aggression that was so marked a trait in the older generations.

Our own science, medicine, has also become a sensitizing influence, for the alleviation of pain, and the refinements of the sick room, while they help us to conquer, at the same time make invalidism much easier and the individual softer. Maladies that were formerly regarded by the public as minor have become major, and it pains one to say that we have developed a breed within our own calling who encourage this distorted perspective.

Certain races are more sensitive than others, but, I believe this is the result of extraneous factors and not of genetic qualities. In general,

Southern races are more sensitive than Northern, this is probably due to climate which makes the emotions of Southern people more labile. But there are other reasons that apply to isolated cases. Our Southern women are notoriously more sensitive because of the chivalrous attitude of their male associates. Primitive peoples are less sensitive than those that are civilized, and in a general way, the greater the civilization the greater the potentiality for sensitization.

This is readily understood when one considers that increasing complexity of life brings corresponding mechanisms for protection. It is a remarkable phenomenon that as soon as a primitive folk comes into prolonged contact with a civilized one, evidences of sensitization become manifest. This is well exemplified in our Negroes. Formerly Graves' syndrome was a rare disease in Negroes, at present it is common and appears to be increasing. The notorious sensitivity of the Jews is undoubtedly due to generations of persecution and the development of keen protective mechanisms, as the result of the conflicts engendered by the Diaspora. Religion may be a sensitizing agent only when it teaches irreconcilability in the face of death, if reward is promised, such as heaven or immortality, death arouses little fear. Religion may be regarded as one of the escapes from a world of reality and probably the most widespread neurosis that has affected mankind. Religion is therefore a result and not a cause of sensitivity to life.

Education is the most potent antagonist of neurosis, for fear is bred of ignorance. Scientists are not so subject to anxiety and kindred neuroses as those who lack the scientific discipline. Scientific discipline connotes the ability to doubt while the sensitive depend for their conduct in life upon dogma. It is not in the diffusion of knowledge that education fails, but rather when it teaches such protective mechanisms as the inviolability of tradition, rigidity of thought, the sanctity of conventions, and the virtues of a soft, smug, and complacent life.

Thus far, in this discussion, the influences that make for sensitivity, either of the individual or of the mass, have been entirely environmental. Sensitivity, in other words, represents a mutual reaction, a give and take between the ego and its surroundings that is progressive as life increases in complexity and intensity. I do not believe that sensitivity is congenital except under two conditions. First, when there is a congenital deficiency in the individual's physical frame or the basic intellectual potentials, so that he masks his deficiency in various forms of compensatory mechanisms. Lord Byron with his deformed foot is an example of physical inferiority that comes readily to mind. Acquired deformities, especially if they arise in the early years, may result similarly. The second is the sensitivity both to phys-

ical and mental insults that accompanies that curious morbid state known as status thymico-lymphaticus which has all the earmarks of a congenital lesion. It is well recognized that this lesion is a common background upon which Graves' syndrome is engrafted. Indeed, over 95 per cent of the fatal cases of this malady are associated with status thymico-lymphaticus. The cause of the sensitivity is a mystery.

The manifestations of a heightened sensitivity to life are largely functional and range from the milder aberrations of behavior to major hysteria and even to manic depressive psychoses. I have already referred to certain maladies of organic character such as Graves' syndrome, hypertensive disease (essential) and peptic ulcer, which I believe are of psychogenic origin. Of these, Graves' syndrome is the most exquisite example. I tried to show in a previous study<sup>1</sup> that this syndrome expresses biologically a series of events ranging from the primitive form variously represented under the terms autonomic imbalance, Basedow, pre-Basedow, formes frustes to the complete florid stage conventionally termed exophthalmic goitre. The dominant characteristic of this malady is a constitution that is largely phenotypic. The disease occurs in highly sensitive, emotionally unstable folk and the clinical manifestations are brought to light as a general rule either by catastrophic emotional insult, or by less perceptible reiterated mental shocks. The hyperthyroidism is secondary, probably the most important clinical manifestation, and therefore should by no means be considered as synonymous with the disease. Psychotherapy is an important adjunct in the treatment of the disease not only before but even after thyroidectomy. The evidences of sensitivity in hypertensive disease (essential) and in gastric ulcer are not so apparent as in Graves' syndrome, but inasmuch as conflict enters so largely into their genesis the matter of sensitivity is entirely a relative one.

It is agreed that neuroses represent an attempt at adjustment, an escape from the world of reality and an attempt to hurdle life's difficulties. As Wechsler aptly puts it, a neurosis is the penalty for the unsuccessful attempt to grow up. Such escapes manifest themselves in a variety of disturbances of conduct: the phobias, anxiety neuroses, exaggerated narcissism, compulsion neuroses, hypochondriasis, doubting folies, psychasthenias, etc. But there is a host of other manifestations of escape that are not as a rule classed among the neuroses, these aberrations of behavior are so slight that society not only condones but even approves of them.

One of the most conspicuous symptoms of sensitivity is the overdevelopment of the instincts and the senses. This is obvious when

one considers that an escape from the realities of the environment leads naturally to a greater dependence upon one's own inner fires. And thus the instinct of self preservation becomes extraordinarily refined and enhanced; jealousy, hate, love, and fear become powerful weapons. The emotional life of those who are thus affected covers a wide range. They lack poise and phlegm, they become profoundly narcissistic, self absorbed and self pitying. Sensuality becomes their predominant characteristic. They take easily to drink and sedative drugs because they want to forget. I take it that this represents a sort of death wish. Their passions are always aflame. They indulge in sexual excess. If these are for various reasons frustrated, perversions and especially homosexuality often ensue. As a consequence their married lives become unstable. They plunge deeply into religious cults and into philosophies tinged with mysticism. They pass speedily from experience to experience and become a restless, wayward Bohemian folk. From this group come most of our artists, poets, writers, musicians, painters and actors. We need them badly, indeed, far more than most of our captains of industry for it is they who bring romance into our lives. It is the idea of romance that people associate with Southern climes. That is why Cohen Porthem says, "The North craves the South. The South satisfies feeling. The cooler regions of the earth lead to a scientific outlook on life but it leaves an emotional void. The Northern lands have many admirers but few lovers."

Hovering over the lives of the abnormally sensitive is the constant menace of self-destruction. The vast majority of suicides, especially the young, come from these people. It may seem strange that one who loves a sensuous life so intensely should seek to destroy himself, but the gratification of the senses becomes so constant and so intense that living becomes a long-drawn-out pain and it requires but a push (and it is often a ludicrously trivial one) to make a decision between life and death. Security is attained at last, but in the grave.

Having made this indictment, what is the outlook and what is the remedy? The outlook is not rosy, so far as the immediate future is concerned. We cannot stay the hand of material progress nor indeed would we be willing to do so. Nor is the permanent solution of the economic problem and in consequence the stabilization of the social order an immediate prospect, so that social service seems likely to continue as a vital public and private function. The simple life, except in the sense of a change of values must, therefore, remain an enticing dream. And so if it is difficult to mould our environment the solution must come from within.



ourselves I have already hinted at the remedy in the foregoing remarks. Escapes are not always avoidable in what Powys calls "our conscious life between two incredible eternities", but if escape we must the only legitimate and reasonable one is knowledge. By knowledge, one does not necessarily mean culture, although it helps by affording a finer sense of values, but the study of man himself. Although we cannot select our mothers and other relations, at least we can teach them. We can teach them and the rest of humanity the dark menaces of overprotection. We can teach them to face realities squarely, to appreciate the drifts of civilization and to cultivate self-reliance and self-determination and thus to achieve maturity. To accomplish this they must be taught the workings of the human mind, the springs of human motives, the proper control of the instincts and senses. Spiritual values will be prized above the material. Money will be regarded in the light of a means and not an end.

The beginnings of such an education are already visible in the recent diffusion and popularization of knowledge in regard to child and adult hygiene. But it must go much farther. The responsibility of the medical profession for this knowledge and the part that it must play in it is very important. I fear we have been rather remiss in trying to maintain the traditional medieval isolation of medical lore. The practice of medicine is no longer a matter of magic or mystery, however dark its workings may be. One of the crying defects of practice of medicine today is the appalling lack of public knowledge of the principles of medicine, not only the functional but organic. There is need to recognize not merely the external conflict with disease but the disease caused by the internal conflict. Doctors must teach people how to live as well as how not to die.

## REFERENCES

- 1 Moschcowitz E. The nature of Graves disease. Arch. Int. Med 46: 610 1930

## VERMONT STATE MEDICAL SOCIETY

### ATROPINE FEVER IN EARLY INFANCY\*

BY C K JOHNSON, M D †

**A**LTHOUGH I am aware that there have been several papers written on this subject within recent years, I feel sure that many of you are not familiar with the fact that atropine may cause a rise of temperature, at times very high, in a few susceptible infants. This drug is now quite generally used in young infants in the treatment of pyloric spasm or for gastro-enterospasm (colic).

It is usually used in solution made with one grain of atropine in two ounces of distilled water. One drop of this solution would represent approximately 1/1000 of a grain. The usual dose is one drop in a teaspoonful of water a little before each feeding and this dose slowly increased to two or three drops at each feeding if needed to control symptoms.

White states that atropine will cure the majority of infants with functional vagogenic gastro-enterospasm and given the principal symptoms of this condition as "(a) Extreme fretfulness, aggravated by feeding, with inability to nurse because of cramps or (colic) with (b) occasional projectile vomiting, plus diarrhea or constipation, with or without visible gastric or intestinal peristalsis and (c) without the olive shaped tumor of organic pyloric stenosis."

This tendency to spasm is most frequently

found in infants under two months of age. The cause of the fever seems somewhat uncertain. Benzing believes that the fever is of central origin, the atropine circulating in the blood is a parasympathetic toxin attacking the heat regulating vegetative centers, then, owing to the paralysis of the heat inhibiting centers, heat formation is excessive.

Physiological effects of the atropine show a scarlet flush of the face and body, dilated pupils, shallow and more rapid respiration and increased pulse rate.

Howell doubted the existence of any one center, considering that there were several coordinating systems involved. Atropine diminishes glandular activity, especially of the sweat glands and the absence of perspiration may be at least in part responsible for the fever. Howell cites Zunt's case of a man without sweat glands who developed a high fever on making the slightest effort in warm weather and he further states that this is analogous to the struggling infant deprived of its ability to perspire by atropine, but by this analogy all infants given atropine should develop a fever. It is, however, estimated that less than ten per cent of them do so.

Wood<sup>1</sup> attributes the temperature to paralysis of the thermogenic centers in the spinal cord, and the final fall to vasomotor paralysis.

Solis-Cohen<sup>2</sup> believes that atropine fever re-

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sults from increased heat production due to direct stimulation of the heat center

Benzing<sup>4</sup> in a study of fifty infants distinguished two groups in regard to type of reaction to atropine. The first group were definitely hypersensitive to atropine. In this hypersensitive group he found infants on a concentrated diet with insufficient fluid and thinks that dehydration favors the fever. A marked increase of tolerance was noted when the dose of atropine was very slowly increased.

Dresel states that there is much experimental evidence to prove that the parasympathetic fibers inhibit heat, and that the sympathetic fibers stimulate heat production and that atropine is a parasympathetic inhibiting agent.

Alarcon<sup>5</sup> stresses that individual susceptibility varies, some infants showing signs of intolerance after one drop of a 1/10,000 solution and cites another infant who by mistake received twenty drops with each feeding, without untoward effect. He states that this phenomenon may be explained as follows: it is due to the pharmacodynamic action of the minute doses of atropine which excite the vagosympathetic system, stimulating the secretory function of the glands, chiefly of the thyroid, the resultant transient hyperthyroidism, by accelerating metabolism, produces abnormal heat. The cutaneous hyperemia and suppression of sweat which accompany the fever are vagal phenomena parallel with or consequent to it, they cannot however, be considered as causes of the rise of temperature although they are contributing factors. He states further that an important factor in the production of fever is the thermolability of the tiny organism due to innate vagotonia, together with its transitory inability to control and direct its vegetative physiology by means of the skin.

McNab reports a case, that of a four year old child who died after eating belladonna berries, the temperature reaching 110 degrees F., a few hours before death.

Beehler<sup>6</sup> has reported the case of a female twenty five years of age who took three grains of atropine. She developed an axillary temperature of 105 degrees F. and a red rash. Atropine was found in the urine four hours after ingestion and one drop of the urine in a cat's eye dilated the pupil in five minutes.

Benzing and others report that infants with atropine fever show a neutrophilic leucocytosis.

This atropine fever is characterized by a sudden onset and may last a few days or may disappear rapidly without any aftereffects. Stopping the drug causes the temperature to disappear, only to reappear, when more atropine is given.

Marrion<sup>7</sup> says that atropine may at times lead to an increase of body temperature to 102

to 104 degrees F., not accounted for by any infection. He also states that atropine fever is not necessarily a contraindication to its use, although it is usually well to diminish the dose somewhat.

Neff<sup>8</sup> states that not infrequently small doses of atropine cause flushing of the skin but that this is not dangerous or injurious. Several other textbooks on pediatrics have been consulted, some of them just off the press and about fifty per cent of them do not mention fever in connection with atropine therapy.

Munns<sup>9</sup> reports a case of atropine fever reaching 109 degrees F. with recovery. He states that the reaction occurs only in very young infants and may occur when an ordinary dose is given. He further states that the fever is controlled by hydrotherapy and that there are no harmful aftereffects. He does not attempt to explain the phenomenon but considers the drug a safe remedy if the dose is increased with caution.

Bass<sup>10</sup> was one of the first to describe that which he called "the hypertonic infant" and recommended the use of atropine in these cases.

Dennett<sup>11</sup> describes the hypertonic infant and strongly recommends the use of atropine. He speaks of atropine as a specific and that its use in vomiting is of diagnostic value. He also calls attention to the fact that this drug may at times cause hyperpyrexia.

It is this fact, that many textbooks do not mention the possibility of atropine causing a temperature at times very high, and the fact that atropine is now quite frequently used in the treatment of these small infants that led me to present this paper.

I have used atropine quite extensively in infant therapy for some years and during this time have occasionally seen infants that were rather sensitive to this drug. I have however not seen many who developed high fever.

I wish to cite but two cases of atropine fever at this time.

CASE 1. A H. born December 28 1933 weight nine pounds and three ounces birth normal breast with complementary feeding from the first day. On January 1 the four day old infant vomited a little and on the sixth day the vomiting had increased and was thought to be projectile in character so at 6 P.M. 1/500 grain of atropine was given by mouth this dose being repeated at 10 P.M., also at 6 A.M. and at noon the following day. I saw this infant at 6 P.M. on this day because of a rectal temperature of 103.8 degrees F. The respiration and pulse were rapid and there was a red flush over the entire body. The physical examination was otherwise negative. The atropine was stopped and fluids given, with a drop of temperature to 99.4 degrees F. at 10 P.M. There was no further rise of temperature and no more vomiting of account. It has been stated that this hyperthermia caused by atropine had a beneficial effect on the vomiting in some cases, as might have been the case in this instance. However one would hardly wish to induce the high fever purposely. I feel that in many of these in

phants three or four days old that begin to vomit, the cause is often a poorly adjusted formula rather than any instability of the infants' nervous system

CASE 2 C S, born January 23, 1933, weight seven pounds and two ounces. On February 18 when twenty-five days of age and a weight of six pounds and ten ounces, with some dehydration the vomiting which had been mild before became more marked and at 6 A.M. temperature was 99 degrees F rectal. At 7 45 A.M. 1/1000 grain atropine was given, at 9 30 the temperature was 102 degrees F, at 10 30 A.M. 1/1000 grains atropine, and the same at noon, the temperature then 101 4. At 2 45 1/1000 grain of atropine was given and the temperature at 3 P.M. was 107 degrees F rectal. I first saw this infant at 5 P.M. No more atropine was given and the rectal temperature was 100 at 10 P.M. and remained down.

#### REFERENCES

- 1 Wood H. C. Text-Book of Therapeutics Philadelphia J B Lippincott Company 1904
- 2 Solis Cohen S. and Githens T. S. Pharmacotherapeutics, Materia Medica and Drug Action New York D Appleton and Company 1928
- 3 Benzling R. Über Atropinfeber bei Säuglingen Monatschr f Kinderh 24: 505 1922-23
- 4 Alarcon A. G. La fiebre de la atropina An de med int. 2: 267 (March) 1933
- 5 Comroe, B. L. Atropine poisoning recovery after 7 1/2 grains of atropine sulphate by mouth J A. M. A 101: 446 1933
- 6 Marriott, W. M. Infant Nutrition A Textbook of Infant Feeding for Students and Practitioners of Medicine St. Louis C V Mosby Company 1930
- 7 Neff F. C. Clinical Pediatrics Diseases of the Digestive System of Childhood New York and London D Appleton and Company 1927
- 8 Munns George F. Atropine hyperpyrexia in early infancy J A. M. A. 93: 171 1929
- 9 Haas Sidney V. The hypertonic infant the curative action of atropin on certain of its manifestations Am J Dis Child 15 323 1918
- 10 Dennett R. H. Simplified Infant Feeding with Eighty Illustrative Cases Philadelphia and London J B Lippincott Company 1920

### MISCELLANY

#### ANNUAL MEETING

The Annual Meeting of the Vermont State Medical Society will be held at Rutland, Vermont, October 17 and 18. The following provisional program is submitted:

- 1 President's Address George G. Marshall, M.D., Rutland
- 2 Paper Augustus B. Wadsworth, M.D., Director of Division of Laboratories and Research of the State of New York, Albany, New York  
Topic "Practical Limitations of Vaccine and Serum Therapy"

- 3 Paper Ward Woolner, M.D., Past President of the Ontario Medical Association, Past President of the Medical Health Officers Association, Ayr, Ontario  
Topic "Rural Health Problems, the Problems Themselves and Their Control."
- 4 Paper C. F. Whitney, M.D., Professor of Physiological Chemistry and Toxicology, University of Vermont, Burlington, Vermont  
Topic "Chemistry in Relation to the Practice of Medicine"
- 5 Paper N. D. Smith, M.D., Mayo Clinic, Rochester, Minn.  
Topic "Obscure Abscesses a Cause of Acute Anal Pain" (Their Diagnosis and Treatment)
- 6 Paper E. J. Rogers, M.D., and L. A. Rabinowitz, M.D., Vermont Sanatorium, Pittsford, Vermont.  
Topic "Chronic Cough"
- 7 Paper Henry A. Christian, M.D., Physician-in-Chief, Peter Bent Brigham Hospital, Hersey Professor of the Theory and Practice of Physics, Harvard University, Boston, Massachusetts  
Topic "Types of Edema and Their Treatment."
- 8 Paper Foster Kennedy, M.D., New York City  
Topic "The Biopsychic Approach to Diseases of the Mind Its Dependence on Neurology and General Medicine"
- 9 Paper O. N. Eastman, M.D., Associate Professor of Obstetrics, University of Vermont, Burlington  
Topic "Hysteroptosis"
- 10 Address James S. McLester, M.D., President of the American Medical Association, Birmingham, Alabama
- 11 Vice President's Address Frank C. Phelps, M.D., Attending Physician, Porter Hospital, Middlebury, Attending Physician, Vermont State Industrial School, Vergennes, Vermont
- 12 Paper Arthur J. Bedell, M.D., Albany, New York  
Topic "Ophthalmological Diagnoses"

CASE RECORDS  
of the  
MASSACHUSETTS GENERAL  
HOSPITALANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., Editor

## CASE 21391

## PRESENTATION OF CASE

A forty four year old Italian woolen worker entered complaining of diarrhea.

During the past three years the patient had had frequent abdominal pains across the epigastrium, occasionally extending in an irregular manner to both lower quadrants. These pains were sometimes present for about a month or more at a time and were also absent for a similar length of time. Four weeks before admission, about an hour and a half after supper he vomited. He continued to vomit that evening three or four times in all. At the same time he developed rather severe diarrhea, moving his bowels every one or two hours. The next morning the vomiting stopped but the diarrhea continued. From that time until admission he had about eight bowel movements every day. The stools were always soft and watery, but as far as the patient knew had always been free from fresh or old blood. Accompanying these symptoms he also had a feeling of abdominal distention immediately after eating. Two hours after eating he felt a "pinching stabbing" epigastric pain which was relieved by food. At times he had a "rolling sensation" and a "rumbling" running down the left side of his abdomen to just below the umbilicus and then crossing to the right lower quadrant, where it stopped. Shortly after meals he had the sensation of "something hard and big" passing down the bowel and getting stuck in the region of the right lower quadrant. His desire for food remained good but the fear of precipitating abdominal distress prevented him from satisfying this desire so that he had practically abstained from eating meat during the past four weeks. During this same period he had cramplike pains in the calves of his legs which had increased in severity. He became progressively weaker and lost about twenty pounds in weight.

The family marital and past histories are non-contributory. There was no history of tuberculosis or carcinoma. He had had pneumonia twenty years before admission.

Physical examination showed a fairly well

developed and rather poorly nourished man in no immediate distress. The mucous membranes were pale. The heart and lungs were negative. The blood pressure was 104/60. There was slight tenderness in the right lower quadrant. No masses could be felt. There were a few small external hemorrhoids. Rectal examination, however, was negative except for slight tenderness.

The temperature was 98.4°, the pulse 78. The respirations were 22.

Examination of the urine was negative. The blood showed a red cell count of 3,120,000 with a hemoglobin of 50 per cent. The white cell count was 9,700. 66 per cent polymorphonuclears. The stools were small, soft and brown. Three out of seven stool examinations showed positive guaiac tests. No amebae could be found. A Hinton test was negative.

A barium enema showed a definite delay in the passage of the barium at the rectosigmoid junction but then a small quantity of barium entered the descending colon and flowed to the region of the splenic flexure. The remainder of the colon could not be filled but a definite lesion could not be demonstrated.

On the fourth day a red non ulcerating polypoid mass on the right wall of the region of the rectosigmoid was removed during proctoscopy. The pathologic diagnosis was adenomatous polyp. One week after admission he had considerable vomiting, abdominal cramps and diarrhea so severe as to amount to incontinence. He became severely dehydrated. The blood pressure was 70/50. He was given 4 liters of 10 per cent glucose with marked benefit. One observer at this time felt a small, hard mass in the region of the cecum. Another enema on the tenth day showed that the sigmoid was somewhat spastic but no lesion could be made out. The cecum was quite irregular but a definite diagnosis could not be made. During the examination the patient vomited several times and was unable to retain all of the enema. Two weeks after admission an exploratory laparotomy was performed.

## DIFFERENTIAL DIAGNOSIS

DR. HENRY H. FAXON. Intermittent epigastric symptoms of three years duration would immediately suggest a gastric ulcer until proved otherwise. Radiation from the epigastrium to both lower quadrants however is distinctly atypical for any common type of pathology and raises doubt as to how much weight to lay on this part of the history.

Four weeks before admission about an hour and a half after supper, he vomited. There is such an abrupt transition between the rather mild three year story and the severe symptoms which have been present for only four weeks that one is forced to raise the question whether this is a new lesion or some type of fairly dra

matic change in that of which he originally complained

"Two hours after eating he felt a 'pinching, stabbing' epigastric pain which was relieved by food." Relief so long after eating would be rather atypical of an ulcer and might better fit the picture of gastric malignancy.

The "rolling sensations" and rumblings spoken of are suggestive of a certain amount of obstruction with which the vomiting would also be in keeping. However, if the obstruction (which with his diarrhea would have to be incomplete in nature) were located in his upper intestinal tract it should not have radiated to his lower abdomen. If, on the other hand, as seems more likely, the site of the obstruction were in his large bowel, it is difficult to correlate the epigastric pain of which he also complained.

"Shortly after meals he had the sensation of 'something hard and big' passing down the bowel and getting stuck in the region of the right lower quadrant." Again in all probability this is gas in the face of a certain amount of obstruction.

In an Italian the possibility of some parasitic infection as a cause for the whole picture cannot be overlooked and with the muscle pain mentioned here trichiniasis comes to mind. There is no report subsequently, however, of any increase in the eosinophilic count which would be expected in most of these conditions. We find later that he had a considerable degree of anemia, so that the pain in the calves of his legs may have been on the basis of insufficient oxygenation of these muscles.

His weight loss most probably could be largely attributed to his very restricted diet, although of course, the effects of malignancy might also be a factor.

Tenderness in the right lower quadrant is often hard to evaluate since gas in the cecum is always somewhat tender to pressure, and granted the assumption that a certain amount of large bowel obstruction was present I would expect that there would be more than the average amount of gas in his ascending bowel.

His secondary anemia, it would seem to me, could best be explained in the light of the whole picture as being due to malignancy. Taken in conjunction with the normal temperature it would seem that his pathology was not primarily infectious in type.

"Three out of seven stool examinations showed positive guaiac tests." Certainly this clinical finding is of more significance than his story that blood in the stools had never been noted. However, these two factors taken together would suggest that the degree of hemorrhage at any one time had never been severe.

"No amebae could be found." If properly carried out this should rule out amebic dysentery as a cause of his symptoms.

Although no definite diagnosis was made on the first x-ray examination, this study gives more of a lead than anything we have met so far. Certainly from this report it can be definitely stated that some abnormality involving the large bowel was present.

"On the fourth day a red non-ulcerating polypoid mass on the right wall of the region of the rectosigmoid was removed during proctoscopy. The pathologic diagnosis was adenomatous polyp." Had any definite abnormality of the mucous membrane of the rectum itself been noted I assume that it would have been stated in this report. The finding of the polyp in itself is of significance chiefly due to the fact that it is well recognized that polyps are apt to be multiple, and it is more than likely that elsewhere in the large bowel additional polyps might be found any of which conceivably could have undergone malignant changes.

"One week after admission he had considerable vomiting, abdominal cramps and diarrhea so severe as to amount to incontinence." I can not stress too strongly the added help that it would be to know whether the abdominal cramps referred to were above or below the umbilicus. If the latter were the case I could discount to a considerable extent his upper intestinal symptoms, whereas if these cramps referred to were above the umbilicus some correlation between his large bowel pathology and upper intestinal tract would have to be made. Considering that vomiting is also a noteworthy symptom I am inclined to believe that the upper intestinal tract is probably involved secondarily by mechanical interference.

"He became severely dehydrated." Certainly with diarrhea of the extent this man had, dehydration would be a prominent symptom if not vigorously combated by a high fluid intake.

"The cecum was quite irregular but a definite diagnosis could not be made." This finding together with the fact that one observer believed he felt a mass raises the question as to whether the lesion might not be in the cecum or ascending colon. Malignancy could well account for the secondary anemia and it is characteristic of right-sided lesions to bleed to a considerable extent. However, with a right-sided lesion a diarrhea of the degree that he showed would, I believe, be unusual, and the obstructive symptoms also, which I cannot but feel play a part in the picture, would be more unusual with carcinoma of the cecum than with a lesion further along the large intestinal tract.

We are not told at any time what x-ray studies of the stomach and small intestines showed. Such an examination would, of course, have been of value from a threefold point of view. It would be of help in excluding any gastric pathology, it would help clear up the problem of upper intestinal obstruction, and it would give the definite lead to any spontaneous anasto-

mosis that might have occurred between a lesion of the large bowel and the stomach or upper abdominal tract.

When the above facts are evaluated the most significant definite points we have to go on are the fact that a forty four year old Italian has a bleeding lesion of his gastrointestinal tract associated with a diarrhea and with x ray findings suggestive of a lesion in the large bowel. Many of his complaints, however, are referable to the upper intestinal tract. I believe that he had malignancy of the large bowel, most probably located in the transverse or descending colon. I picture the lesion as causing a partial obstruction of the large bowel and, due to extrinsic involvement, a certain amount of associated upper intestinal obstruction as well.

#### CLINICAL DIAGNOSIS

Carcinoma of cecum (colloid adenocarcinoma grade III)

DR. HENRY H. FAXON'S DIAGNOSIS

Carcinoma of large bowel (probably transverse or descending colon)

#### ANATOMIC DIAGNOSES

(Carcinoma of cecum)

Operative wound. Transverse ileocolostomy, resection of cecum

Peritonitis, acute localized

Lung abscesses, bilateral

Bronchopneumonia, left

Bronchiolitis obliterans, very slight

Pleuritis, chronic fibrous, bilateral

Benign adenomatous polyp of rectum

#### PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY. The preoperative diagnosis in the house was in agreement with Dr. Faxon—that there was a carcinoma of the large bowel—although they placed it in the cecum rather than in the transverse colon, evidently taking the questionable mass in the right lower quadrant fairly seriously. The patient was transferred to the surgical service where a right rectus incision was made and the peritoneal cavity explored. A rather large adherent tumor mass was found in the ascending colon which extended almost up to the hepatic flexure. The patient's condition was considered too poor to attempt radical extirpation at this time; so an ileocolic anastomosis was performed. Following this operation the patient's condition steadily improved for a two-week period. Then a second operation was performed in the attempt to resect the growth. It was found to be firmly adherent to the lateral wall of the duodenum and it proved necessary to resect a portion of the duodenal wall along with the cecum and ascending colon. The op-

erator felt that very probably a fistula between the colon and duodenum had been present although it was not possible to verify this with certainty from the resected specimen. The pathologic examination of the specimen showed a polypoid, fungating, slightly ulcerated tumor mass, from the base of which induration extended a considerable distance into the adjoining intestinal wall. The microscopic examination showed a colloid adenocarcinoma and also proved that the duodenal wall was deeply invaded.

Following this second operation the patient's course was progressively downhill. Abdominal spasm was noted for three days but then disappeared. He ran a moderate fever ranging from 100° to 101° and the respirations, after remaining at 20 for the first fifteen days, climbed to 30. Coarse râles were heard at the left base and slight dullness was made out. A portable chest plate showed mottled dullness involving the mid portion of the left lung field and the entire right lung field. It was considered characteristic of bronchopneumonia.

The autopsy showed two localized areas of peritonitis—one immediately beneath the abdominal incision, the second occupying the entire cecal bed and extending up to and around the lower pole of the right kidney. The surgical suture lines all appeared tight and in good condition and no evidence of a fistula could be made out in the remaining portion of the duodenum. It was felt that this localized peritonitis was probably not an important factor in the fatal termination. A much more important lesion was a series of lung abscesses varying from 1.5 to 6 centimeters in diameter which were filled with necrotic, blackish, foul smelling material. The abscesses were apparently still in the developmental stage and had not as yet broken down to the point where significant amounts of their content had been discharged into the bronchi. The adenomatous polyp which had been found on proctoscopy proved to be at the junction of the rectum and sigmoid. Microscopic sections through its base confirmed the previous diagnosis of a benign polyp.

Cases of this type, where a carcinoma of the large bowel is associated with one or many benign adenomatous polyps, are very frequent and present strong presumptive evidence for the development of malignancy from benign polyps. A less common lesion, of which I thought when I read over this history, is the extreme grade of multiple polyposis in which almost every inch of the bowel wall is covered with the polypoid masses. Such cases not infrequently give a history of prolonged intractable diarrhea which may be indistinguishable from the stories of cases of ulcerative colitis.

Dr. Faxon's attempt to correlate the epigastric with the lower abdominal symptoms by the

assumption of a tumor in the transverse colon which had invaded the stomach or small bowel, with or without the establishment of a fistula, was an ingenious solution of the perplexing symptomatology, and the actual finding of a carcinoma of the ascending colon involving the duodenum is so close that he deserves considerable credit for having made it

### CASE 21392

#### PRESENTATION OF CASE

A forty-one year old single American teacher entered complaining of fever of two weeks' duration

Three months before entry the patient had an attack of "ptomaine poisoning," apparently due to lobster, which kept her in bed for two weeks. She was acutely ill during the first week with abdominal pain and fever. After this she was perfectly well until two weeks before entry when she developed a sore throat and "ached all over." She went to bed and stayed there until admission with a temperature of  $101^{\circ}$  to  $102^{\circ}$  every afternoon. After about a week the sore throat subsided somewhat, although it was red and covered with membrane. The cervical glands were enlarged. During the first week she sweat a great deal but had no chills. There was no cough or pain in the chest. She had herpes of the lips and nose. During this illness she had been given digitalis. There was no vomiting, diarrhea or abdominal pain. She had no urinary difficulties. Her menstrual history was negative.

Her family history is non-contributory.

She had an unknown fever at the age of five, scarlet fever at twelve, diphtheria at twenty-three and repeated attacks of tonsillitis. At the age of eighteen her appendix was removed. Seven years ago she was said to have a heart murmur. During the past three years she had slight dyspnea and palpitation upon exertion. She was seen by a cardiologist two years before entry and a diagnosis of mitral stenosis was made. She was not reexamined until four months before entry and the heart condition had not essentially changed.

Physical examination showed a pale thin, sick-looking woman lying in bed breathing a little rapidly. Her throat and tonsils were moderately infected and dull red but contained no exudate or membrane. The heart was enlarged, the left border of dullness being 11.5 centimeters from the midsternal line, the right 3 centimeters. There was a systolic wave over the precordium and a short presystolic thrill at the apex. The sounds were loud.  $P_2$  was slightly louder than  $A_2$ . There was a middiastolic rumble heard best toward the axillary line. The chest showed some dullness with bronchial breathing, decreased breath sounds and a moderate number of moist râles at the left base.

The liver was felt 12 centimeters below the costal margin in the midclavicular line and was non-tender. There was no evidence of fluid in the abdomen. The spleen was not felt. There was no edema of the ankles. No petechiae were seen. The knee jerks were not obtained.

The temperature was  $102.1^{\circ}$ , the pulse 110. The respirations were 38.

Examination of the urine showed a specific gravity of 1.028 with a trace of albumin. The sediment contained 30 white blood cells, 15 red blood cells and numerous bacteria. The blood showed a red cell count of 4,060,000, with a hemoglobin of 70 per cent. The white cell count was 24,000, 87 per cent polymorphonuclears. The stools were negative. An electrocardiogram showed normal rhythm, rate 80, broad notched  $P_1$  and  $P_2$  and right axis deviation. The P-R interval was 0.18 seconds.

Examination on the third day showed no real changes except those in the lungs. The right chest was quite dull and the râles persisted. The previous bronchial breathing had subsided. In the left axilla, however, there was an area of dullness with a suggestion of bronchial breathing and râles. No friction rub was heard. There was very little cough and no sputum. She rapidly went downhill. The temperature, which at first went down to between  $100^{\circ}$  and  $101^{\circ}$ , rose on the fourth day to  $103.5^{\circ}$ . The white cell count rose to 33,200. The edema increased. She became progressively weaker, moderately cyanotic and died on the fourth day.

#### DIFFERENTIAL DIAGNOSIS

DR WILLIAM B BREED. I do not like to call this intestinal episode ptomaine poisoning if it was simple food poisoning. She was well after two weeks. Well, either it was food poisoning and had nothing to do with the present illness or it was not food poisoning, from lobster at least, and it did have something to do with it. I cannot tell which it was. She was well for two months and I am tempted at the moment to exclude this episode from the present illness, although it may become significant later. We will say that the present illness began two weeks before entry when she developed the sore throat and ached all over. The throat was red and covered with membrane. I should like to know a little more about the membrane, whether it was an exudate which resembled a membrane or a true membrane. I should like to know why she was given digitalis. We may find out later. She had an acute sore throat with cervical adenitis and herpes. We do not know about a culture or what the white count was, and we do not know whether she had taken any other drugs for her sore throat, such as amidopyridin, so we think either of acute streptococcus infection or possibly agranulocytosis. It may be one of the leukemias.

There is probably no diphtheria in spite of the mention of the membrane.

With this story of repeated tonsillitis and the evidence she has of rheumatic heart disease, this is a perfectly good story for acute rheumatic fever. I am not clear about the association of herpes with rheumatic fever. I have never seen it. It may be associated with it or it may be incidental. I still do not bring in the food poisoning. The observation that  $P_2$  is greater than  $A_2$  does not mean anything unless there is an added note that  $P_2$  is accentuated. We know that she has a sore throat and presumably tonsillitis, and there may be a flare up of rheumatic infection associated with the sore throat. Of course, the fact that she was "aching all over" in the first part of the history means that she was toxic. There is no evidence pointing to joint involvement. However, we know that that is not necessary for a flare-up of a rheumatic nature. The respirations are high. On physical examination there is dullness with bronchial breathing, decreased breath sounds, and a moderate number of rales at the left base, so that she may have some process in the chest either bronchopneumonia or possibly something of an embolic nature.

The P R interval would indicate in general that she was not suffering at the time from recurrence of a rheumatic infection, and although that is not an absolute criterion it is a good piece of evidence. The summary does not say anything about a throat culture. She certainly does not have agranulocytosis or leukemia. Was a culture taken?

DR. TRACY B. MALLORY. It is not recorded.

DR. BREED. Presumably this is a streptococcus throat infection, although we do not know. We do not know about a blood culture. I presume that they were taken. She certainly had an overwhelming infection because she died of it. I think that is clear, and I should doubt that she died of rheumatic infection. She had some bronchopneumonia, probably bilateral but it does not seem reasonable to expect that she would die as suddenly as that from bronchopneumonia, as mild as it appeared to be. I do not know whether we are at a deadlock here because we have no information or because we are so stupid we cannot make a diagnosis, but the evidence that we have points merely to an overwhelming upper respiratory infection.

A PHYSICIAN. How about subacute bacterial endocarditis?

DR. BREED. The course is too rapid even for malignant endocarditis.

A PHYSICIAN. She may have had symptoms for some time before she came in.

DR. BREED. But she was well for two months.

A PHYSICIAN. How about metastatic abscess, then?

DR. BREED. I should not expect it to be found.

A PHYSICIAN. I think her death might be caused by pneumonia but there is a possibility of acute or subacute endocarditis.

DR. BREED. That is merely a guess. All we can do is guess.

I cannot make a definite diagnosis other than chronic rheumatic heart disease with mitral involvement. She died of infection. I do not know what infection other than just plain tonsillitis and bronchopneumonia. She may have had septicemia. I am sorry that the blood culture was not forthcoming.

#### CLINICAL DIAGNOSES

Acute rheumatic fever  
Pneumonia (rheumatic)?  
Rheumatic heart disease with mitral stenosis.  
Uremia?

#### DR. WILLIAM B. BREED'S DIAGNOSES

Chronic rheumatic heart disease with mitral involvement  
Acute infection—unknown etiology

#### ANATOMIC DIAGNOSES

(Acute rheumatic fever ?)  
Endocarditis, chronic rheumatic, mitral with stenosis, aortic.  
Cardiac hypertrophy, rheumatic slight  
Pulmonary thrombosis  
Pulmonary infarcts bilateral  
Pulmonary congestion and edema  
Hydrothorax, bilateral  
Ascites.  
Petechial hemorrhage of peritoneum, pleura and pericardium  
Pleuritis, chronic  
Cyst of right ovary  
Operative scar. Appendectomy

#### PATHOLOGIC DISCUSSION

DR. MALLORY. I was not too sure of the cause of death after the autopsy was over. She had a very definite, fairly severe old mitral stenosis. We could not find any fresh vegetations on the valve. There were, however, two or three minute vegetations, perfectly consistent with acute rheumatic vegetations, on the aortic valve which otherwise showed only very slight thickening. We did not find any sign of Aschoff bodies in the heart muscle. That means almost nothing, because we do not run through more than two or three blocks of heart muscle per autopsy and if you want to find Aschoff nodules you have to run fifty blocks to be certain of getting them. They can only be found with very high incidence provided you make the search for them almost a research job in each case.

The pulmonary complications were peculiar



A lot of interest has developed in the last two or three years in the question of so-called rheumatic pneumonia and any time a rheumatic case dies with anything in the lungs everybody wants to know whether it is rheumatic pneumonia. I find it very difficult to get any idea what rheumatic pneumonia is. There are many clinical reports in the literature and a few of them have some appended pathologic notes written almost invariably, I should say, by a clinician who has attempted to interpret the microscopic sections. I cannot make head or tail of the descriptions. There is one paper\*, based on only two cases, however, that is fairly good from the pathologist's point of view. In most cases there are multiple areas of hemorrhage throughout the lung, rather sharply focal, looking very much like infarcts, but usually not leading to complete necrosis of the lung tissue. You can also find, microscopically, lesions in some of the very small pulmonary arteries in the immediate neighborhood of the hemorrhagic foci. Histologically the lesions are about half way between infarct and pneumonia in appearance. We have seen two cases here in children with acute rheumatic fever that correspond to that picture. We have seen a lot of atypical pneumonias of other kinds in other rheumatics, and so far I have no clear conception as to whether there is a rheumatic pneumonia entity. This woman had a large number of fairly small but definite infarcts scattered throughout the lung. There was no doubt of their being real infarcts. The alveolar walls were becoming necrotic and we could find thrombi or proba-

bly adherent emboli in the arteries leading to each of the infarcts. We did not find any thrombi in the right side of the heart, so it is unlikely that they came from there. I imagine that she was getting emboli from some undiscovered phlebitis of the leg. One always thinks of pulmonary infarcts as a surgical or rather post-surgical disease. As a matter of fact pulmonary infarcts are fairly common on the medical wards but are almost impossible to diagnose except in very characteristic cases where you have a localized pleuritis and frankly bloody sputum or a lead in the form of an obvious phlebitis. One certainly can have thrombosis in the deep veins of the leg which is absolutely silent. The postmortem blood culture was negative. There is no proof, therefore, what the fever was but on the whole rheumatic fever seems as good a bet as any, mostly because of the indefiniteness of the findings.

DR. BREED It is unusual for a person of her age to die as quickly as this of rheumatic fever, although children die of rheumatic fever oftener than is generally supposed.

A PHYSICIAN How about the liver?

DR. MALLORY It was normal in size. It weighed 1600 grams which is within normal limits. The spleen weighed 225 grams. She simply had a low diaphragm.

DR. BREED We all agree that she probably had an old mitral stenosis and that she died of acute infection, with a question of rheumatic fever. I guess that is the best we could say.

\*Fraser, A. D. The Aschoff nodule in rheumatic pneumonia. *Lancet* I 70 1930.

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## TUBERCULOSIS—AN ANOMALY

TUBERCULOSIS holds a unique place among the communicable diseases—unique, that is, in the attitude of the public, of physicians and of public health officials. With other infectious diseases, the first evidence of their presence starts the operation of a series of events carefully planned to prevent their spread. The first act, after initiating treatment of the patient and reporting the disease, is to search for the source of the infection. While this quest is going on, precautions are taken to prevent the patient from passing on the virus to others. The sick one is surrounded by safeguards, those nursing the sick are instructed in ways for shielding themselves and others against the infection, the room or the house may be quarantined or the patient removed to an isolation hospital. In our archaic handling of that disease of low transmissibility, leprosy, we even banish the leper to exile. If the source of the disease is found to be a harbinger of diphtheria

bacilli, we sequester the carrier until cultures show the disappearance of the bacilli, and, sometimes, when they remain persistently positive, we, if permitted, remove the tonsils. The typhoid carrier is excluded from all occupations connected with food handling, and when we are successful in our persuasion, we take out the gall bladder.

The yellow flag, the quarantine card, the gossip of neighbors warn that danger is present. But, with tuberculosis, the order is changed. The source, the open case, spreading living tubercle bacilli, is sympathized with, precautionary instructions may or may not be given, and the attending physician, when there is one, is frequently casual in the announcement of his diagnosis. And, as our city and state vital statistics show, he may report the case to the local health authorities sometimes as late as a month or a week before death, and all too often after the demise of the patient.

Our city, county, state and veterans' hospitals are intended for the removal of the infectious patient from his or her surroundings, but frequently the waiting lists leave the open case at home. But many of these institutions prefer the favorable case. For chronic phthisis sufferers there are hospitals especially planned for their care, but there are too few of them and it is often impossible to persuade such a patient to leave his home and family circle and to enter an institution known as a resort for incurables. So the source of this disease may be allowed to go about his occupation as long as he is able and then to rest and die, likely, to spread infection in the midst of his susceptible relations and friends.

Tuberculosis, we realize, does not present the immediate and frightening menace of diphtheria, scarlet fever or smallpox, but it causes a greater economic loss, a heavier drain on the efforts and funds of our charitable organizations and a greater sacrifice of human lives.

The voluntary, philanthropic societies have been wholly admirable in their efforts to control this disease. Their education of the public in the ways of good living, of the predisposing causes and early symptoms of tuberculosis, their preventoria and sanatoria for the threatened or afflicted, their vocational training for the convalescent deserve the highest praise for their nobility of purpose and their splendid achievement. Their aims are both preventive and palliative, but many an active case escapes their search and having no official authority they can only control these human sources of infection by suasion.

If we examine their programs or those of health departments, we are impressed by their emphasis on the strengthening of health, on early diagnosis, and on the medical and surgical care of the tuberculous. If we read the jour-

nals devoted to this disease, we learn about the biology of the tubercle bacillus, about epidemiological features, new diagnostic aids, the use of this or that remedial agent, the management of hospitals and sanatoria, but in all these publications we find so little about the reporting and control of the open case

In our private and public campaigns we are now experiencing the operation of the law of diminishing returns. The declining curves of morbidity and mortality from tuberculosis are flattening, and it requires still greater effort to reduce the rate by a point

Every case of tuberculosis comes from another case, either in a cow or man. Our official federal and state agriculturists are persistent in their determination to rid the country of infected cattle, but we, perhaps because of the difficulties presented by sentimentalism, must be more gentle in the disposition of our human wells of infection. For the control of other communicable diseases our laws are largely mandatory, for the control of tuberculosis they are mostly permissive

So many of the baffling problems presented by other plagues have been solved, that we are confident of ultimate success in controlling this particular disease. More intensive search and closer control of the open case would speed us along the way. It is, after all, the tubercle bacillus that causes tuberculosis, and it is the purpose of this editorial to focus closer attention upon this neglected, difficult and eminently important feature of tuberculosis eradication in man

### A PHYSICIAN'S HANDBOOK

THE actual practice of medicine proves to be so much greater than and so different from those aspects of practice to which the attention of medical students was formerly directed in order that they might gain a knowledge of disease, that the study of so-called disease entities has been supplemented by more or less complete study of the conditions in which disease arises and develops and must be treated. The supplementary aspects of disease may be characterized as involving environmental factors, among which are the social elements. There is involved, then, first the study of the individual who is sick, and then the study of the society of which he is a part, in which he is sick, on which he acts and which reacts to him.

Several years ago there was published under the auspices of the Massachusetts General Hospital a "Physician's Handbook of Community Resources in Metropolitan Boston, together with Certain Legal Responsibilities", which was made possible by the benefaction of an anonymous donor. The idea of such a handbook seemed excellent, the booklet has filled a long-felt need and the results have justified the un-

dertaking. Has the time not come for a greater development into a larger field of usefulness?

While the legal responsibilities of the physician change little throughout the Commonwealth, the Community Resources vary greatly in the different communities. A physician entering upon practice in a town or city often has little knowledge of the resources of the community and as such a physician is generally beginning practice, he may have had no experience with community resources anywhere. He knows little, therefore, of what his community can and does offer.

Medical students who have been fortunate enough to have intimate contact with the well organized medical social service of a hospital, may have some conception of what to look for and of how to go about finding what the patient needs, but too often it is only after a blundering and time-consuming experience that the physician learns what his community actually supplies.

The Massachusetts Medical Society, on admitting a physician to membership, gives him a copy of its Constitution and By-Laws. It would not be impracticable and it might be most helpful if each district of the Society provided for its members a handbook similar to that which has proved so useful in the metropolitan area. In addition it would be a step in the right direction if the Board of Registration provided each registrant, at the time of licensure, with a copy of the medical practice act and of other statutes of the Commonwealth pertaining to the practice of medicine. Dealing with the violation of these statutes is part of the duty of the Board of Registration in Medicine and it is not asking too much of the Commonwealth that it provide each registrant with a copy of the law under which he is to practice.

In any case, the issuing by the Society to its new members of a Handbook would be an extension of its educational program into a field hitherto neglected, and an additional recognition of its educational obligation toward all its members.

### AN UNFAIR BURDEN

AN analysis of the burden falling on doctors and hospitals is set forth by M. J. O'Malley in the *New York Times* of August 11, 1935. He affirms that several years ago the unpaid hospital bills due to highway accidents had amounted to over \$6,000,000. "Hospital Management" in October 1931 estimated that the losses to hospitals in this country incurred in caring for automobile accidents was \$5,000,000 a year.

The Research Division of the New Jersey Department of Institutions and Agencies conducted an investigation of highway accidents which dis-

closed that in 1930 the number of persons requiring bed service in hospitals was in excess of 13,000. Nineteen general hospitals were studied as the basis of this estimate. They treated 1781 highway accident patients, who spent a total of 22,441 days in the hospitals. The bills rendered for these cases totaled more than \$100,000, but only 56 per cent of this sum was collected.

In 1930 the Ohio Hospital Association found that, of more than \$810,000 hospital charges for automobile accident patients, about 50 per cent was considered uncollectible.

During 1931-1933 inclusive, accidents within the metropolitan area of Richmond, Va. brought 4056 patients to the Medical College of Virginia Hospital and over 7000 were given out-patient treatment. The total cost to the community for the three years was \$217,000. In Philadelphia a committee found that charges amounting to \$16,410 for patients hospitalized by reason of highway accidents were made with one third unpaid at the close of the year following the accidents. In all cases, fatal and otherwise, studied by this committee, one bill in sixteen was paid.

In England it is provided that the driver of a car involved in an accident causing personal injury must pay for emergency treatment for each patient. Some of our States have tried to have laws enacted which will protect doctors and hospitals in caring for victims of automobile accidents. Senator Miles tried to have the law passed in Massachusetts with this object in view. Lawyers claimed that the bill as drafted was unconstitutional. It is strange that a great injustice cannot be remedied. No one, so far as reports are available, has computed the unpaid bills for doctors' services for these accident cases.

If this burden on hospitals and doctors can not be remedied by existing or proposed laws there should be a further study of the subject. It is reasonable to expect that the public will endorse an appropriate remedy.

### POSTGRADUATE TRAINING IN MEDICINE

A DISPATCH to the *New York Herald Tribune* of August 15, 1935, quoting from the *German Doctors' Journal* sets forth that the "Aryan" physician of the Third Reich must take a compulsory training course of three weeks once every five years. The evident purpose of this requirement is to elevate the standards of medical practice in Germany.

General practitioners of cities and towns of less than 100,000 residents will be called first to take the prescribed courses with certain exceptions.

This plan apparently recognizes the general

belief that doctors as a class do not keep in step with medical progress.

This state of affairs is not confined to Germany and its recognition in the United States is shown by the facilities for postgraduate study which are available for every doctor who is desirous of keeping up to date. The trouble with us is that those who need instruction and training most, are least apt to avail themselves of the opportunities provided by societies and medical schools, with the result that there is a substratum of unprogressive doctors. It has been said that only about forty per cent of our doctors attend medical meetings conducted by District Societies and there are many who do not read medical journals.

Nothing but compulsion will drive such men to study.

If the state confers the right to practice, why should the indifferent doctor be left to practice out-of-date medicine? Just because he has passed the examinations of the State Board, there is no guarantee of his progress in medical education in subsequent years. The government does not let its military surgeons retrograde or even remain static, but requires evidence of improvement at regular intervals. The custom of certification of the doctor's qualifications by one examination is hardly an adequate assurance of his capacity in the competitive field of medical practice.

The German plan is highly commendable, but would meet obstruction in America, in all probability. Our people want freedom from supervision even in the practice of medicine.

### A SUIT AT LAW AGAINST AN OFFICER OF THE MASSACHUSETTS MEDICAL SOCIETY

DR. DAVID CHEEVER, Chairman of the Committee on Ethics and Discipline of the Massachusetts Medical Society, has been sued by Dr. Nicandro F. DeCesare for libel. The claimant places fifty thousand dollars as the financial damage. Dr. DeCesare resides at Methuen and has an office at 57 Jackson Street, Lawrence.

This action of Dr. DeCesare is based on statements made by Dr. Cheever in the performance of his duty as defined in the By Laws of the Society in the investigation of certain charges concerning Dr. DeCesare made to the committee of which Dr. Cheever is Chairman. It became Dr. Cheever's further duty to present the facts bearing on the charges which had come to the attention of his Committee to a Board of Trial appointed by the then President, Dr. W. H. Robey.

It is also of interest to Fellows of the Massachusetts Medical Society that Dr. Daniel Fiske Jones, who originally brought the matter in issue to the attention of the Committee on Ethics and

Discipline, has also been sued by Dr DeCesare for fifty thousand dollars

After hearing the evidence, the Board of Trial unanimously reported to the then Secretary of the Massachusetts Medical Society, Dr W L Burridge, its opinion that Dr DeCesare was guilty of the acts defined in the complaint but after deliberation appended to the report differences of opinion as to the appropriate disciplinary measures to be adopted by the Society

This report of the Board of Trial was submitted to the Annual Meeting of the Society June, 1935 The Society then referred the material which had been submitted to the Board of Trial to a large committee representing all sections of the Society for a review of the proceedings and a report to be submitted at the next annual meeting of the Society

It is felt that the Fellows of the Society are entitled to this general statement of this case, but the *Journal* refrains from the publication of details and explanations until the Society shall have taken final action

The reference of this controversy to the courts also requires a conservative attitude by this *Journal*

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

CHRISTIAN, HENRY A. A.M., LL.D., Sc.D. (Hon.), M.D. Johns Hopkins University Medical School 1900 Hersey Professor of the Theory and Practice of Physic, Harvard University Medical School Physician-in-Chief, Peter Bent Brigham Hospital, Boston His subject is "Expected Lags Between Clinical Diagnosis and X-Ray Confirmation" Page 593 Address Peter Bent Brigham Hospital, Boston

WHITAKER, LESTER R. M.D. Harvard University Medical School 1923 F.A.C.S. First Assistant Visiting Surgeon, Massachusetts Memorial Hospitals, Boston Associate Member, Evans Memorial for Clinical Research and Preventive Medicine Instructor in Surgery, Boston University School of Medicine His subject is "Electrosurgical Cholecystectomy I Experimental Observations" Page 596 Address 41 Bay State Road, Boston

COHEN, LOUIS A.B., M.D. Tufts College Medical School 1932 Formerly Rotating interne, Lynn Hospital, Lynn, Mass Surgical Interne VI Surgical Service, Boston City Hospital, Boston Now Interne, Orthopedic Service, State University of Iowa Hospitals, Iowa City, Iowa His subject is "Anterior Poliomyelitis with Reference to the Occurrence of Two Attacks in the Same Individual" Page

601 Address Children's Hospital, Iowa City, Iowa

DAY, HILBERT F. Ph.B., M.D. Harvard University Medical School 1905 F.A.C.S. Professor of Clinical Surgery, Tufts College Medical School Surgeon-in-Chief, The Boston Dispensary Visiting Surgeon, Cambridge Hospital, Cambridge, and the Boston Floating Hospital Consulting Surgeon, Masonic Hospital, Shrewsbury and State Prison Colony Hospital, at Norfolk His subject is "Torsion of the Pregnant Uterus Report of Two Cases" Page 605 Address 412 Beacon Street, Boston

OTTENHEIMER, EDWARD J. B.S., M.D. University of Virginia Department of Medicine 1922 F.A.C.S. Chief, Surgical Service, Wmham Community Memorial Hospital His subject is "Postoperative Gas Pains" Page 608 Address 29 North Street, Willimantic, Connecticut

PETRONE, FRANCIS J. B.S., M.D. Harvard University Medical School 1926 Assistant Surgeon, Union Hospital, and General Hospital Fall River, Mass Address 140 Winter Street, Fall River, Mass Associated with him is

VIEIRA, EDWIN A.B., M.D. Harvard University Medical School 1931 Externe, Medical Service O.P.D. Rhode Island Hospital, Providence, R.I., and Cardiac Service O.P.D. Rhode Island Hospital, Providence, R.I. Address 221 Warren Avenue, East Providence, R.I. Their subject is "Incarcerated Bladder in a Scrotal Hernia A Case Report" Page 614

EDWARDS, EDWARD A. M.D. Tufts College Medical School 1928 Assistant in Surgery, and Member of the Circulatory Clinic, Boston City Hospital Assistant in Surgery, Tufts College Medical School His subject is "The Arteriographic Comparison of Thrombo-Angitis Obliterans and Arteriosclerosis" Page 616 Address 1571 Beacon Street, Brookline, Mass

MOSCHCOWITZ, ELI A.B., M.D. Columbia University College of Physicians and Surgeons 1900 Associate Physician, Mt Sinai Hospital, New York City Consulting Pathologist, Beth Israel Hospital, New York City Consulting Physician, Beth-El Hospital, Brooklyn, N.Y. His subject is "Allergy to Life An Interpretation of the Neurotic Constitution" Page 617 Address 25 West 68th Street, New York City

JOHNSON, C.K. M.D. University of Vermont College of Medicine 1899 F.A.A.P. Professor of Pediatrics, University of Vermont. Pediatricist, Mary Fletcher Hospital, Bishop DeGoesbriand Hospital, Fanny Allen Hospital, Elizabeth Lund Home and the Home for Destitute Children. His subject is "Atropine Fever in Early Infancy" Page 620 Address 266 Main Street, Burlington, Vermont

## The Massachusetts Medical Society

### STATED MEETING OF THE COUNCIL

A STATED meeting of the Council of the Massachusetts Medical Society will be held in John Ware Hall, Boston Medical Library 8 Fenway, Boston, on Wednesday, October 2, 1935 at 12 o'clock, noon

#### Business

- 1 Call to order at 12, noon
- 2 Reading record of last meeting in abstract
- 3 Report of Committee of Arrangements for Annual Meeting
- 4 Report of Committee on Membership and Finance
- 5 Reports of committees to consider petitions for restoration to the privileges of fellowship and appointment of new committees.
- 6 Appointment of an auditing committee
- 7 Fill any vacancies in the offices of the Society
- 8 *Incidental Business*

ALEXANDER S BEGG *Secretary*

Boston, September 25, 1935

Councillors are asked to sign one of the two attendance books before the meeting

### SECTION OF OBSTETRICS AND GYNECOLOGY\*

C J RICKHAM M.D.,  
*Chairman*

R. S. TITUS M.D.  
*Secretary*

524 Commonwealth Ave., Boston Mass  
472 Commonwealth Ave  
Boston Mass

#### TRICHOMONAS VAGINALIS

*Trichomonas vaginalis* is a fairly common condition responsible for many cases of annoying leukorrhea. To make the diagnosis it is necessary only to place a cotton swab on an applicator, rub it firmly over the vaginal walls and wash it off in a few cc. of warm normal saline solution. From this a hanging drop can be made, or a few drops may be placed under a cover slip on a slide. Examined under the high dry lens of the microscope the characteristic protozoa is readily identifiable, having moving flagella at one pole and several cilia at the other. It is pyriform or spindle shaped, larger than a pus cell but smaller than an epithelial cell.

In the presence of an acute vaginitis from this parasite the smear usually shows, in addition

A series of short selected articles by members of the Section will be published weekly

Comments and questions by subscribers are solicited and will be discussed by members of the Section.

tion to the trichomonads, large numbers of pus cells, but as the condition is improved by treatment the pus cells diminish rapidly in number leaving the usual preponderance of normal epithelial cells. The discharge produced is often very profuse, yellowish white, thin or mucoid, sometimes foamy, with a foul odor, it appears on a vaginal wall which is inflamed and frequently covered with fine petechiae. In addition to the discharge the patient usually complains of an itching or burning sensation at the introitus and of dyspareunia. Dysuria is often present, frequency is not so common.

It is trite to remark that the almost countless forms of treatment which have been recommended only suggest the many failures of each. Space does not permit even a résumé of the various measures which have been advocated. The writer has been so well satisfied, however with a method which was suggested to him by Dr Mortimer Hyams of New York that he has had no extensive experience with any other, and will here limit his discussion to this treatment.

The vagina is scrubbed with cotton saturated in half strength tincture of green soap and left for five minutes. The soap is next thoroughly washed out with an irrigation of hot mercury oxycyanide solution 1:3000. A speculum is introduced the vaginal walls dried with cotton gauze, and two drams of one per cent picric acid in glycerine poured in. The vagina is then packed with a gauze bandage and the patient is directed to remove the packing twenty four hours later. For the first two or three weeks the treatments should be given every second day, but after that they may be spaced farther and farther apart. In addition to these treatments the patient is advised to take a slow two quart douche of hot 1:3000 mercury oxycyanide solution each night before retiring except on those days when she has been treated. The douches are continued through the menstrual periods.

The patient should not be considered cured until she has been found free of any trichomonads when examined directly after the menstrual period for several consecutive months. And because recurrences are not uncommon it is safer to advise reexamination at the end of another six months. It must be borne in mind, however, that there is at least a theoretical possibility of mercury poisoning if the douches are continued indefinitely, and for this reason their use should be limited to a few months at a time.

A high percentage of cures is certain with almost any of the recognized treatments if the patient is cooperative and the physician persistent in his efforts. And the woman who has had to wear perineal pads constantly or douche daily for months or years because of this foul discharge is most appreciative of the result.

MISCELLANY

THE SUCCESSOR TO DR MAGRATH

With the announcement of the resignation of Dr George Burgess Magrath from the position of medical examiner of Suffolk County because of ill health, His Excellency, Governor Curley, plans to advance Dr William J Brickley, associate examiner, to fill this position when Dr Magrath vacates the office. The acceptance of Dr Magrath's resignation will be deferred in order to allow him to qualify for a pension under the county retirement system. This is in recognition of the long and valuable service rendered by Dr Magrath.

With the advancement of Dr Brickley, the Governor plans to appoint Dr Cornelius J O'Leary to the position of Associate Medical Examiner, according to reports in the daily press.

Dr Brickley has enjoyed the confidence and respect of the citizens of Suffolk County for the energy and ability displayed in his attention to the duties of the office of Associate Medical Examiner. By education and experience he is well fitted for the higher position.

Dr O'Leary was born in 1902, graduated in medicine from the Tufts College Medical School in 1933 and served as interne at St. Elizabeth's Hospital. He is a member of the staffs of St. Elizabeth's, the Cambridge and Waltham Hospitals. He is bacteriologist for the Boston Department of Health and a Fellow of the Massachusetts Medical Society.

ANTERIOR POLIOMYELITIS CASES FOR 1935  
WEEKLY LIST, SEPTEMBER 16-21

City or Town	
Attleboro	1
Fall River	7
North Attleboro	1
Westport	2
Braintree	1
Dedham	1
Medfield	1
Medway	1
Norwood	1
Quincy	8
Scituate	1
Walpole	2
Weymouth	2
Arlington	1
Boston	37
Brookline	1
Cambridge	5
Chelsea	2
Everett	1
Lexington	1
Malden	5
Maynard	2
Medford	1
Melrose	1
Newton	3

Revere	3
Somerville	7
Stoneham	1
Waltham	4
Wellesley	1
Amesbury	1
Dracut	1
Gloucester	1
Haverhill	1
Lowell	1
Lynn	1
Marblehead	1
Methuen	1
North Andover	1
Peabody	1
Reading	1
Swampscott	1
Wakefield	1
Wilmington	1
Milford	1
West Boylston	1
Worcester	2
Hardwick	2
Holyoke	1
Springfield	4
Total	132

CONNECTICUT CITIES ARE STUDYING  
NON-PROFIT HOSPITAL SERVICE

In an address before the Clinical Congress of the Connecticut State Medical Society, September 18, Mr Van Dyk, executive director of the Associated Hospital Service of New York, reported that plans are being considered for non-profit hospital service in New Haven, Hartford, New Britain, Norwich, Derby, Norwalk, Bridgeport, Torrington, Meriden and Danbury.

TUFTS COLLEGE MEDICAL SCHOOL  
'NEWS ITEMS

Dr Siegfried J Thannhauser, formerly Medical Director of the University of Freiburg, has been appointed Associate Professor of Medicine.

Four scholarships of the value of \$1,000 each, known as the Commonwealth Fund Scholarships, are awarded annually to properly qualified medical students. The recipients of these scholarships must agree to practice medicine in a rural community for a period of three years. The scholarships are awarded with the understanding that they will be renewed for each of the years required for graduation in medicine, provided that the record of the recipient warrants such extensions. Applicants must be residents of Massachusetts. The following selections have been made for the coming year:

Walter F Crosby, Danvers, Mass., Bowdoin, '35  
Bronislaus A. Galuszka, Chicopee Falls, Mass., Tufts, '35  
Marshall A. Lamb, Rockland, Mass., Harvard, '34

Horatio J Young Florence Mass., Johns Hopkins, '35

It is anticipated that the tuition of the medical school will be increased to \$500.00 a year and the enrollment limited to 100 beginning with the fall of 1935

# FROM NAVAL CUSTOMS TRADITIONS AND USAGE BY LT COMMANDER LELAND P LOVETT U S NAVY

UNITED STATES NAVAL INSTITUTE, ANNAPOLIS  
MAYLAND 1934 PAGES 232-233

Gun, Son of a In the early days sailors were permitted to keep their wives on board. The term was actually used to refer to children born along side the guns of the broadsides. In fact, the expression questioned the legitimacy of anyone. The old definition of a man-o-war's man was,

"Begotten in the galley and born under a gun Every hair a rope yarn every tooth a marine spike every finger a fish hook and in his blood right good Stockholm tar

A British officer commanding a brig off the Spanish coast in 1835 wrote in his diary

"This day the surgeon informed me that a woman on board had been laboring in child for twelve hours, and if I could see my way to permit the firing of a broadside to leeward, nature would be assisted by the shock. I complied with the request and she was delivered of a fine male child."

The Gunnery Department surely made a perfect score—Submitted by Dr John P Monks

## THE APPOINTMENT OF DR. JOHN A. HUFFMIRE

Dr John A. Huffmire of Huntington, Massachusetts has been appointed Associate Medical Examiner of the second Hampshire District and has taken the oath of office

Dr Huffmire is a graduate of the Middlesex College of Medicine and Surgery Class of 1924

## THE APPOINTMENTS OF DR. JOHN V GALLAGHER AND DR. IRVING F ARMSTRONG

Governor Curley has appointed Dr John V Gallagher of Milford medical examiner of the sixth Worcester District, to succeed the late Dr George Curley and Dr Irving F Armstrong of Hudson, medical examiner of the ninth Middlesex District, to succeed Dr Norman M. Hunter

## MORTALITY RATES

Telegraphic returns from 86 cities with a total population of thirty-seven millions for the week ending September 7 indicate a mortality rate of 94 as against a rate of 101 for the corresponding week of last year. The highest rate (17.3) appears for Nashville Tenn., and the lowest (8.4) for Somerville Mass. The highest infant mortality rate (185) appears for Cincinnati Ohio and the lowest for Bridgeport, Conn., Canton, Ohio Duluth Minn.

Evansville Ind., Jersey City N J., Long Beach Calif., New Bedford, Mass., Schenectady N Y., Seattle Wash., Somerville Mass., South Bend, Ind., Spokane Wash., Springfield, Mass., Tacoma Wash., Utica, N Y., and Yonkers N Y., which report no infant mortality

The annual rate for 86 cities is 11.6 for the thirty six weeks of 1935 as against a rate of 11.5 for the corresponding period of the previous year—Bureau of the Census

## RÉSUMÉ OF COMMUNICABLE DISEASES IN MASSACHUSETTS FOR AUGUST 1935

Disease	Aug., 1935	Aug., 1934	5 Yr Average*
Anterior Poliomyelitis	483	16	143
Chickenpox	97	87	103
Diphtheria	23	51	109
Dog Bite	1117	1031	721
Epidemic Cerebrospinal Meningitis	4	2	6
German Measles	89	15	25
Gonorrhea	546	680	661
Lobar Pneumonia	123	90	83
Measles	130	95	139
Mumps	225	131	148
Scarlet Fever	175	179	249
Syphilis	444	401	351
Tuberculosis Pulmonary	324	340	321
Tuberculosis Other Forms	35	40	37
Typhoid Fever	15	24	34
Undulant Fever	2	0	
Whooping Cough	293	596	568

Based on the figures for the preceding 5 years.

## RARE DISEASES

Anterior poliomyelitis—483 cases (see weekly lists)

Anthrax was reported from Sheffield, 1.

Dysentery (bacillary) was reported from Somerville 1 Watertown 1 total 2

Encephalitis lethargica was reported from New Bedford 1 Swampscott, 1 total 2

Epidemic cerebrospinal meningitis was reported from Belchertown 1 Cambridge, 1 Medford 1 Norwood 1 total 4

Malaria was reported from Watertown 1

Pellagra was reported from Boston 1 Watertown, 1 total, 2

Septic sore throat was reported from Athol 1 Boston 3 Brookline 1 Lynn 1 Winthrop 1 total 7

Tetanus was reported from Fall River 1 Hingham 1 Watertown 1 total, 3.

Trachoma was reported from Boston, 2 Worcester 1 total, 3

Trichinosis was reported from Boston 1 Methuen, 1 total 2.

Typhus fever was reported from Beverly 1



*Undulant fever* was reported from Cambridge, 1, Greenfield, 1, total, 2

Infantile paralysis was at its highest reported August incidence with foci in Boston and Fall River and a scattering of cases throughout the eastern part of the state

Diphtheria was at its lowest reported monthly incidence in the history of the state

Lobar pneumonia continues to show an increase over last year's figures, which may mean an increased prevalence throughout the coming winter

German measles had the usual summer decline after a year of epidemic incidence, with a possibility of another year of increased prevalence in 1936

Typhoid fever, with a total of 76 reported cases to date, shows no increase over the 1934 record low figure

Tuberculosis, pulmonary and other forms were reported to about the usual expectancy

Epidemic cerebrospinal meningitis, measles, mumps, and chickenpox showed nothing remarkable

Scarlet fever and whooping cough are running lower than in 1934

#### THE CAMPAIGN TO DIMINISH AUTOMOBILE ACCIDENTS

*The Boston Traveler* is engaged in a campaign to reduce the number of automobile accidents and in order to secure the influential cooperation of doctors has deposited at the Boston Medical Library copies of the Safe Driving Pledge with the request that doctors be asked to sign and forward them

This is a worthy movement and doctors may well participate in giving assurance of cooperation by signing the pledges under seven headings as follows

- 1 To drive at moderate speed and on own side of road
- 2 Not to pass cars on curves or hills
- 3 To stop at stop signs
- 4 Not to jump traffic lights
- 5 In city traffic, to be particularly watchful for pedestrians stepping into the line of traffic from parked cars
- 6 Always to give hand signals showing my intention of turning to the left, to the right, or stopping, and not to leave the curb from a parked position without giving a signal
- 7 To be fair to other drivers in all respects and to refrain from reckless driving

#### CORRESPONDENCE

##### MIDDLESEX SOUTH DISTRICT MEDICAL SOCIETY

September 18, 1935

Editor, *New England Journal of Medicine*,

I am writing you the following report to establish what I think is originality of action for the Middlesex South District Medical Society

Recently a meeting of the Councilors of the Middlesex South District Medical Society was called by its President, Dr Sumner H Remick. The meeting was held at the Middlesex County Sanatorium. Thirty four out of a total of fifty-one Councilors representing this District were present.

Many problems pertinent to the practice of medicine were discussed. Such problems as "the abuse of charity hospitals," "medical legislation," "post graduate study," "relief for indigent physicians" and "program" were discussed and certain plans of procedure were evolved.

Dr Charles E Mongan, the President of the Massachusetts Medical Society, was present. He acquainted the Councilors with the medical economic situation and spoke about the future activity of the Society along these lines.

The meeting of the Council of the Middlesex South District Medical Society will no doubt, in the future, become an important part of the activity of this Society and will therefore place the Councilors in a better position to assume their responsibility toward the Massachusetts Medical Society.

Very truly yours,

ALEXANDER A LEVI, M D, *Secretary*

#### RECENT DEATHS

**MINDLIN**—CARL MINDLIN, M D, of 105 Emerson Street, Haverhill, died August 20, 1935. He was born in Russia in 1884 and early in life went to New York City where his early education was acquired. He graduated from the Long Island College of Medicine in 1910 and served as intern at the Long Island Hospital. He first settled in Manchester, New Hampshire, and soon afterward moved to Haverhill where he maintained an active practice for twenty five years. He was a Fellow of the Massachusetts Medical Society and the American Medical Association. He is survived by his widow, Mrs Ada Mindlin, a daughter, Barbara, a brother in Russia and a sister in New Jersey.

**TRAINOR**—JOHN BRETT TRAINOR, M.D., of 1517 South Main Street, Fall River, Massachusetts, died September 20, 1935, at St. Anne's Hospital.

Dr Trainor was born in 1868 and graduated from McGill University Faculty of Medicine in 1897. He joined the Massachusetts Medical Society in 1901 soon after opening an office in Fall River.

He was a Fellow of the American Medical Association, and served on the staffs of the Union Hospital and St. Anne's Hospital of Fall River. He was especially devoted to x-ray work.

He was affiliated with the Knights of Columbus, the Ancient Order of Hibernians, the Royal Arcanums, and the Catholic Order of Foresters. Dr Trainor is survived by his widow, Mrs Margaret E (Brady) Trainor, a sister, three brothers, and a nephew.

**McQUAID**—THOMAS BERNARD McQUAID, M D, of 42 Norwood Street, Everett, Massachusetts, died at

Webster Massachusetts September 19 1935 while on vacation.

Dr McQuaid was born in 1860 was a graduate of Holy Cross College and received his medical degree from the Dartmouth Medical School in 1896 He had practiced in Everett for more than thirty years and had served as physician to the local Board of Health

He was a Fellow of the Massachusetts Medical Society and the American Medical Association.

Dr McQuaid is survived by a sister Miss Elizabeth McQuaid and two brothers Michael McQuaid of Webster and Owen McQuaid of California

**BRYANT**—JOHN BRYANT M.D. of 120 Sargent Road Brookline died September 19 1935 Dr Bryant was born in Cohasset, Massachusetts in 1880 the son of the late John Bryant and Charlotte Olmsted Bryant. His premedical education was acquired at the Milton Academy and Harvard College His medical degree was conferred by the Harvard University in 1907 Early in his medical career he spent two years abroad in research work. On his return he served as assistant physician at the Robert Breck Brigham Hospital. He entered military service during the war with the title of captain and was advanced to the rank of major with assignment for duty at the surgeon-general's office in Washington

After the war he was elected secretary to the American Gastro-Enterological Association and later became its president. Dr Bryant was especially interested in the problems of convalescence and had written several articles on this subject and was consultant to the Burke Foundation for Convalescents in New York City

He was a Fellow of the Massachusetts Medical Society and the American Medical Association and a member of the New England Pediatric Society the Harvard Club the Somerset Club and the Society of Mayflower Descendants

He is survived by his widow Mrs Adelaide Barnes Bryant, and two brothers Edward Bryant of Bolton New Hampshire and Owen Bryant of Tucson Arizona.

## NOTICES

### MEDICAL CLINIC AND STAFF ROUNDS AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 P.M. on Thursday October 3 in the amphitheater of the Peter Bent Brigham Hospital Dr Henry A. Christian, Physician-in-Chief Hersey Professor of the Theory and Practice of Physic in the Harvard Medical School will give a medical clinic. To it are cordially invited practitioners and medical students. These clinics will be repeated on Thursdays from October to May

On Saturdays in the wards of the Peter Bent Brigham Hospital from 10 to 12 staff rounds will be conducted by Dr Christian

## ERRATUM

The caption of the article by Milton S Lloyd M.D. published on page 101, issue of July 18 1935 was incorrect. It should have read "The Clinical Classification and Early Diagnosis of Cancer of the Bronchus"

### BOSTON UNIVERSITY SCHOOL OF MEDICINE SURGICAL CLINIC AT THE BOSTON CITY HOSPITAL

Friday September 27 121 Cheever amphitheatre  
Dr William R. Morrison, Associate Professor of Surgery will present

- 1 Carcinoma of Distal End of Stomach Billroth II Operation.
  - 2 Carcinoma of the Transverse Colon with Partial Intestinal Obstruction. Resection with Intestinal Anastomosis
  - 3 Acute Appendicitis with Peritonitis
- Physicians and medical students are invited

### UNITED STATES CIVIL SERVICE EXAMINATION

Medical Supervisor (Psychiatric) \$5 600 a Year  
Department of the Interior

Applications must be on file with the United States Civil Service Commission at Washington D. C., not later than October 7 1935

Applicants must possess the following qualifications

- 1 They must be citizens of the United States
- 2 Education. — They must have been graduated from a recognized medical school with a degree of M.D.
- 3 Experience — 1 They must have completed either a regular rotating or a psychiatric internship of at least one year's duration or must have had experience considered equivalent to such internship
2. In addition, they must have had not less than five years of responsible and progressive specialized experience in neuropsychiatry of which at least three years must have been in a senior administrative capacity in a mental hospital with not less than 300 daily average of patients under their care
- 4 Age—They must not have reached their fifty third birthday on the date of the close of receipt of applications.

For more detailed information apply to the U S Civil Service Commission

## REPORT AND NOTICES OF MEETINGS

### THE NEW HAMPSHIRE SURGICAL CLUB

The thirty-eighth annual meeting of the New Hampshire Surgical Club was held at the Farragut House, Rye Beach New Hampshire September 8 1935

Dr Irving J Walker Clinical Professor of Sur-

gery, Harvard Medical School, read a paper on Infections of Clean Operation Wounds

At the banquet, Dr A. Warren Stearns, Dean of Tufts College Medical School, was the principal speaker

A golf tournament was held on the Abenaki links

The following officers were elected for the ensuing year Dr Robert J Graves of Concord, President, Dr Richard W Robinson of Laconia, Vice President, and Dr Ralph E Miller of Hanover, Secretary Treasurer

#### WORCESTER DISTRICT MEDICAL SOCIETY 1935 1936

Wednesday Evening, October 9, 1935  
Rutland State Sanatorium, Rutland, Massachusetts

##### PROGRAM

6 00 P M Dinner (Complimentary by State Sanatorium)

7 30 P M Scientific Program

1 "X-ray Diagnosis Silicosis vs Tuberculosis"  
Dr David Zacks, Massachusetts Department of Public Health

Discussion — Dr W Irving Clark, Worcester, Massachusetts

2 "The Value of Blood Studies in the Selection of Cases for Thoracoplasty" Dr Gull Lindh Muller, Pathologist, Rutland State Sanatorium

Dr William Lynch, President, Dr Erwin C Miller, Secretary

Wednesday Evening, November 13, 1935

Grafton State Hospital, North Grafton, Massachusetts Dinner and Scientific Program—Subjects of program to be announced later

Wednesday Evening, December 11, 1935

St Vincent Hospital, Worcester, Massachusetts Dinner and Scientific Program—Subjects of program to be announced later

Wednesday Evening, January 8, 1936

Worcester City Hospital, Worcester, Massachusetts Dinner and Scientific Program—Subjects of program to be announced later

Wednesday Evening, February 12, 1936

Worcester State Hospital, Worcester, Massachusetts Dinner and Scientific Program—Subjects of program to be announced later

Wednesday Evening, March 11, 1936

Memorial Hospital, Worcester, Massachusetts Dinner and Scientific Program—Subjects of program to be announced later

Wednesday Evening, April 8, 1936

Hahnemann Hospital, Worcester, Massachusetts Dinner and Scientific Program—Subjects of program to be announced later.

Wednesday Afternoon and Evening, May 13, 1936

Annual Meeting of Society—Time, place and details of program to be announced in an April issue of the *Journal*

ERWIN C MILLER, M.D., Secretary

#### FAULKNER HOSPITAL CLINICAL MEETING

The first clinical meeting at the Faulkner Hospital for the season of 1935-1936 will be held on Thursday, October 3, 1935, at 5 00 P M

Subject Several Cases of Unusual Vascular Lesions with Fatal Termination

Discussion by Drs Eugene E O'Neill and John Homans

All physicians are invited

#### SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

##### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, SEPTEMBER 30, 1935

Wednesday, October 2—

112 M Clinico-Pathological Conference Children's Hospital

Thursday, October 3—

\*3 30 P M Medical Clinic at the Peter Bent Brigham Hospital

\*5 P M Clinical Meeting—Faulkner Hospital.

Saturday, October 5—

\*10-12 Staff rounds at the Peter Bent Brigham Hospital

\*Open to the medical profession

†Open to Fellows of the Massachusetts Medical Society

September 27—Boston University School of Medicine Surgical Clinic at the Boston City Hospital See page 637

September 27 28—New England Surgical Society See page 649, issue of September 12

September 30 - October 12—International Medical Post Graduate Courses in Berlin For further information apply to the Geschäftsstelle der Berliner Akademie für ärztliche Fortbildung Robert Koch—Platz 7 (Kaiserin Friedrich Haus), Berlin N W 7

October 3—Medical Clinic at the Peter Bent Brigham Hospital. See page 637

October 3—Faulkner Hospital Clinical Meeting See notice above

October 6 20—Seventh Annual Training Course for Medical Reservists at the Mayo Clinic See page 441, issue of August 29

October 7-10—American Public Health Association will meet in Milwaukee, Wisconsin For information address the American Public Health Association, 60 West 60th Street, New York City See page 673

October 14 19—Inter-State Postgraduate Medical Association of North America See page 649, issue of September 12

October 21 - November 2—1935 Graduate Fortnight of the New York Academy of Medicine See page 638, issue of May 9

October 28 - November 1—The Twenty-Fifth Clinical Congress of the American College of Surgeons See page 1065, issue of May 30

#### DISTRICT MEDICAL SOCIETY

##### WORCESTER DISTRICT MEDICAL SOCIETY

October 9 - May 13—Schedule of Meetings. See notice elsewhere on this page

# The New England Journal of Medicine

VOLUME 213

OCTOBER 3, 1935

NUMBER 14

## The Massachusetts Medical Society

### SECTION OF MEDICINE

Hotel Statler Boston

Tuesday, June 4 1935, 2 30 P.M.

#### PRESIDING

Dr Francis M. Rackemann Boston Chairman  
Dr Richard P. Stetson Boston Secretary

THE CHAIRMAN *Gentlemen*—We have become very proficient in locating the trouble in the heart or brain or kidneys as well as in determining the nature of this trouble. We have learned about the clinical effects of lesions in all the different organs in the symptoms which result from disturbances of many different physiologic processes.

We have been much interested in the results of the disease process that is in pathology and in pathological physiology. Now I believe that the time has come to consider how these various diseases develop and what we do know or what we do not know about their cause.

At this meeting we have brought together a group of men who will give us a series of papers which ought to be very interesting from this new point of view. The first paper is by Dr Joseph H. Pratt, of Boston.

### THE DEVELOPMENT OF PHYSICAL DIAGNOSIS\*

BY JOSEPH H. PRATT, M.D.†

THE ability to make an anatomical diagnosis in many cases of organic disease of the hidden organs of the chest and abdomen by the skilled and systematic use of eyes, ears and fingers is a medical triumph of the first half of the nineteenth century. This epoch making development of medical diagnosis was inaugurated by two men, Corvisart and his pupil Laennec.

To John Collins Warren, first surgeon of the Massachusetts General Hospital, belongs the credit of introducing the first knowledge of heart disease to the physicians of America. Years later he told in his reminiscences how this came about. His account shows that as late as the early part of the nineteenth century not only were the methods of diagnosing heart disease unknown but the very existence of organic disease of the heart denied. For the light it throws on the development of physical diagnosis it is worth quoting over a hundred years later.

"In the year 1808 I was called to attend Governor Sullivan, who was then Democratic Governor of the State. \* \* \* He was subject to frequent attacks of cough and difficulty of breathing, followed by copious expectoration of mucus, and frequently of blood in quantities. He had, also, violent palpitations of the heart, and great shortness of breath on going up stairs.

Under one of these paroxysms, his life seemed to be in danger, and I requested my father to see him in consultation. Among some remarks which he made he dropped a suggestion of a derangement of the heart. The moment he spoke the word, the whole subject flashed upon my mind. In 1801 and 1802, I had attended the lectures of Corvisart in Paris. He examined many bodies before us, used percussion and pointed at organic changes in this organ. Amidst a multitude of other concerns, this account of diseases of the heart had slipped my mind but was revived in the way I have mentioned.

"In England the subject was so entirely unknown, that a patient in Guy's Hospital dying of hypertrophy or as Corvisart called it, aneurism of the heart (the largest I have ever seen) was thought by the celebrated Dr Saunders to have died of hydrothorax. The body was not examined by the physicians, but was left to me who was a surgeon's pupil and had no right to do it. With the aid of my friend Senter, I examined it, and got out this enormous heart, which is now preserved in the museum of the Medical College.

"The symptoms of organic disease of the heart were not indeed, unknown, but they were attributed generally to other causes than derangement of the heart itself. I studied Governor Sullivan's case very carefully, and immediately discovered all the symptoms mentioned by Corvisart and some others.

\*Read at the Annual Meeting of the Massachusetts Medical Society Section of Medicine June 4 1935.

†Pratt Joseph H. — Physician in-Chief, Boston Dispensary. For record and address of author see "This Week's Issue," page 633.

"The Governor's illness made a great noise \* \* \* Of course, there was much conversation about this notion of organic disease. All the older physicians, except my father, ridiculed this 'organic fancy' as Dr Danforth called it."

"In the month of December, 1808, the Governor died, with full symptoms of organic disease of the heart. Permission was given to examine the body thoroughly, and I invited the principal physicians in town, most of whom came. Among them were Drs Danforth, Rand, Jeffries, Dexter, my father, and Dr James Jackson. I proceeded to examine the body with tremulous confidence, knowing that some of the gentlemen present had a different opinion, and confidently expected I should fall into disgrace and ridicule."

"In the examination, I proceeded to point out the swelled limbs, purple visage, oedematous eyelids, the water in the thorax and abdomen, congested lungs, all of which belonged to the train of organic changes. But the heart was yet untouched. I then stated that the heart would be found enlarged, the left cavities increased in capacity, and the origin of the aorta, with its valves, ossified to a considerable degree. I then made a small aperture in the left ventricle, which was full of coagulated blood, and passing the finger into its cavity, sought for the aortic aperture. This was very much contracted, and surrounded by a bony ring extending through the aorta to the valves. The heart was enlarged, and its cavities extended, the parietes thickened. The other gentlemen examined successively, and were all satisfied of the change of structure."

"The subject was soon after illustrated by the appearance of Corvisart's work in this country. In England, the knowledge of these complaints became more slowly diffused than here."

The case of Governor Sullivan stimulated Dr Warren to the intensive study of heart disease. In 1809 he presented before the Massachusetts Medical Society the report of ten cases of heart disease with the postmortem findings. In this paper is described in detail the case of Governor Sullivan. It was not the custom at that time to make any examination of the body and so it happened that Dr Warren had been treating Governor Sullivan for some time without even inspecting his chest. Finally after a degree of insensibility had developed, "I seized this opportunity," he writes, "to examine the region of the heart, which had not been done before from fear of alarming the active and irritable mind of the patient. The heart was perceived palpitating obscurely about the seventh and eighth ribs, its movements were very irregular, and consisted in one full stroke followed by two or three indistinct strokes, and sometimes by an intermission corresponding with the pulse at each wrist. The pulsation was felt most distinctly in the epigastric region."

Publication of this excellent paper was delayed until 1813 when it appeared in the second volume of the Medical Communications and Dissertations of the Massachusetts Medical Society. A year previous the *New England Journal of Medicine and Surgery* was started and in the first volume a second series of cases of organic diseases of the heart was reported by Dr Warren. A case of aneurism of the aorta was described with an excellent drawing of the specimen obtained at autopsy. It is interesting to note that this patient was bled and blistered from the fall of 1808 until the spring of 1809 for pains in the right shoulder and arms without any examination of the chest. Finally the pains in the shoulder became "so severe as to induce Dr Eustis a friend of his family and Dr Bates his physician to make an examination of this part. When the breast was uncovered Dr Eustis observed with astonishment a small pulsating tumour on the right side of the thorax between the second and third rib at the distance of one or two inches from the sternum."

An examination of Dr Warren's case reports gives no indication that he attempted to use is probable that he received no personal instruction as a method of diagnosis. He states that he only attended a few of the lectures of Prof Corvisart at the hospital of La Charité in the year 1802 while a student in Paris. It is a pity that no further information came from this great clinician.

Singularly enough Dr Gates, the translator of Corvisart's great work, dedicated the American edition published in Boston in 1812 to the same Dr Danforth who four years before was so convinced that heart disease was an "organic fancy." Corvisart's method of percussion of the heart was very simple. A typical note in a case of "great enlargement of the heart" reported in this book is the following: "The thorax when struck sounded well on the right, but not the least on the left." In another case it was observed, "the region of the heart did not sound," and in a third, "The chest which sounded well in every other part was silent near the region of the heart." Percussion was made with the fingers of the whole hand and the force used was considerable. In addition to percussion Corvisart always noted the character and force of the apex beat and of the pulse. The rate in minutes was not noted.

Knowledge of physical diagnosis developed slowly. In 1817 in the first textbook of medicine to appear in America that of James Thatcher of Plymouth, Massachusetts, there is no mention of the examination of the heart or lungs. As late as 1825 Dr James Jackson in his textbook on the theory and practice of physic devoted only a few lines to percussion and auscultation. The only form of heart disease discussed is angina pectoris which is briefly described. The cause was not known. The condition was called sternalgia and it was not rec-

ognized that the heart was the seat of the disease. The words *angina pectoris* are not mentioned.

Modern medicine may with truth be said to date from the publication of Laennec's *Do l'auscultation médiate* in 1819. One of the first outculls of Paris to appreciate the value of auscultation and to attempt to employ it was Dr. James Jackson, the professor of medicine at Harvard and first physician of the Massachusetts General Hospital. His gifted son, James Jackson Junior, under his father's tutelage was studying with zeal and with as much thoroughness as possible the auscultatory signs of disease. He had studied medicine less than two years when he wrote in his commonplace book on December 28, 1829 the report of a case of phthisis. I was invited this morning by Dr. Fischer, physician of the House of Industry in South Boston to attend with him the examination of a woman who died the night before. I had seen the patient about a month ago. . . . The circumstances most observable at that time and for which I was invited to see her, were that the metallic tinkling had been heard in her chest through the medium of the stethoscope. This was observed upon the left side of the thorax. . . . It was just below and partly upon the scapula, and also, if I did not mistake over the space between the scapula and spine. On applying the instrument, I heard it very distinctly several times. It was audible immediately upon the termination of inspiration as expiration commenced and thus with great regularity. Dr. Fischer likened it to the sound produced by the blowing of air into a wet bladder. Another gentleman thought it most like a drop of water falling into a glass bottle half filled with fluid. For myself I should say it was something between the ticking of a watch and the sound produced by striking a small bar of steel upon any resounding body. Whatever this sound may have resembled, however it was most unequivocally metallic in its nature."

An autopsy was carefully performed and young Jackson wrote a detailed protocol occupying nearly four pages of printed text. The (left) upper lobe presented at once the appearance of a large cyst, and upon handling and tapping this with the finger we felt assured that it was a large cavity filled with air and fluid, and we again heard a faint metallic sound. . . . Upon opening into the cavity we found nearly a pint of purulent fluid of a cream like consistence. The walls of the cyst were one third of an inch in thickness. . . . At the end of the protocol he made the following comment. One practical advantage to be derived from this examination is, that pneumothorax does not always exist when the metallic tinkling is heard. . . . "Laennec mentions two cases similar to this (37-38 1st edit) entitled '*Tontement métallique dans une vaste excavation tuberculeuse*'."

It is astonishing that the above carefully recorded facts were observed by a youth of nineteen. He made as thorough a physical examination as he could, then performed a complete autopsy and finally consulted the literature. This case report shows that auscultation of the lungs was practised as early as 1829 in Boston and with the aid of a stethoscope, and the results obtained were compared with the pathological findings at autopsy.

Young Jackson continued the study of auscultation with great zeal and industry in Paris under the great Louis and also received personal instruction from the distinguished professor Andral. A memoir of this brilliant young American student whose untimely death at the age of twenty-four was a great loss to the science of medicine was published by his father in 1835. This book contains much of present-day value on physical examination of the chest and abdomen. It can be read with profit by all students of medicine. Dr. H. B. Jacobs of Baltimore says of this remarkable work "I scarcely know any book which is more of an inspiration to the medical student, more of an incentive to hard work and to high ideals than the little story of the life of this young man."

James Jackson Senior was an eager student of auscultation. In September 1831 in a letter to his son then in Paris he said "I want to know more what you have learnt about auscultation in diseases of the chest" and again on January 6, 1832 he wrote of the difficulties he had in the use of the stethoscope "I scarcely expect to overcome them—yet I expect you to do it."

It can be seen from these historical notes that John Collins Warren was the first physician in this country to recognize the existence of heart disease. The physical examination in diseases of the heart introduced the new knowledge brought to light by Corvisart into America that there was a relation between the size and action of the heart and the well known symptoms dyspnea and dropsy. Twenty years later James Jackson and his son were eagerly studying the relation between sounds heard on listening to the chest and diseases of the lungs especially phthisis. James Jackson Junior while in Paris made the important discovery that prolongation of the expiratory sound was a symptom of what was then regarded as the early stage of consumption. Up to that time the attention of auscultators on listening to the breath sounds was chiefly devoted to the inspiratory phase of respiration.

Auscultation was first taught in Boston by Henry I. Bowditch. He was the friend and fellow pupil of James Jackson in Paris. Thoroughly trained in physical diagnosis by Louis he was well equipped to give instruction in this subject. According to Dr. Jackson young Bowditch was inspired by the "same desire for knowledge and love of truth" that character

ized his son. For about twenty years from 1835 onward he gave personal instruction in physical diagnosis to a small group of students annually. The notes of his lectures in manuscript form are in the Boston Medical Library. In 1846 he published the first textbook in America on auscultation and percussion. It was entitled "The Young Stethoscopist or the Student's Aid to Auscultation," a title far too modest for an admirable work that can be studied by all practitioners as well as medical students with profit.

The great advance in the first third of the present century in diagnosis is the ability to recognize at an earlier stage serious disease, such as pulmonary tuberculosis and cancer of the digestive tract and gall bladder disease by means of the roentgen ray, and cancer of the esophagus and stomach, urinary bladder, lower portion of the intestine and the bronchi, with the aid of the endoscope, by direct inspection.

Recent discoveries have lessened confidence in negative physical examinations of the chest and abdomen. It should be common knowledge that the percussion and auscultation of the lungs may reveal nothing abnormal when an x-ray film may show evidence of pulmonary tuberculosis in even an advanced stage. Hence a patient should never be assured positively that he does not have tuberculosis of the lungs until a good x-ray film has been made with a negative result. Formerly cancer of the stomach was rarely diagnosed before a tumor mass could be palpated. Now by means of the relief method of studying the gastric mucosa with the x-ray and by gastroscopy it is often possible to recognize this disease at a stage early enough to permit some hope of cure.

In examining a patient one only sees what he looks for. Unless an observation appears to have some significance, little attention is paid to it and little or no impression is made on the memory. The reason physicians one hundred and thirty years ago did not examine the chest was doubtless due to the fact that such an examination as they could make very rarely revealed anything of significance to their minds. The diagnosis may have been "writ large" on chest or abdomen but if in an unknown language it made no impression on the observer.

Doubtless physicians for centuries had been consulted for headache by patients afflicted with acromegaly but the large nose and massive jaw, the thick lower lip, the short hands with their broad stubby fingers made little impression upon observers until Pierre Marie demonstrated the connection between this peculiar bodily structure and tumors of the hypophysis.

At an earlier period Addison showed the connection between brownish pigmentation of the skin and mucous membranes, and disease of the adrenal glands. From that time onward such pigmentation was sought for and described with care, simply because its possible significance

was for the first time understood. The same was true in regard to exophthalmos when its association with a particular type of goitre was discovered by Parry and Graves. Recently discovered new facts in the domain of endocrinology make various types of obesity appear in a new light. Now that the association of a rapidly developing obesity with purple striae of the skin, hypertension, hirsutism, amenorrhea and a high blood pressure has been shown by Harvey Cushing to be related to small basophilic adenomas of the pituitary gland, cases of obesity in all parts of the world presenting any of these characteristics are receiving a more careful physical examination than previously. Within the past three years a number of cases of tumors of the adrenal cortex have been reported which presented a similar clinical picture. This has been the result of a more thorough study of unusual cases in which obesity was a feature. Rapid emaciation with cachexia has likewise been investigated more thoroughly since it has been recognized as the clinical expression of great deficiency of pituitary secretion, the clinical condition produced being known as Simmonds' disease. Likewise the details of the physical structure and confirmation of stunted children and dwarfs have been observed and noted down since the discovery was made that certain types are due to pituitary insufficiency.

Some special diagnostic procedures have increased the understanding of functional disorders with the result that inspection and palpation are of more aid in diagnosis at the present time than ever before in diagnosis. A notable example is furnished by the polygraph of Sir James Mackenzie and the electrocardiograph. Possessed of the new knowledge gained from the use of their instruments it is possible usually by listening to the heart and palpating the radial pulse to recognize sinus arrhythmia, extrasystoles, auricular fibrillation, and heart block. The orthodiagraph has been helpful in developing the technique of cardiac percussion.

The importance of the physical examination alone in detecting early disease is often overrated. In recognizing beginning heart failure as Sir James Mackenzie taught, subjective symptoms generally precede objective signs. On the other hand in early endocarditis a systolic murmur is usually the first sign of the disease. Only examinations repeated either daily or at frequent intervals may reveal a pericardial or pleural friction rub or the appearance of fluid in pleural or pericardiac cavities. Physical signs in association with early subjective symptoms characteristic of a disease often clinch the diagnosis. A favorite example of a pathognomonic physical sign is the crepitant râle of early pneumonia. Localized râles in the upper part of a lung with bronchovesicular breathing are almost diagnostic of pulmonary tuberculosis when pres-

ent in a patient with cough and slight fever of some weeks' duration. Similar examples might be cited, such as the value of the consonating character of the râles in the diagnosis of bronchopneumonia.

The great value of a negative physical examination in making a diagnosis is largely by exclusion in a patient who presents marked subjective symptoms and should be emphasized.

The history of the development of physical diagnosis shows clearly that deviations from the normal are either unnoticed or attract little attention until their significance stands revealed. It is probable that advance in knowledge will enable physicians, one hundred years from now, to discover much of diagnostic value on the physical examinations of their patients that is now passed unnoticed. The gain in the last century has been enormous. It is possible that the next may show an even greater advance.

#### DISCUSSION

**THE CHAIRMAN.** Before I open the discussion I would like to ask all those who want to talk about these papers to come forward and stand on the platform so that everybody can hear.

**DR. ROBINALD FITZ,** Boston. *Members of the Section*—I think we have heard a very helpful paper. Personally I never can hear anything of medical history without feeling humble. It does one good to realize by what sort of men our present quality of physical diagnosis has been developed. In Boston it must always give us pleasure to hear the names of Warren, Jackson and Bowditch repeated lest we forget what those men did to build up our present knowledge.

Dr Pratt has brought out another interesting point in his paper that is worth mentioning. In the early days pathological examinations were relatively unimportant. As the number of pathological examinations increased so increased clinical and pathological correlation and the accuracy of physical diagnosis. Carefully conducted pathological examinations are still most important particularly in hospital cases which claim to train interns.

Dr Pratt says that a generation ago physicians were apt to be more expert in physical diagnosis than today because they were not handicapped by the mechanical aids that have crept in. There is no doubt that the mechanical aids to diagnosis may be helpful and will continue to be employed. It is important to remember however that one can learn much by physical examination. New methods may be misleading unless they are most carefully controlled. In this connection I am sorry that Dr Pratt did not mention the warning of Oliver Wendell Holmes. About the time the stethoscope was introduced Dr Holmes wrote the story of the young girl who fell ill and of the young doctor who took care of her. The young doctor listened very carefully with his stethoscope and heard queer noises in the patient's chest. He called in one of his older colleagues who looked at the young lady and soon discovered that the trouble was that she had fallen in love with the young doctor and the queer noises in her chest were due to a couple of flies in the bell of the stethoscope.

"Now use your ears, all that you can,  
But don't forget to mind your eyes,  
Or you may be cheated like this young man,  
By a couple of silly abnormal flies

**DR. F. VAN NUTS** Weston, Mass. Dr Pratt quotes a significant statement, "that in physical examination we see only what we look for." A corollary of this statement is that we look at a disease not as a whole but at its most familiar facet. Inasmuch as most diseases have not one but many facets the etiological, the chemical, the anatomical, the histological, it behooves us to broaden our conception of each disease.

This conception itself varies with each medical generation, and indeed with the physician's nationality. The endemic typhoid of a generation ago presented clinical aspects which physicians will never see again. The changing scientific viewpoint today upon polyneuritis is totally different from that of pre-war days.

We see only what we look for. Hence the key stone of all physical examination is pathology. Lewellyn Barker writes, that, "once the main outlines have been mastered it is easy to fill in with finer material. These 'main outlines' mean pathology."

One concept of yellow atrophy once a rare disease has been completely remodeled. Formerly the symptoms themselves loomed large. The disease was a very narrow one. It came usually after pregnancy and ran to a speedy death. Today the conception of the disease has been widened greatly. The symptoms are relegated to second place, and the pathological picture of a toxic hepatitis with its various subsequent events, Barker's "Finer material" stands to the foreground in our diagnosis.

You remember Keats' Sonnet

"Then felt I like some watcher of the skies  
When a new planet swims within his ken."

Just as does a general medical practitioner watch day by day for one of the rare findings in physical diagnosis. One keeps hoping that he may see the miliary tubercle of the choroid, the amaurotic "cat's eye" of a sarcomatous retina, the trident hand of achondroplasia, the pulsating intercapillary arteries denoting aortic aneurism, a motor aphasia in a left sided hemiplegia.

The pleasure of one's first encounter with the thalamic syndrome or with the "glove pigmentation of pellagra, the sulphur granules in actinomycotic pus, the signs of asthenic bulbar paralysis—the discovery of any one of these keeps physical examination fresh and eager. I read once of a policeman who couldn't let go of his prisoner's arm because of a tumor in the officer's corpus callosum. Probably not one of us will ever meet such a case but if he does he will feel like a collector of rare Americana who picks up a copy of Mark Twain's "Elizabetan Fire-Side Conversation in a stall out side a junk shop."

Dr Pratt spoke of new signs of physical findings. Of course these signs always have faced us. It is this significance which counts. We older men knew pulmonary edema as a clinical entity. It is only lately that we recognize it as a symptom of left heart failure.

In "Monographic Medicine of 1916" I find no distinction drawn between angina pectoris and coronary occlusion and yet today they present two distinct pictures.

In my house-officer days cerebral hemorrhage was very familiar. Cerebral thrombosis was almost unrecognized. Death from cerebral hemorrhage was supposed never to be sudden. It always was a matter of a day or so. Later we find it not infrequent within an hour after intraventricular hemorrhage.

**DR. HENRY A. CHRISTIAN** Boston. I would like this opportunity of making a plea for the utilization



tion of the very simple methods of physical diagnosis, the very simple laboratory methods that any physician can carry out, not because they are makeshifts for more complicated methods but because the latter often are not needed, if the simple methods are intelligently applied. I have had occasion recently to bring together some observations on what I call the lag between clinical diagnosis and x-ray confirmation of the diagnosis, pointing out a number of circumstances under which the simple methods of history-taking and physical examination can anticipate the diagnosis by days, weeks or months before the x-ray will show the changes.

I want too, to cite an example of how not doing a very simple thing led to an illness of a year and a half on the part of a patient and the expenditure of a very considerable amount of money. This patient was ill with diarrhea. One of his early contacts with modern medicine was a laparotomy to find out why

he had diarrhea. They did not find out. After eight or nine months more of suffering the patient had x-ray studies of the gastrointestinal tract and then it was found that he had proctocolitis. Now and only now was his stool examined, amebae were found, he was treated with emetin, in twenty-four hours he made a marvelous change, and in a day or two he was practically well.

It is these simple methods, intelligently applied, that give us a vast amount of important information and it is not at all necessary to have complicated laboratory and instrumental methods to arrive at many diagnoses. Obviously, if the simple methods fail to make a diagnosis, then you should proceed to use the more complicated ones and intelligently correlate all of the evidence.

(Dr. Chester S. Keefer of Boston read his paper entitled "The Etiology of Chronic Arthritis".)

## THE ETIOLOGY OF CHRONIC ARTHRITIS\*

BY CHESTER S. KEEFER, M.D.†

ONE of the most important factors in the prevention or control of any chronic disease is a complete understanding of its etiology. At the present time there is no general agreement regarding the cause of various forms of chronic disease of the joints, but it is well for the student of this group of disorders to pause from time to time and assess in a critical fashion the information that has accumulated. In this paper I propose to consider the various hypotheses that have been advanced in an attempt to define the etiology of chronic arthritis. It is not my purpose to make any pretense at a comprehensive review of the extensive literature dealing with this question. The discussion will be confined more or less to a consideration of those facts which deal with the main views regarding the pathogenesis of degenerative and rheumatoid arthritis.

### TERMINOLOGY

In any discussion of chronic arthritis it is highly essential that there be a clear understanding of the terms which are used. Great confusion exists and, since there is a certain degree of looseness in the precise definition of diseases of the joints, it is only natural that misunderstandings should arise from any discussion in which the type of disorder is not defined with care. Another source of error arises when conclusions regarding etiology are drawn from the benefits that seem to follow various therapeutic measures. It is important, moreover, to discriminate between the clinical features that are primary and those which contribute to the symptomatology of the disorder.

It has been well said that thought concerning the etiology of arthritis is clouded by the tendency to confuse primary and contributory factors.

### DEGENERATIVE ARTHRITIS

This term is used synonymously with osteoarthritis and hypertrophic arthritis. The pathologic picture is characteristic so that the condition can be readily discriminated from other maladies of the joints. It is characterized by (1) fibrillation, erosion and destruction of the cartilage with attempts at regeneration, (2) increased vascularization and thickening of the subchondral bone, fracture, attempts at repair with new bone formation, islands of cartilage and cysts in the cancellous bone, (3) the formation of exostoses, (4) normal synovial membrane or slight thickening of the capsule with papillary projections of synovial cells into joint cavity. In other words, it is a condition that begins in the articular cartilage and involves the underlying bone and synovia secondarily. As a result of personal observations, together with those of others<sup>1 2 3 4 5</sup> it now seems evident that degenerative arthritis is not a systemic disease with joint manifestations, that affects many of the joints with equal intensity, but its occurrence in the different joints of the body can be explained on a basis of various factors producing injury, excessive "wear and tear" or trauma to the articular surfaces. A careful analysis of the different factors in the individual case will enable one to discover both the predisposing and accelerating conditions that produce the changes arising in the affected joints. This question of the pathogenesis of degenerative arthritis has been discussed by me previously and for the details supporting these statements the original paper may be consulted.

### RHEUMATOID ARTHRITIS

This term is used synonymously with atrophic or infectious arthritis. It is a disease which be-

\*From the Thorndike Memorial Laboratory, Second and Fourth Medical Services (Harvard), Boston City Hospital and the Department of Medicine, Harvard Medical School, Boston, Mass. Read at the Annual Meeting of the Massachusetts Medical Society, Section of Medicine, June 4, 1935.

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gins in the synovial membrane and periarticular tissues and involves the articular cartilage and bone secondarily. The histologic picture of the synovial membrane and periarticular tissues is characterized by increased thickness and proliferation of the synovial membrane, and infiltration with lymphocytes and plasma cells in the subsynovial layer. In some areas these cells accumulate about blood vessels, in others there is no such arrangement. As the proliferation of the synovial membrane increases and advances, it grows inward from the periphery of the joint and becomes adherent to the articular cartilage. Following this, a sequence of events occurs depending upon the severity and duration of the process and physical activity of the patient. The various pathologic features are summarized in table 1.

TABLE 1

## PATHOLOGIC LESIONS IN RHEUMATOID ARTHRITIS

Primary	Secondary	Miscellaneous
Synovitis	Destruction	Lymphoid
Periarticular	of Cartilage	Hyperplasia
change with	Atrophy of Bone	Calcification of
and without	New Bone	Blood Vessels
subcutaneous	Formation	Amyloidosis
fibroid	Subluxation	Growth
nodules	Ankylosis—	Disturbance
	Fibrous	Pigmentation of
	Bony	the Skin
	Muscular Atrophy	

While many theories have been advanced to explain the etiology of rheumatoid arthritis none of them meet with universal approval or acceptance. For purposes of discussion there are three which merit special consideration. They are as follows: (1) the unitarian theory, (2) the infectious theory and (3) the 'eclectic' theory. It should be insisted upon that any theory which attempts to explain rheumatoid arthritis must account for the development of the lesions in the synovial membranes and periarticular tissues. After all these are the essential and characteristic lesions of the disease and they are present in all proved cases. The factors that tend to exaggerate symptoms and influence the course and progress of the disease once it has been established, may be somewhat different from the primary or inciting cause. These must be studied carefully and separated in so far as it is possible. It is necessary then to examine the evidence that has been brought forth in an attempt to explain the anatomical lesions that are so characteristic of this disease.

## THE UNITARIAN THEORY

The proponents of this theory maintain that both rheumatoid arthritis and degenerative arthritis are due to the same etiologic agent or group of agents and that the differences are due to factors other than causation. In other words the factors determining the type of arthritis

depend upon "trauma, foci of infection the involutional changes of the menopause and the habits of the patient." The reasons for advancing such a theory are due to the observations that the pathologic changes which are seen in the joints of many patients with arthritis have the characteristic changes of both types. This has been referred to by some physicians as a mixed type of arthritis. To find the characteristic features of both types of arthritis in certain patients is not surprising. This can be readily explained and does not necessarily mean that both types are caused by the same factors.

When the incidence of degenerative changes in the joints is studied in a miscellaneous group of individuals regardless of whether they have symptoms referable to their joints it is found that the alterations increase in frequency as age advances and in individuals over forty years old it is difficult to find joints which are absolutely normal. This degenerative process begins in the cartilage and the synovial membrane shows no lesions. If a patient with degenerative changes in the joints develops rheumatoid arthritis then the lesions of both types will naturally be present. If on the other hand there are no degenerative changes in the joints of the patients who develop rheumatoid arthritis then the disorder will be synovial and periarticular in character. Ample evidence for this explanation is forthcoming when the joints are examined histologically. That is to say no one can mistake the characteristic lesions of one type of arthritis for the other. The course of events is quite different in the development of the two types of joint disease, and for the reasons cited it is not possible to accept the unitarian theory of the origin of rheumatoid and degenerative arthritis.

## THE INFECTIOUS THEORY

This theory of the origin of rheumatoid arthritis has attracted widespread attention especially in this country. The presence of slight fever, leucocytosis, increased red blood cell sedimentation rate, inflammatory lesions in the synovial membrane and periarticular tissues, enlargement of the lymph nodes in the region of the joints and the presence of synovial fluid with all of the characteristics of an exudate have suggested this possibility. In addition the occurrence of positive agglutination and precipitin reactions to the hemolytic streptococcus in the blood serum of patients with rheumatoid arthritis has suggested that infection plays an important part in the pathogenesis of the disease.

To explain the lesions in the synovium on a basis of infection three general ideas have developed: (1) The arthritis is a true metastatic lesion from a focus of infection. (2) It results from the action of "toxins" which are absorbed from a focus of infection. (3) It results from a reaction of sensitized tissues to microorganisms or their products.

Before discussing these three views it is desirable to review briefly the theory of focal infection in general, especially as it applies to arthritis

#### THE RELATIONSHIP OF FOCAL INFECTION TO ARTHRITIS

There is, perhaps, no subject which has been discussed more often in its relationship to arthritis in general than focal infection. It has been frequently misunderstood and misrepresented. Much of the confusion has arisen from a lack of understanding of the general principles involved in focal infection and as a result of the enthusiasm or pessimism in the interpretation of the end results that have been obtained in patients with arthritis following the removal of foci of infection. A most careful and comprehensive review of focal infection and elective localization has been prepared by Holman<sup>8</sup>. In America, the subject of focal infections was popularized by the observations of Billings<sup>9</sup>. He defined a focus of infection as "a circumscribed area of tissue infected with pathogenic microorganisms". He further emphasized the fact that a focus of infection may give rise to intoxication or focal infection, which meant invasion from a focus, and it is known, as Holman states, that a focus may be latent or inactive.

Before one can accept arthritis as a condition due to focal infection, it is necessary to establish three things: first, that there exists or has existed a focus of infection, secondly, that the focus of infection is bacterial in nature and, therefore, capable of disseminating toxin or organisms, and, thirdly, that infection or damage to the joints has resulted from a dissemination of material from the focus of infection. In some cases it is possible to establish these three facts, in others it is questionable. For example, everyone is familiar with the cases of arthritis which follow streptococcal infections of the uterus with metastatic lesions in the joints. In these cases, the focus of infection is in the uterus and the organisms have been disseminated through the blood stream to the joint tissues so that the same microorganism may be cultivated from both places. Furthermore, it is common knowledge that following a streptococcal infection of the tonsils, as in scarlet fever, an arthritis may appear which is non-suppurative and the joint tissues do not contain organisms. In these cases, the focus of infection is in the tonsils, but it is not always clear just what the mechanism of the joint inflammation really is. To be sure, it has been attributed to the dissemination of toxic bacterial products or to an allergic response upon the part of sensitized tissues to the disseminated bacterial products. That there is some close as-

sociation between the lesion in the throat and the joint manifestations in the cases cited, there seems to be little doubt. The precise mechanism, however, remains obscure.

When arthritis appears without a preceding acute infection and becomes progressive and chronic, the question then arises, is the condition in the joints the result of the dissemination of bacterial products from a focus of infection which may be latent, subacute or inactive? In the first place, it is necessary to determine whether a focus exists and to consider what criteria of infection are present before such a focus can be considered as a contributory factor to the arthritis. It is only after a most careful history and physical examination that one can feel reasonably certain that a focus of infection exists. Once it has been established that a focus of infection is present, the question then arises, is this focus in any way contributory toward the arthritis and, if so, what is the mechanism by which it exerts its effect? One of the criteria upon which the theory of focal infection is based is the fact that following the removal of the primary focus there may be an exacerbation of the secondary focus or a disappearance of the clinical condition. Every one has had the experience of observing the temporary disappearance or exacerbation of the symptoms of arthritis following such procedures, but the interpretation of such phenomena is most difficult. When there is neither improvement nor an exacerbation of the arthritis following the removal of the suspected focus, it may mean that the focus is either not the cause, or that the arthritis is so firmly established that the removal of the primary focus has been of little help. The failure to observe improvement of the arthritis following the removal of foci, the presence of arthritis without demonstrable foci of infection, the improvement of arthritis without the removal of foci, the common occurrence of foci in patients without arthritis and the inability to obtain organisms from the joints have been the main arguments which cast doubt upon the validity of the theory of focal infection and its relation to rheumatoid arthritis. Moreover, it has been frequently claimed that the improvement which follows the removal of a focus may be due to a general stimulus resulting from the removal of one cause of a lowered systemic resistance.

Aside from the cure of the patient, other criteria have been used to establish the relationship between focal infection and arthritis. It has been stated already that the onset of arthritis following an acute infection is important and the evidence of disease in a tissue which has preceded the arthritis is helpful. But, in many cases, the infection has occurred a long time before the patient is seen and the local evidence for infection may be questionable. In-

deed, many patients give no history of a preceding infection. It has been necessary therefore, to use other methods to establish the relationship between the hypothetical focus and the joint disorder. The finding of organisms in the blood stream or the synovial fluid would be of great diagnostic help. It should be remembered, however, as Holman has pointed out, that the high invasive power of such organisms as streptococci requires caution in accepting the presence of streptococci in the blood as of overwhelming importance in the etiologic diagnosis of such conditions as chronic arthritis.

A most important contribution in this regard is that of Lichtman and Gross<sup>10</sup> who reported finding streptococcemia in an average of 6 per cent of 5,233 blood cultures in at least nine diseases, such as, acute rheumatism with polyarthritis, chronic rheumatic cardiovascular disease, rheumatoid arthritis, aplastic anemia, pernicious anemia, leukemia, colitis, meningococcus meningitis and pyelitis and pyelonephritis. In view of these findings, together with the controversial data on the blood cultures in chronic arthritis which will be discussed presently, it is seen that the blood culture may not be helpful in all instances in establishing the relationship of foci of infection to arthritis.

Another method which has been used in the study of the etiologic relationship of microorganisms recovered from foci of infection to arthritis is the study of the blood serum for the presence of antibodies (agglutination reactions, complement fixation reactions and precipitation reactions<sup>11, 12, 13, 14, 15</sup>). The results as regards the specificity of these reactions are highly controversial. Even those investigators who have found serological reactions to various microorganisms in the blood serum of patients with arthritis freely admit that they are not specific for any one strain of organisms. When reactions to one strain are present they are usually present against other strains as well. It is for this most important reason that it is difficult to assign an etiologic relationship between organisms isolated from a focus of infection and the arthritis in an individual case.

Finally, a third method has been used to determine the etiologic relation of foci of infection to arthritis, that is, to test the patient's skin sensitivity to the bacteria or bacterial products which have been obtained from the focus of infection.<sup>16, 17</sup> The literature regarding this subject has been reviewed previously and need not be repeated here.<sup>18</sup> It is well to recall, however, that results of these studies are most difficult to interpret in so far as causation is concerned. It has been shown that patients with arthritis will have positive skin reactions to microorganisms or their products in a slightly higher percentage of cases than in individuals without arthritis. But in view of the fact that

all patients with arthritis do not show positive skin reactions to products of the microorganisms and they may react to organisms that are not obtained from foci of infection, it is difficult, at the present time, to accept the etiologic relationship of foci of infection to arthritis from studies of this kind.

It is seen, then, that the infectious theory of the etiology of rheumatoid arthritis has as its basis the theory of focal infection. We may now return to the original question. Can the lesions in the synovia be explained on the basis of focal infection?

#### IS RHEUMATOID ARTHRITIS A TRUE METASTATIC LESION FROM A FOCUS OF INFECTION?

From what has been said, it would be necessary in order to answer this question in the positive to demonstrate the following facts: (1) that a focus of infection exists, (2) that the tissues of the joints or the synovial fluid contain the same organisms as those obtained from the primary focus. It would also be of importance, although not absolutely essential, to find organisms in the circulating blood. It is known that some investigators have felt that these facts have been demonstrated. However, there is no general agreement regarding the presence of microorganisms in the synovial fluid or tissues and no one investigator has been able to obtain absolutely consistent results.<sup>19, 20, 21, 22, 23</sup> Until it is possible for all investigators to find organisms in the synovial tissue or fluid it cannot be accepted that rheumatoid arthritis is the result of metastatic lesions from a focus of infection.

#### IS THE REACTION IN THE JOINTS IN RHEUMATOID ARTHRITIS DUE TO THE DISSEMINATION OF TOXIC PRODUCTS OR A HYPERSENSITIVE REACTION TO THE PRODUCTS OF THE STREPTOCOCCUS?

In view of the fact that it is not possible to isolate microorganisms from the synovial fluid or tissues about the joints in cases of rheumatoid arthritis, it has been postulated that the reactions in the joints are due to the response of toxic products or a hypersensitive reaction to the products of the organism. This is also suggested by the observation that some form of joint disease such as is seen in serum sickness or postdysenteric arthritis, and in these cases it is known that the intra articular reaction is not due to the presence of microorganisms.

In order to test this hypothesis, the patients with rheumatoid arthritis have been tested with various toxic products from the hemolytic streptococcus to determine whether they show skin reactions which might be interpreted as being either hypersensitive reactions or susceptibility to toxins. While it has been shown that a high percentage (70-80 per cent)<sup>24, 25</sup> of individuals with rheumatoid arthritis react to these products, whereas only about 40 per cent of normal individuals will show the same reactions it is

not clear that this difference is of etiologic significance. It would be more impressive if all patients with rheumatoid arthritis showed positive reactions and fewer patients without arthritis showed no reaction. It might be argued that patients with other allergic diseases often fail to show positive skin reactions and yet they are known to be sensitive to the antigens injected, and it also can be stated that some individuals will show reactions in the skin and not elsewhere. However, in the face of the evidence as it exists today, it is not possible to accept the allergic hypothesis as proved. This mode of approach to the study of rheumatoid arthritis requires further investigation.

One of the strongest arguments in favor of the infectious theory of rheumatoid arthritis is the presence of agglutinins and precipitins to hemolytic streptococcus in the blood serum.<sup>12 13 14 15</sup> The precise significance of these findings cannot be stated with certainty at present but they are present frequently enough and absent in the control patients who have been studied so that their presence cannot be disregarded as a chance or insignificant finding. There are two questions to answer in this regard, first, are these reactions a response to streptococcal infection or, secondly, are they responses to some process which gives rise to changes in the blood serum which are capable of causing the serological reactions observed? Such serological reactions of a non-specific nature as regards etiology are seen in syphilis and in typhus fever. It is important, therefore, that these serological reactions be investigated much more thoroughly before drawing definite conclusions regarding their etiologic significance.

There are, thus, many facts suggesting that rheumatoid arthritis is an infectious disease. The final proof, however, is lacking and will only be acceptable when the mechanism by which infection produces its effects can be proved beyond doubt.

#### THE ECLECTIC THEORY

This theory is the one sponsored by the American Committee for the Control of Rheumatism.<sup>24</sup> It is somewhat complicated and difficult to understand since a wide variety of factors are considered to be of importance in the etiology of rheumatoid arthritis. For that reason it is difficult to advance arguments for or against it. One gains the impression, from the various discussions of this theory<sup>25 26</sup>, that rheumatoid arthritis results from an "imbalance" or "dysfunction" of three systems, namely, the nervous system, the gastrointestinal system and the peripheral vascular system. It has not been made clear just how this so-called "imbalance" operates to produce chronic inflammatory reactions in the synovial membranes and periarticular tissues with exudates in the

joint cavities but it is profitable to examine the evidence for "dysfunction" in these three domains as etiologic factors in the production of rheumatoid arthritis.

#### GASTROINTESTINAL DISORDERS

It has been claimed that gastric anacidity, atonic dilatation of the colon and carbohydrate indigestion are commonly found in patients with rheumatoid arthritis and are of etiologic significance.

Bloomfield and I<sup>27</sup> pointed out a few years ago that when the data on the incidence of gastric anacidity in chronic arthritis were corrected for age, it was no more common than in a group of control patients of the same age and without arthritis. It would seem unlikely, then, that a disturbance in gastric secretion could be of any etiologic significance. The same conclusions were reached by Miller and Smith<sup>28</sup> who have discussed the subject with considerable penetration.

Atonic dilatation of the colon has been found in a number of patients with arthritis by Pemberton and Pierce, Fletcher and Graham and others.<sup>29 30</sup> This has been attributed to defective nutrition and "frequently plays a part in the development and course of chronic arthritis." When an adequate series of controls is studied, such as has been done by Bauer<sup>31</sup>, Archer<sup>32</sup> and Haft<sup>33</sup>, there is no evidence to support the view that the observed abnormalities in the colon, if they really are abnormalities at all, are in any way related to rheumatoid arthritis unless they are a result of the illness. Furthermore, in a study of the same question by Nissen<sup>34</sup> it was found that the atonic enlargement of the colon appeared gradually in patients with chronic disease, especially in individuals with arthritis. This occurred without changes in the diet, but in individuals who were unable to take exercise. When exercises were given, the size of the colon changed. It should be added that changing the technique of the barium enema may also bring about decided alterations in the size of the bowel. Nissen<sup>35</sup> has examined the colon of these patients with a proctoscope and found no abnormalities, and I have studied the bowel of four patients who died with rheumatoid arthritis and was unable to find any anatomical evidence of atrophy or any other disturbance either by gross or histologic examination.

It would appear, therefore, that the evidence for intestinal dysfunction as a factor in causing rheumatoid arthritis is far from convincing so far as demonstrable changes in the colon are concerned.

#### CARBOHYDRATE INDIGESTION

Intestinal carbohydrate dyspepsia is a condition in which there is evidence of bacterial

fermentation of starches. It has been observed in patients with rheumatoid arthritis<sup>34</sup> but also in many other conditions, as well as occurring by itself so that such a state cannot be etiologically for rheumatoid arthritis. Since the recognition of intestinal carbohydrate indigestion is dependent upon finding excess gas formation over normal following the incubation of a culture of stool, the presence of an excessive number of starch granules in a fresh specimen and a stool that is strongly acid in reaction, it would be necessary to show that this condition is present in patients with rheumatoid arthritis and not present in normal individuals under controlled conditions. It should be emphasized that the condition can be produced at will by giving a cathartic. From the observations of Hurst and Knott<sup>35</sup>, one is led to believe that this condition is a common occurrence in a variety of individuals who complain of intestinal gas and noises, but no mention is made by them regarding the presence of arthritis in such individuals. From this discussion it is seen that there are no constant deviations from the normal when the gastrointestinal tract of patients with rheumatoid arthritis is studied. Moreover, when changes in function are seen they usually follow rather than precede the arthritis and, since similar changes are observed in patients without arthritis it is difficult to accept the hypothesis of dysfunction of the intestinal tract as a cause of rheumatoid arthritis.

#### DISTURBANCES IN THE PERIPHERAL VASCULAR SYSTEM

Since many patients with rheumatoid arthritis have (1) cool hands with increased sweating and an abnormal response to cold, (2) decreased capillary circulation in the nail beds and a delayed removal of sugar from the blood (3) improvement of symptoms following procedures causing vasodilatation, it has been postulated that there is a reduction of the blood supply to the joints which is responsible for the development of the arthritis.

Now, when the synovial membrane of a joint with rheumatoid arthritis is studied with a microscope there is no evidence of a decrease in the blood supply. Indeed, one is impressed by the rich blood supply and the presence of many wide open capillaries. When the capillaries of the skin or nail beds of patients with rheumatoid arthritis are studied, there are no consistent findings<sup>37, 38, 39</sup> and when alterations in the number and the rate of the flow of blood are present, they may be exhibited early, late or not at all (Hench, Weil, Kovacs) and it has recently been pointed by Bordelev that the blood flow in the capillaries of the normal skin is intermittent so that this must be taken into account in evaluating studies of the capillaries

in patients with arthritis. If a decrease of the blood supply to the joints is responsible for the development of rheumatoid arthritis it is not a little curious that diseases in which there is no question of a decrease of blood supply to the extremities are so infrequently associated with arthritis, such examples are (1) occlusion of the larger vessels as in thromboangitis obliterans arteriosclerotic occlusion (2) Raynaud's syndrome, (3) scleroderma.

I have never observed rheumatoid arthritis associated with arteriosclerotic occlusion or thromboangitis obliterans, and the joints of patients who have had their legs amputated for these diseases have, in my experience, shown no changes suggestive of rheumatoid arthritis. These observations are in accord with those of Hench, Kovacs and others.

Arthritis is uncommon in Raynaud's disease and in this condition no one can deny that the blood supply to the extremities is decreased. Indeed, one may see the most extensive changes in the skin and bones in this condition and no changes in the joints.

In scleroderma, the same condition is true. There are certain features of this disease, however, that are extremely confusing with rheumatoid arthritis especially in the early stages when the process may be acute and associated with swelling and edema of the periarticular tissues. At this stage the condition may be indistinguishable from rheumatoid arthritis and this is not surprising since the tissues involved are those of the skin and subcutaneous tissue. As the process advances and the sclerodactylia appear, there can be little doubt as to the nature of the process. Then the joints can be shown to be free of the process. This is true in spite of the presence of marked alterations in the bone. There is another feature of scleroderma that may be confused with rheumatoid arthritis and that is the presence of fibroid nodules about the joints. When these occur however calcium deposits take place (Kalkgicht or Calcinosis circumscripta<sup>40</sup>), and since this condition is not observed in the nodules of rheumatoid arthritis the differentiation can be made.

Another argument in support of the decreased blood supply to the joints is the behavior of the blood sugar tolerance curves on venous blood. Abnormalities in the blood sugar tolerance curve have been found in a certain number of patients with rheumatoid arthritis by some and not by others<sup>41, 42</sup>. When the difference in the arterial and venous blood sugar curves is studied it has likewise been shown<sup>41</sup> that the high point in the curve increases above the normal level in spite of the fact that the amount of sugar in the blood returns to the fasting blood sugar level by the end of the third or fourth hour. This delayed removal of sugar from the blood has been taken to indicate a decreased blood supply to the tissues and joints. At best this

evidence is of an indirect sort and before one could accept it as being of etiologic importance, it would have to be shown to be present in all cases and not due to causes other than an interference with the blood supply to the joints. It is well known that the delayed removal of the blood sugar may be altered with the age of the individual, the state of nutrition, the amount of sugar ingested and the previous amount of available carbohydrate in the body. Moreover, it can be shown that the blood sugar tolerance curve may show delayed removal at one time and a normal removal at another<sup>44, 45</sup> and this may be observed in normal individuals or patients with various diseases.

Until all of the above-mentioned factors are controlled it cannot be said that the delayed removal of sugar from the blood in patients with arthritis is an indication of a decreased blood supply to the joints or evidence of a disorder of carbohydrate metabolism.

#### DISTURBANCES IN THE SYMPATHETIC NERVOUS SYSTEM

In view of the presence of vasomotor disturbances in the extremities of some patients with rheumatoid arthritis, it has been claimed that their presence is of importance in etiology. In some, the vasomotor symptoms appear before the arthritis, in others they occur early in the course of the disease, and in another group late or not at all. The hands may even be warm and show no alteration in capillary flow. Just how these disturbances in function can bring about inflammatory changes in the synovial membrane has not been made clear. Since the vasomotor symptoms disappear after sympathectomy it has been assumed that these changes are of etiologic importance in the disease. From the reports in the literature<sup>46</sup> it is not clear just how the course of the arthritis has been altered by this procedure since they have not been followed long enough. Rowntree and Adson are conservative when they point out that one should be cautious in evaluating the results of sympathectomy as far as the arthritis is concerned until they are followed over a period of years. That one can cause the vasomotor symptoms to disappear following sympathectomy is not surprising. But before one can accept the vasomotor reactions as playing a partial rôle in causing the joint changes it would have to be shown that (1) all patients have these changes before the appearance of the arthritis, (2) vasomotor reactions are capable of producing inflammatory changes in the synovial membrane, (3) the arthritis can be completely arrested by sympathectomy. Moreover, it will be necessary to study a large group of controls, that is, patients with vasomotor disturbances in other diseases or without any evidence of organic disease.

From the evidence at hand it cannot be accepted that vasomotor disturbances are of decisive importance in the etiology of arthritis.

When they exist, they undoubtedly contribute to the symptomatology but in the present state of our knowledge, it would be premature to assume that these changes are responsible for the development of rheumatoid arthritis.

From what has been said about the eclectic theory, it cannot be claimed for the studies of the gastrointestinal tract, the peripheral vascular system, or the sympathetic nervous system that they have yet thrown any clear light on the essential nature of rheumatoid arthritis.

#### CONCLUSION

From the discussion of these three theories of the etiology of rheumatoid arthritis it may be taken that none of them are wholly satisfactory or conclusive. The question then must continue to remain in doubt. However, the recent advances in our knowledge of the anatomical and physiological changes that occur during the course of the disease have created fresh suggestions for thought and have improved our understanding of the condition. Gradually, the types of chronic arthritis are being more clearly defined and there is emerging a better understanding of what one is dealing with when the subject is discussed. Progress is being made in this field in spite of the fact that it is slow.

Wide differences of opinion regarding etiology continue to exist and this state of affairs is desirable since it stimulates thought and investigation. Every effort should be made to determine the cause of chronic arthritis since it is only by knowing the etiology of a disease or its mode of inception that one can prevent its occurrence or control its progress.

#### REFERENCES

1. Keefer C. S., Parker F. Jr., Myers W. K. and Irwin, R. L. Relationship between anatomic changes in knee joint with advancing age and degenerative arthritis. *Arch. Int. Med.* 53: 225 1934.
2. Parker F. Jr., Keefer C. S., Myers W. K. and Irwin, R. L. Histologic changes in knee joint with advancing age relation to degenerative arthritis. *Arch. Path.* 11: 516 1934.
3. Keefer C. S. and Myers W. K. Incidence and pathogenesis of degenerative arthritis. *J. A. M. A.* 102: 811, 1934.
4. Keefer C. S. The pathogenesis and diagnosis of degenerative arthritis. *M. Clin. N. Amer.* 18: 947 1935.
5. Bauer W. Discussion in "The relationship between the anatomical changes in the knee-joint with advancing age and degenerative arthritis" by C. S. Keefer. *Trans. Assn. Am. Phys.* 48: 57 1933.
6. Archer B. H. Chronic nonspecific arthritis: etiology and treatment, with special reference to vaccine therapy. *J. A. M. A.* 102: 1449 1934. See this paper for additional references suggesting the unitarian theory.
7. Jordan, E. P. Microbic etiology of rheumatic fever and arthritis. *Arch. Path.* 10: 79 1930.
8. Holman W. L. Focal infection and elective localization: critical review. *Arch. Path. & Lab. Med.* 5: 65 1931.
9. Billings Frank. Focal Infection. New York D. Appleton & Co. 1918.
10. Lichtman, S. S. and Gross L. Streptococci in blood in rheumatic fever, rheumatoid arthritis and other diseases based on study of 5233 consecutive blood cultures. *Arch. Int. Med.* 49: 1078 1932.
11. Dawson M. H., Olmstead, M. and Boots R. H. Studies on etiology of rheumatoid arthritis: bacteriological investigations on blood, synovial fluid and subcutaneous nodules in rheumatoid arthritis. *Proc. Soc. Exper. Biol. & Med.* 28: 419 1931.
12. Dawson M. H., Olmstead M. and Boots R. H. Agglutination reactions in rheumatoid arthritis: nature and significance of agglutination reactions with *Streptococcus hemolyticus*. *J. Immunol.* 23: 205 1932.
13. Dawson, M. H., Olmstead M. and Jost, E. L. Agglutination reactions in rheumatoid arthritis: comparison of agglutinins and precipitins for *Streptococcus hemolyticus* in rheumatoid arthritis sera. *J. Immunol.* 27: 355 1934.

14. Nicholls, E. E., and Stainsby W. J.: Streptococcal agglutins in rheumatoid arthritis. *J. A. M. A.* 97: 1146 1931
15. Keefer C. S.; Myers, W. K., and Oppel, T. W.: Streptococcal agglutins in patients with rheumatoid (atrophic) arthritis and acute rheumatic fever. *J. Clin. Investigation* 13: 267, 1932
16. Walnwright, C. W.: Treatment of chronic rheumatoid arthritis with Streptococcus vaccine on basis of skin sensitivity. *J. A. M. A.* 103: 1247 1932
17. Freiberg, J. A., and Dorff, S. E.: Allergic joint. *J. Lab. & Clin. Med.* 15: 1109 1930
18. Keefer C. S.; Myers, W. K., and Oppel, T. W.: Skin reactions to nucleoprotein of streptococcus scarlatinae in patients with rheumatoid arthritis and rheumatic fever. *J. Clin. Investigation* 13: 79 1932
19. Cecil, R. L., Nicholls E. E. and Stainsby W. J.: Bacteriology of blood and joints in chronic infectious arthritis. *Arch. Int. Med.* 43: 871 1929
20. Forkner C. E., Shanda, A. R. Jr., and Poston, M. A.: Synovial fluid in chronic arthritis: bacteriology and cytology. *Arch. Int. Med.* 43: 575 1929
21. Forkner C. E.: Synovial fluid in health and disease with special reference to arthritis. *J. Lab. & Clin. Med.* 15: 1187 1930
22. Gray, J. V., and Gowen, C. H.: Role of streptococcus in arthritis deformans: improved cultural method. *Am. J. M. Sc.* 123: 422 1931
23. Bernhardt, H., and Hench P. S.: Bacteriology of blood in chronic infectious arthritis. *J. Infect. Dis.* 49: 455 1931
24. Outline of factors influencing the onset of and recovery from chronic arthritis. Prepared by the American Committee for the Control of Rheumatism. Scientific Exhibit Cleveland Session, 1934
25. Pemberton R.: The work of the American committee for the control of rheumatism. The present status of arthritis. *J. M. J. & Rec.* 128: 259 1932
26. Scull C. W., and Pemberton, R.: The influence of dietetic and other factors on the swelling of tissues in arthritis. Preliminary report. *Ann. Int. Med.* 8: 1247 1933
27. Bloomfield, A. L., and Keefer C. S.: Significance of gastric anacidity. *Bull. Johns Hopkins Hosp.* 29: 204 1933
28. Miller S., and Smith, F. B.: An investigation of gastric function in chronic arthritis and fibrositis. *Quart. J. Med.* 20: 371, 1926 27
29. Pemberton, R.: Arthritis and Rheumatoid Conditions Philadelphia. Lea & Febiger 1932
30. Fletcher, A. A.: The large bowel in chronic arthritis. *Trans. Assoc. Am. Phys.* 44: 231 1929. *Am. J. M. Sc.* 179: 91 1930
31. Bauer W.: What should have with arthritis eat? *J. A. M. A.* 104: 1 1935.
32. Haft, H. H.: Colon changes in chronic arthritis compared with other chronic diseases. *Am. J. M. Sc.* 165: 511 1933
33. Nissen, H. A.: Atonic stasis: clinical and laboratory study of intestinal variations in chronic disease. *M. Clin. N. Amer.* 13: 359 1935
34. Monroe R. T., and Hall, F. C.: Feces of patients with chronic arthritis. *Arch. Int. Med.* 47: 744 1931
35. Hurst, A. P., and Knott, F. A.: Intestinal carbohydrate dyspepsia. *Quart. J. Med.* 24: 171 1930 31
36. Well, A. J.: Das Verhalten der Kapillaren bei Arthritis-kranken. *Med. Klin.* 48: 1791, 1920
37. Kovacs J.; Wright, I. S. and Duryeo, A. W.: The surface temperature and the minute blood vessels of the skin in arthritis. *J. A. M. A.* 100: 10 1932
38. Hench P. S.: Discussion of Kovacs's Paper. *Proc. Am. Assoc. for Study and Control of Rheumatic Diseases* June 11 1934
39. Durham, R. H.: Scleroderma and calcinosis. *Arch. Int. Med.* 42: 407 1932.
40. Darsoy T. and Frisch, E.: Beiträge zur Röntgenologie der "Akroklerose." *Fortsch. a. d. Geb. d. Röntgenstrahlen* 47: 287 1933
41. Archer B. H.: Sugar tolerance in arthritis chronic infectious arthritis. *Arch. Int. Med.* 44: 37 1930
42. Nissen, H. A., and Spencer, K. A.: Sugar tolerance in the arthritis. *New Eng. J. Med.* 210: 13 1934
43. Lemmon, W. G.: Stimulation of sugar-regulating mechanism as shown by duplicate blood sugar curves. *J. Biol. Chem.* 73: 437 1931
44. Lemmon, W. G. and Bellinger, M.: Repeated blood sugar curves in non-diabetic subjects. *J. Clin. Investigation* 4: 331 1937
45. Hench P. S.; Henderson, M. S.; Rowntree L. G. and Adson, A. W.: Treatment of chronic "infectious" arthritis by sympathetic gangliotomy and trunk resection. *J. Lab. & Clin. Med.* 15: 1247 1930
46. Rowntree, L. G. and Adson, A. W.: Polyarthritid further studies on effect of sympathetic gangliotomy and ramsectomy. *J. A. M. A.* 93: 179 1929

For additional references dealing with the subject of the etiology of arthritis the readers are referred to Hench P. S.; Bauer W.; Fletcher A. A.; Christ, D. Hall, F. and White, P.: The present status of the problem of "rheumatism" a review of recent American and English literature on "rheumatism" and arthritis. *Ann. Int. Med.* 8: 1315 and 1495 1935

## DISCUSSION

THE CHAIRMAN To open the discussion I will call upon Dr. Walter Bauer who has been working on arthritis at the Massachusetts General Hospital just as Dr. Keefer has been working on arthritis at the City Hospital.

DR. WALTER BAUER Judging from past experiences in medicine, it would seem right to conclude that the cause of a disease is unknown if there exists no unanimity of opinion in the medical profession as to its cause or treatment. If one were to go on this assumption in the case of rheumatoid arthritis he would be forced to conclude that it is a disease of unknown etiology. Dr. Keefer has not used this argument, yet he has arrived at the same conclusion. He has attempted to show that no one of the present theories pertaining to the cause of this disease has been proved beyond the point of doubt. The existing theories fall short because they are not based on sound facts or adequate proof has not been presented as yet.

One of our greatest needs in the study of chronic arthritis is critical appraisal of each newly proposed etiological theory as well as intelligent interpretation and evaluation of the supposed therapeutic benefits. Failure on the part of our profession to do so in the past is in part responsible for our present meagre understanding of rheumatoid arthritis. How much better for the profession and for the patients if we would only say we do not know the cause of this disease. Such an attitude would stimulate sound thinking and call for the study and treatment of each patient as an individual case. The end result would be a more nearly correct answer to the problem.

In order to evaluate correctly the theories and treatment of chronic arthritis one must not be content with labeling each patient arthritis. He should appreciate that there are many types and should therefore attempt to classify each patient as to the type of arthritis present. If this is not done, many cases of arthritis of known origin will be included under the heading of rheumatoid arthritis. Many of these cases run a self-limited course with eventual recovery. If they are incorrectly labeled and included under rheumatoid arthritis one will unconsciously be recording certain patients as cured cases of rheumatoid arthritis who in reality had suffered from gonorrheal arthritis or some other type of arthritis of known cause.

We have long considered degenerative or hypertrophic arthritis as primarily a degenerative disease. The word, arthritis when used in this connection is in a sense a misnomer because histological examination fails to reveal any important evidence of inflammation. We prefer the term degenerative type of joint disease because the primary change is one of degeneration of articular cartilage all other changes being secondary to this primary process. This type of joint change is demonstrable in some degree in all normal individuals with increasing age. This fact is not surprising if one recalls that articular cartilage is a relatively avascular structure with a limited ability to repair. Because of this limited ability of articular cartilage to repair one finds more evidence of changes resulting from the wear and tear of daily use and increasing age than in other tissues where such limitations of repair do not exist. One can readily demonstrate by careful laboratory and clinical studies that the greater the wear and tear unusual use and repeated trauma to which a joint is subjected the earlier these changes will appear. We further believe that certain patients inherit poorer cartilage than others and in consequence develop the disease at an earlier age. For these and other reasons, we refuse to accept the various infectious, metabolic or endocrine theories proposed by certain workers. It represents a disease



of known origin which in many instances may represent nothing more than physiological aging. There may be certain accelerating factors which could conceivably injure or impair articular cartilage and thus allow for the early development of such joint changes. To date we have no proof of their existence.

I agree with almost everything that Dr. Keefer has said concerning rheumatoid arthritis. It is a chronic disease of unknown etiology, characterized by remissions and relapses. It is important to remember that such remissions may occur when least expected and may last months or years. Because of this fact, one must proceed with caution when interpreting the benefits derived from any form of therapy. It is equally as important to appreciate that a joint which has appeared clinically inactive for years will often show an active process without any evidence of healing when examined microscopically.

The joint pathology in rheumatoid arthritis is primarily one of inflammation and proliferation of the synovial membrane, all other changes being secondary. The pathological and clinical findings in these two diseases are in no way related. Therefore, there is little reason for confusing one with the other or for believing that they are both caused by the same etiological agent (unitarian theory).

If one carefully studies and follows a group of patients with rheumatoid arthritis for a long period, he finds it increasingly more difficult to obtain convincing evidence favoring either the focal infection, toxic, allergic or eclectic theory. Time will not permit presenting my reasons for making this statement.

I prefer to think of rheumatoid arthritis as a chronic infectious systemic disease of unknown origin, unrelated to focal infections. The organism responsible for the disease, its portal of entry, its length of residence in the body at any one time, the other pathological changes resulting because of its presence and many other factors are as yet unknown. There is considerable evidence in favor of its being a specific infectious disease, producing many other symptoms and signs than those referable to the skeletal system. However, time will not permit a consideration of all these points. Because of the chronicity of the disease, the persistence of systemic symptoms, the ever present evidence of infection, the proliferative joint lesions without evidence of repair, one might surmise that the responsible organism is quite different from the organisms causing the other types of infectious arthritis or any of the supposedly causative agents thus far isolated. What the organism is we do not know. Whether it is a virus or some other hitherto unrecognized organism remains for future work to disclose.

DR. HERBERT L. LOMBARD, Boston. Methods for the prevention of disease have been existent as long as the diseases themselves, according to medical history. Whether it was the propitiation of the gods, the devising of an ointment, or bowing to a taboo, there has always been some plan for disease prevention. In most cases, there was no scientific basis for the beliefs, although in the case of cinchona bark, quinine was found. Even as late as 1898 it was recommended to burn a village in Cuba to stop yellow fever, and most of us here can remember when each scale of the scarlet fever patient was considered a deadly menace. Other forms of misguided enthusiasm have resulted in various rules of hygiene. Too often physicians have urged the adoption of this or that method of living without any clear cut picture of its value. The sulphur and molasses days may have passed but who can be sure that many of the so-called principles of hygiene are properly named?

Rheumatism is the most frequently encountered

type of chronic disease. With 138,000 sick in Massachusetts, 6,000 completely disabled physically and twice that number economically, any method which could prevent this disease would be heralded by the entire profession. In order to obtain some information pointing toward the etiology of this disease, certain questions were incorporated in the chronic disease survey of 1929-1933. In this survey information was obtained from 75,000 individuals by means of house-to-house surveys. These individuals lived in fifty-one cities and towns of the State and, inasmuch as both well and sick were questioned, the information regarding the habits of living is pertinent.

No attempt was made to differentiate the various types of rheumatism and the findings are those of the disease as a whole, including hypertrophic arthritis and atrophic arthritis as well as individuals complaining of various chronic rheumatic pains. In any survey of this nature some errors are bound to occur. It is probable that some who claimed rheumatism as a disease were not so afflicted while others who maintained they were well may not have been so, but with an estimated error of not over ten per cent, the findings are of value.

The case records of all individuals were divided into two groups, those who had rheumatism and those who did not, and the habits of the two groups were studied.

Over one half of the individuals with rheumatism had had former attacks of rheumatic fever, frequent sore throats, growing pains, frequent colds, malaria, typhoid fever, diphtheria, and scarlet fever, while only slightly over one third of the well group had had these same diseases. This would point toward a greater susceptibility to rheumatism among individuals having had these diseases. In the rheumatism group 56.2 per cent were infrequent or non-users of the so-called protective foods, in the well group 41.6 per cent were non-users of protective foods. This points to a vitamin deficiency as a predisposing cause of the disease. Foci of infection were measured by poor teeth and tonsils. Here, again, the group with rheumatism had much higher rates than the well group, the rates of bad teeth being 53.8 and 32.5 per cent respectively, and bad tonsils 16.4 and 6.8 per cent.

Nervous temperament was another variable measure and an association was found between this condition and rheumatism. In the group with rheumatism lack of exercise was reported by 9.3 per cent of the patients and in the well group by 3.7 per cent. Overweight was reported by 30.0 per cent of the group with rheumatism and by 19.6 per cent of the well group. Chronic indigestion and the habitual use of laxatives were more frequent among the individuals with rheumatism than among the well, the chronic indigestion rates being 38.9 and 15.2 per cent respectively, and frequent use of laxatives being 40.5 and 21.8 per cent.

More individuals with rheumatism lived in damp houses than did well individuals. From the survey it would appear that the individual with rheumatism had had more attacks of certain acute illnesses, was an infrequent user of the protective foods, had or had had bad teeth and bad tonsils, had a nervous temperament, had insufficient exercise, was underweight, was constipated, and lived in a damp house. All this points toward better hygiene as a possible preventive of this disease.

The association of rheumatism with these variables does not prove causation. It is possible with some of the variables that the same cause which produced the variable also produced the rheumatism. For example, an hereditary influence might have made the individual susceptible to both bad tonsils

and rheumatism and the bad tonsils may not have been instrumental in causing the rheumatism. This reasoning however could not apply to non-users of protective foods, and while these figures do not prove causation, they suggest possible predisposition. With personal hygiene as a possible preventive of rheu-

matism all individuals should acquire a knowledge of the subject and put it into practice.

(Dr. John P. Peters of New Haven Conn., read his paper entitled "Some Factors in the Etiology of Bright's Disease")

## SOME FACTORS IN THE ETIOLOGY OF BRIGHT'S DISEASE\*

BY JOHN P. PETERS, M.D.†

IT is possible to recognize clearly among the congeries of conditions that find their way into the category of nephritis a certain group of cases that originate in association with diseases caused by streptococci. The clearest example of these conditions is scarlatinal nephritis. Its exact relation to the antecedent infection is not clear. It is usually stated, not quite accurately, that it occurs after the initial disease has subsided. More precisely, nephritis manifests itself in the second, third or fourth week after the onset of scarlatina. At this time toxic manifestations of the infection have ceased and there is presumably an excess of antitoxin in the blood. This is one reason for believing that the scarlatinal toxins are not responsible for the renal disorder. Another is the fact that persons who have had scarlet fever and are therefore immune to the disease may, nevertheless become infected with the scarlatinal streptococcus and develop a typical nephritis. The organisms have been identified in the throats of some such patients. Lyttle<sup>1</sup> has found that formed elements increase in the urine of most patients with scarlet fever at about the time when nephritis usually appears. This would almost suggest that the nephritis is only an exaggeration of a phenomenon which is part of the normal course of scarlet fever. Additional factors, however, appear to be required to evoke such a major explosion. There is much to indicate that one of these factors is the presence of a residual infection. By this I do not mean a recondite focus, but an active septic process of some kind. The idea that nephritis is a remote sequel of scarlet fever is not supported by the analysis of a large series of cases in our clinic. It does not usually attack those patients who have an uncomplicated convalescence, but those who have a septic complication, such as cervical adenitis, sinusitis, otitis media, bronchopneumonia, etc., from which streptococci can be recovered. A similar point of view has been expressed by Longcope.<sup>2</sup> If the infection clears rapidly, the nephritis seems to resolve completely, leaving no demonstrable residue. In a certain proportion of cases, however, it becomes chronic. In all but the most fulminating of these it runs an irreg-

ular course, punctuated by exacerbations and remissions. These again appear to be precipitated by infections (usually respiratory) of the kind generally attributed to streptococci, and during these more active phases, in Longcope's<sup>3</sup> experience and our own, pathogenic streptococci can be recovered from the nose or throat with great frequency.

All that has been said of scarlatinal nephritis holds equally well for the nephritis that follows tonsillitis. There is the same interval between the initial infection and the appearance of renal and vascular symptoms, with the latter the same evidences of residual or persistent infection are found. The pathogenesis or nature of the renal lesions and the mode of action of the infectious agents I shall not consider except to state that the nephritis is probably not due to direct infestation of the kidneys by the streptococci. Streptococci were not in Longcope's series or our own, recovered from the blood or urine of patients with simple nephritis.

The analogy between rheumatic heart disease and nephritis has long been obvious, but has, in recent years, received increasing attention. In epidemiological characteristics as in their apparent relation to streptococcal infections and their remittent or intermittent courses the two diseases are quite similar. There is much to suggest that the connection is more than analogous. Studies of autopsy material have yielded such conflicting reports that McCann<sup>4</sup> has even suggested that there may be geographical differences in the clinical character of rheumatic infections. A disease with all the characteristics of glomerulonephritis is undoubtedly encountered in the course of rheumatic fever in certain subjects. If rheumatic heart disease and nephritis are due to the streptococcus, there is no reason to believe that these streptococci are specific. Both heart disease and nephritis may occur as sequelae of scarlet fever, which may also give rise to typical arthritis. The simultaneous occurrence of the two diseases in the same subject seems altogether too frequent to be attributed to mere coincidence. Some time ago, in an analysis of the nature of infections associated with the onset of acute nephritis among 141 patients in the New Haven Hospital, ninety-two were found to have associated conditions that might have been referable to

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the streptococcus Of these ten, or 10 per cent, had outspoken arthritis In fact arthritis ranked fourth in the list of presumable etiological factors, with only scarlet fever, tonsillitis and coryza leading it Since then, possibly because more assiduous search has been made for manifestations of rheumatic fever in nephritis, the relative incidence of rheumatic nephritis has further increased Undoubtedly a plausible case could be built up for the inclusion of glomerular nephritis among the rheumatic infections It is not, however, my intention to indulge my speculative vein to this extent It may not be entirely idle to point out that the existence of a valvular endocarditis is generally accepted as *prima facie* evidence of rheumatic infection even in the absence of any history of arthritis, while nephritis which is known to result from indistinguishable infections is declared rheumatic only if it is attended by frank arthritis or valvular heart disease

Whether a true nephritis can be provoked by infections referable to organisms other than the streptococcus is a question which I shall not attempt to discuss at length, because my chief interest today is not the bacteriological aspects of etiology Certainly these other infections play a far less important or frequent rôle than streptococcal infections In the same series of cases of acute nephritis cited above, pneumonia appears as the provoking cause twelve times It may be worth noting that in no instance did nephritis develop in conjunction with a simple lobar pneumonia Always it appeared with some subsequent complication, varying from otitis media to empyema, most frequently with non-resolving or necrotizing pneumonic processes Hemolytic streptococci were recovered in this stage of the disease twice from throat cultures, once from sputum, once from empyema fluid and once from an otitis media, although some of these patients had initial pneumococcus infections Of course no conclusions can be drawn from such studies, except possibly that significance cannot be attached to sporadic cultures However, since repeated cultures were not taken in all cases the possibility cannot be excluded that streptococci might have been recovered from a larger proportion At least these nephritides cannot be ascribed unquestioningly to the pneumococcus

An attempt has been made to incriminate the streptococcus further by means of various serologic tests and immunologic reactions with results quite as suggestive and inconclusive as those which have been secured in rheumatic fever Epidemiologic and climatologic investigations have shown a rough correlation between the distribution and incidence of streptococcus infections, rheumatic fever and glomerulonephritis They have, however, been less successful in nephritis than in these other diseases,

probably because nephritis occurs less frequently and also because it lacks definition, Statistics can be of no value unless there is certainty that they deal with homogeneous data. The term nephritis is used so loosely that in ordinary parlance it has almost lost significance

At this point the specific etiology of nephritis ends, with nothing more than tenuous threads of circumstantial evidence incriminating the streptococcus or particular streptococci in a certain group of cases and with the great mass of cases entirely unexplained For try as we will, it is impossible to secure satisfactory evidence of an initial or antecedent streptococcal infection, or indeed a precipitating infection of any kind, in a large proportion of nephritic cases. Failure in this respect may derive in part from the perfunctory way in which histories are obtained The frequency with which a positive etiology can be traced is directly related to the attention paid to details in the anamnesis The latent period between infection and the renal disorder must always be kept in mind Unless the persistent septic process was severe the layman fails to recognize any connection between the renal symptoms and a respiratory infection that occurred so much earlier If the nephritis develops insidiously, as it may, the connection appears still more remote

The problem might be solved if it could be proved that the "streptococcal" forms of the disease had any especial distinctive characteristics, clinical or pathological Numerous workers have claimed that there are such distinguishing features, which have thereupon almost invariably served as a basis for a new classification of the disease, but the fallacy of these claims becomes immediately apparent when any one (or better, two) attempts to fit clinical material into the various categories

In general there is a tendency among clinicians to draw distinctions on the basis of symptom-complexes or functional disturbances in the great mass of cases in which the onset of the disease has not been observed or has been so insidious as to escape attention and to assign these conditions to categories to which some etiological significance appears to be attached Roughly, four or five large classes which appear under a variety of names are recognized in every nomenclature

- 1 *Acute nephritis* Characterized by its mode of appearance and the presence of one or more of the following symptoms edema, high blood pressure, vascular lesions convulsions, albuminuria, cylindruria, hematuria
- 2 *Nephrosis* Characterized by edema, albuminuria, low serum proteins and lipemia, without hypertension, vascular lesions or renal insufficiency

- 3 *Chronic glomerulonephritis* Characterized by hypertension and its sequelae and vascular lesions, with frank evidences of renal insufficiency
- 4 *Nephrosclerosis or Arteriosclerosis* Characterized by hypertension and its sequelae without evidences of renal insufficiency
  - a) Benign or functional, without obvious anatomical arterial changes in the early stages.
  - b) Malignant, with obvious arterial lesions in the early stages

The first three of these syndromes are usually looked upon as infectious, the last is more generally ascribed to metabolic disorders or to the degenerative changes of senescence. Some objection may be raised to the inclusion among infectious processes of the nephrotic syndrome. Whether this condition can arise, as has been suggested, as an idiopathic metabolic disorder, an indistinguishable syndrome is encountered in the course of glomerulonephritis or as the result of amyloid disease. Among adults at least outside of pregnancy, these two conditions account for the great majority of cases and should receive first consideration.

The term glomerulonephritis, or in fact nephritis, does scant justice to the disease it is intended to define and, like other misnomers in medicine, is a constant source of prejudice. It has tended to focus attention too much upon the renal lesion to the neglect of the general vascular system. Undoubtedly glomeruli are injured, but this injury appears to be part of a general vascular disorder which evinces itself especially in hypertension. Damage to the finer blood vessels can be demonstrated by simple methods only in the kidneys and the retina in the kidneys because it manifests itself in albuminuria and hematuria, in the retina because these vessels can there be visualized. Only by indirect methods and very imperfectly can injury to the general vasculature be estimated. Therefore the fact that glomerulonephritis may do its major damage to vessels outside of the kidney is not sufficiently recognized.

A young colored girl of fourteen in the summer of 1924 had a mild attack of scarlet fever. About October 9 she developed a cold and a few days later began to vomit. October 14 she complained of severe headache and abdominal pain and on the 16th was admitted to the Hartford Hospital in coma, having had several convulsions with hypertension and albuminuria. She was discharged after two months with a diagnosis of acute nephritis with hypertension and albuminuria persistent. Three months later when she was brought to the New Haven Hospital Dispensary her blood pressure was 195/110 her brachial and radial arteries seemed tense and thickened and were described as pulsating forcibly. The urine had a specific gravity of 1.009 and contained a moderate amount of albumin and occasional red blood cells. The blood non-protein nitrogen was 23 mg per cent, the phenol sulphophthalein excretion 60 per cent. Three

months later that is eight months after the original acute nephritis, albuminuria and hypertension remained. She was not seen again until April 19 1929 after an interval of three years. She looked surprisingly well her urine was entirely clear her heart of normal size. Her blood pressure by the oscillatory method was estimated as 115/70. It could not be measured by the usual techniques because no pulsations could be seen or heard in either the brachial or radial arteries. In December of the same year when she was admitted to the New Haven Hospital for a cervical lymphadenitis the blood pressure in the legs was found to be normal the renal concentrating powers proved unimpaired the blood non-protein nitrogen was 17 mg per cent and the phenol sulphophthalein excretion 85 per cent. There were minimal changes in the retinal vessels.

In this case an acute glomerulonephritis of the most typical kind, probably scarlatinal, seems to have left its most prominent marks not in the kidneys, but in the systemic vasculature, where it caused obliteration of the brachial arteries. Other cases could be cited in which a more characteristic picture of nephrosclerosis has developed in the course of a disease which appeared to originate with a streptococcal infection.

The frequency with which the picture of advanced glomerulonephritis or nephrosclerosis appears as a result of bilateral obstruction of the urinary tract with infection is too little recognized. Longcope<sup>4</sup> has recently called timely attention to this point. Our own attention was forcibly turned in the same direction by certain experiences with toxemias of pregnancy. It is now generally recognized that hydronephrosis is a natural concomitant to pregnancy in a large proportion of women, perhaps one of the ill-referable to assumption of the erect position, from which, as usual, the female is the chief sufferer. With this mechanical obstruction, for such it must probably be considered, infectious agents which may gain access to the urinary tract either from above or below, are given a peculiar opportunity to establish themselves and to work irreparable damage. It has surprised us to learn how many toxemias originate from this condition. Sometimes it may lead to a precipitate eclampsia, more often having become established as a chronic condition in one pregnancy, and perhaps aggravated by subsequent pregnancies, it gradually leads to secondary contraction of the kidneys with ultimate production of the characteristic picture of chronic glomerulonephritis or, more frequently, advanced nephrosclerosis.

CASE 37453 aged thirty-three was admitted to the hospital July 10 1925 about six weeks before term. A year and a half earlier her first pregnancy had been terminated at six months because of a severe pyelitis. After a prolonged convalescence she was pronounced cured but during the present pregnancy had been treated in another city for B. coli pyelitis. She arrived in New Haven feeling well but with slight edema of the feet July 6. On the morning of July 10 she complained of some

abdominal pain with nausea, and vomited. At 4 30 P.M. she was found in coma, breathing stertorously, at 9 30 she began a series of convulsions in which she was admitted to the hospital. She was delivered of a stillborn child by low forceps six hours later. After delivery she passed into shock in which state she died after another twenty-four hours. Her blood pressure on admission was 180/100, but fell sharply after delivery. Her temperature rose from 105 to 107.4° while she was in the hospital. Catheterized specimens of urine contained large amounts of albumin, occasional casts, many white blood cells, red blood cells and bacilli.

This is only one of a series of cases in which a typical eclamptic toxemia seemed to arise from a pyelitis in pregnancy. In this case it proved immediately fatal. In cases that survive, the disease takes on the features characteristic of the secondary contracted kidney, with hypertension and vascular phenomena usually predominating.

CASE 55527 was admitted to the hospital October 6, 1926, at the age of thirty-eight. October 5 she had been delivered at home of a 4.5 lb baby at term. One week earlier a trace of albumin had been found in her urine, but the blood pressure had been normal. October 6 at 3 P.M. she had a sudden convulsion followed by the passage of a large amount of urine, "enough to fill 3 bed pans." The blood pressure was found to be 230/160. At 7 P.M. after a second convulsion she was admitted to the hospital in a condition of shock. She recovered from this after appropriate treatment, the blood pressure rising again to over 200 mm. During a febrile convalescence, owing to dysuria, frequency of urination, pyuria and pyrexia, a diagnosis of cystitis was made. It was then learned that she had been treated for cystitis at an earlier date. She was discharged with persistent hypertension, but readmitted five months later, after a slight convulsion, still complaining of dysuria and, in addition, of headache, with a blood pressure of 220/135, nonprotein nitrogen 31 mg per cent, phenolsulphonephthalein excretion 70 per cent. Cystoscopy revealed bacilli and pus cells in the urine from the right ureter. After this she was seen at intervals, suffering from the same conditions, which steadily increased in severity until death, presumably from a cerebral vascular accident in 1933.

Such cases could be multiplied. In some, autopsies have been secured which have supported the clinical diagnosis of chronic pyelonephritis with secondarily contracted kidneys. The same sequence of events, usually without early explosive incidents, is seen when infection and obstruction occur in the absence of pregnancy in either male or female, and the onset may be so insidious as to obscure entirely the true cause of the condition.

CASE A 33549 male aged forty-one, was admitted to the hospital January 29, 1934 complaining of crampy pains in the right side of the abdomen. Five years earlier albuminuria had been discovered in the course of a life insurance examination, although he had no symptoms of any kind. Three years later, because of pain in his back and indigestion, he consulted a physician who found profuse albuminuria and a blood nonprotein nitrogen of 48 mg per cent. It was after this that he began to suffer from the abdominal cramps with increasing fre-

quency. After another year the nonprotein nitrogen had risen to 59 mg per cent and the blood pressure was found to be elevated. On admission his temperature was 101°, the blood pressure 160/98, the retinal vessels were sclerosed and the peripheral arteries thickened. The urine was of low specific gravity and contained a moderate amount of albumin, a few red blood cells and a few white blood cells. B. coli were found in catheterized specimens. The blood nonprotein nitrogen was 58 mg per cent, the phenolsulphonephthalein excretion was 25 per cent. Cystoscopy and pyelograms revealed bilateral hydronephrosis, with strictures of both ureters, more marked in the left kidney, which was almost functionless, while the function of the right kidney was greatly reduced. The blood pressure rose rapidly to malignant heights, heart failure and other sequelae of hypertension appeared, and he died about a year later. Autopsy revealed bilateral secondarily contracted pyelonephritic kidneys and general arteriosclerosis.

In this case none of the symptoms of hydronephrosis or pyelitis appeared until, judging from urinary findings and blood nonprotein nitrogen, the condition had become advanced. It is possible, however, that a diagnosis could have been made when the albuminuria was first discovered. The end-result does not differ from that seen in the cases which began with pregnancy toxemias.

Experience with cases of this kind occurring in pregnancy has engendered a certain skepticism concerning the general attitude toward toxemias of pregnancy. Pregnancy, besides obstructing the urinary tract in these cases, appears only to accelerate or exaggerate a condition that is predetermined by the conjunction of infection and hydronephrosis. Perhaps it predisposes more particularly to convulsive explosions. In other types of toxemias it is possible to detect counterparts of renal and vascular diseases which are found in the non-pregnant. The term toxemia with its unproved implications stands as a bar to the proper understanding of these conditions. If our present views should prove correct, pregnancy toxemias offer a fruitful field for the study of the etiology of nephritis and hypertensive conditions.

It seems hardly necessary to say that pyuria and bacilluria are sufficiently rare in nephritis to arouse immediate suspicion of pyelonephritis. By the time hypertension and renal insufficiency have developed, morphological abnormalities of the urine may be negligible, irreparable damage has been done and attempts to relieve obstruction are futile or dangerous. Benefit can only come from early recognition of these conditions and expulsion of the conventional cavalier attitude toward pyelitis. There is sound reason for believing that infection of the urinary passages is rapidly self-terminative unless it originates from the parenchyma of the kidneys themselves or is nurtured by improper drainage. The persistence of infection should therefore be taken as an indication of one or other of these conditions. Such an attitude

might obviate the disasters that usually result from congenital malformations of the urinary tract, and especially anomalies of the female urethra which are so frequently the cause of renal infantilism or rickets.

The main purpose of this argument, however, is not to draw any moral lessons, but merely to point out that the clinical pictures and functional disturbances which are ascribed to particular etiological agents, and especially the vascular disorders associated with renal disease may result from a variety of causes. It is not altogether strange that this should be the case. The relation of hypertension to renal injury is quite mysterious. To call it a "compensatory reaction" may be comforting to those who find relief in calling names, but to a realist such a term can have no physiological significance. Even compensatory reactions can find expression only through existing physiological mechanisms. In streptococcus infections the changes in kidneys and arteries are, so far as we can discover, only responses of these tissues to some stimulus, whether this be toxic allergic or what not. Vascular responses, as yet indistinguishable, may be provoked by certain more direct injuries to the kidneys. Hypertension, however, is not an invariable sequel of renal destruction, no matter how far or how slowly this proceeds.

A young woman with destructive lesions of the kidneys due apparently to local infection with non-hemolytic streptococci was followed for eight years after signs of severe renal insufficiency had developed. For the last year the blood nonprotein nitrogen varied constantly about 100 mg. per cent. Nevertheless her blood pressure was never elevated and there were no signs of vascular disease elsewhere in the body. Perhaps for this reason she also remained free from the distressing symptoms which usually attend this degree of renal impairment.

It has been demonstrated that hypertension is part of the syndrome that results from hyperactivity of the adrenal cortex\* or the basophilic cells of the pituitary gland\*. Autopsies on cases with tumors of these tissues have revealed renal and arterial lesions that cannot as yet be distinguished from those of nephritis or arteriosclerosis. This has led some to conclude that hypertensive states of various kinds are caused by overactivity of these glands and, with this view, new therapeutic measures such as adrenal ectomy and irradiation of the pituitary have been advocated and employed, usually without benefit. Behind many of these efforts there seems to be the idea that these hypertensive states are expressions of primary disease of these endocrine organs, whose functions are still so ill-defined. Cushing\* and Zimmerman\* have demonstrated in the hypophyses of patients who have died of renal and vascular diseases with hypertension abnormal accumulations of baso-

philic cells. It will take far more extensive studies to establish any correlation between the basophilic proliferations and these vascular disorders. But if the association is established it will still be unjustifiable to ascribe to these basophilic cells a primary role in the etiology of the hypertension. Zimmerman's series of cases, with which I am most familiar, appears to be, from a clinical standpoint, most heterogeneous. Any statement concerning the relation of basophilism to hypertension is, at this time, mere speculation. With this clearly understood it is permissible to suggest that the diffuse basophilism described in hypertensive cases by Cushing and Zimmerman may represent only the intermediary physiological mechanism through which in certain diseases or in injuries of the kidney hypertension and its accompanying phenomena are actuated. And it may well prove that basophilism is not the only mechanism by which this is effected.

The term nephritis is still applied clinically to a wide variety of conditions. In the solution of the problem of etiology careful clinical observation and description cannot be set aside because bacteriology and endocrinology have offered new methods of approach. Even if streptococci or other organisms are responsible for the production of certain cases of nephritis it will still be necessary to find criteria by which these cases may be distinguished. Such differentiation has been retarded by the tendency to look on nephritis as a disease of the kidneys rather than as a general vascular disease. Although hypertension and its associated vascular lesions can apparently arise from primary diseases of the urinary system, renal lesions can equally well result from primary vascular disease. As yet pathology and the clinic have not found in the fully developed disease pictures the marks by which the initial sequence of events can be distinguished. Perhaps the difficulty lies in the fact that distinctions have been drawn on the basis of criteria which are not directly related to primary etiological agents, but are merely secondary responses of inherent physiological mechanisms which may be activated indifferently by a variety of agents or disorders. The pathogenesis of symptoms and signs is a valid and essential concern of those who are investigating more fundamental problems of primary etiology. It is a more immediate interest of the clinician who is still compelled to rely upon symptomatic therapy. This requires above all more accurate analysis of the course of disease in those cases in which a presumptive etiological factor can be found, without the traditional preconceptions which, though so strongly fixed in all our terminologies, are strangely at variance with ascertained clinical facts and with the modern discoveries of physiology and experimental pathology.

## REFERENCES

- 1 Lyttle J. D. Addis sediment count in scarlet fever. *J Clin Investigation* 12: 95 1933
- 2 Longcope W. T. Pathogenesis of glomerular nephritis. *Bull Johns Hopkins Hosp* 45: 335 1929
- 3 McCann W. S. Bright's disease: review of recent literature. *Arch Int. Med.* 55: 512 1935
- 4 Longcope W. T. and Winkenwerder W. L. Clinical features of contracted kidney due to pyelonephritis. *Bull Johns Hopkins Hosp* 53: 255 1933
- 5 Walters W. Wilder R. M. and Kepler, E. J. Suprarenal cortical syndrome with presentation of 10 cases. *Ann. Surg* 100: 670 1934
- 6 Cushing H. Basophil adenomas of pituitary body and their clinical manifestations (pituitary basophilism). *Bull Johns Hopkins Hosp* 50: 137 1932
- 7 Cushing H. Hyperactivation of neurohypophysis as pathological basis of eclampsia and other hypertensive states. *Am J Path* 10: 145 1934
- 8 Zimmerman H. M. Personal communication

## DISCUSSION

DR SOMA WEISS This presentation of Dr Peters' is of special interest because it deals with a new phase of knowledge of Bright's disease. Investigations of the past three decades have been busily engaged in classifications and in analysis of symptoms, signs and kidney function related to Bright's disease. Some of the most significant results of these activities consist in the separation of functional and structural renal changes of a primary inflammatory origin, on the one hand, and those due to primary degenerative vascular lesions, on the other hand. Among the vascular changes, those associated with arterial hypertension have become better understood. It is now established that primary arterial hypertension, regardless of its etiology, frequently results in progressive impairment of kidney structure and function, and contrariwise different types of primary lesions of the kidney and of the urinary tract lead to a secondary diffuse vascular response with arterial hypertension. Today, as was pointed out by Dr Peters, we recognize that the active lesions of glomerulonephritis do not require the presence of infection in the kidneys or other parts of the body. The tissue reactions in glomerulonephritis represent, apparently, an intrinsic response of the body frequently, but not always, set in action by an infection. The progressive changes in the kidney often proceed independently of the causative infection and may advance after eradication of the foci of infection. Indeed, examples are not lacking indicating that in the causation of inflammatory reactions of the kidney, infection is but one of the trigger mechanisms. Thus a closer study of the kidneys in the "malignant phase" of hypertension, so-called, reveals that inflammatory changes leading at times to acute necrosis may result from acute local anoxemia of renal vascular origin.

Today we have also a better understanding of the relation of congenital and acquired obstructive lesions of the urinary tract to the development of pyuria and pyelitis, so-called. The appreciation of the frequency and importance of these transient local renal infections in the precipitation of pyelonephritis and focal nephritis represents also a definite and significant advance. It is of special interest, and bears on the better understanding of the clinical course of a group of patients, that the inflammatory and vascular response of the kidneys to local infections may proceed long after the absence of bacteria, and the healing of the active local infection.

The relationship between pregnancy and kidney and vascular diseases, although far from being settled, is becoming better understood. As Dr Peters has implied in the light of present knowledge the term toxemia of pregnancy is rapidly becoming a misnomer, hindering the advancement of knowledge and the use of this term is comparable to

the incorrect use of psychosis of pregnancy, as a condition sui generis.

Pregnancy is apt to precipitate pyelitis and pyelonephritis, and may accentuate the vascular, renal and cerebral manifestations of a latent glomerulonephritis, or a primary hypertension and nephrosclerosis. The detailed mechanism responsible for such effects of pregnancy is by no means clear, but some of the operative factors are known. Thus it is established that mechanical pressure by the pregnant uterus on the ureters leads to stagnation of urine and to pyuria and pyelonephritis. Similarly, pressure on the renal veins in certain forms frustes lesions of the kidney is perhaps a factor in the precipitation of renal disturbances and arterial hypertension. Pressure on the splanchnic vascular system in pregnancy may be an active factor in the elevation of arterial pressure by interfering with one of the most important vasoregulatory mechanisms. In addition to these mechanical factors, changes in internal secretion, in metabolism and in immunological reaction of the body in pregnancy may bear on the apparently altered reactivity of the central nervous system to cardiovascular renal changes.

Now the appreciation of these recent contributions will be of great aid in the understanding of the clinical pictures as presented by the patient. One of the weighty arguments often used against the validity of the subclassifications of Bright's disease is the fact that many, if not the majority of cases, do not fall clearly in one or the other groups. It may be worth while to point out, on the other hand, that classifications in biological sciences simply imply the definition and description of existing principles. Classification does not rule out, on the contrary, it often implies the existence of a combination of clinical or morphological principles. It is essential to emphasize that a combination of the types of kidney changes described in various classifications is common. Thus if glomerulonephritis or pyelonephritis precipitates arterial hypertension, the effect of the latter on kidney structure and function will become important. Depending on the duration and severity of each of the two conditions, clinical and histological manifestations of one or the other condition will be predominant. Cases such as those described by Dr Peters, which start as pyelonephritis with hypertension, are also not rare, the pyelonephritis may then completely heal but the hypertension persists, and the ultimate predominant renal disturbance may be an advanced nephrosclerosis with evidence of old healed pyelonephritis.

If we remember, therefore, some of the points discussed by Dr Peters, it is to be expected that the clinical and laboratory findings, as well as the histological picture in Bright's disease, will show great variation from patient to patient, even in those with the same type of renal disease. The present tendency toward simplification by clinician and pathologist is often at the expense of the exact truth. On the other hand, on the basis of a good anamnesis and a careful study of the patient it is often possible to elicit the combination of factors active.

In spite of the pessimism of many, we have traveled a long distance since the time of Bright. By defining not only what we know but also what we do not know, as has been done here by Dr Peters, the way is paved for future progress for the foundation of new knowledge often depends on the crystallization of our ignorance.

I am certain that I express the sentiment of this gathering when I say we are greatly indebted to Dr Peters for his interesting and valuable discussion.

Dr. JAMES P. O'HARE, Boston. Dr. Peters in the paper he just read has hit on several deficiencies in our knowledge of the etiology of this disorder we have come to call Bright's disease. The particular etiologic factors that he mentioned pyelonephritis and basophilic, numerically represent a rather small portion of the commonly accepted causes of the various forms of Bright's disease. His group of these is very much larger than is usually found in the literature. In our patients at the Brigham Hospital we have had but one case of rheumatic fever as the probable cause of the acute nephritis. With more careful histories we would no doubt find a larger number. The importance of Dr. Peters expressed facts lies not so much in these particular causes as in this, that he has exposed many fundamental weaknesses in our knowledge of the etiology of nephritis and has gone on farther to show us ways by which we can remedy those weaknesses.

To me the most important part of his message is the statement repeatedly made that nephritis is not a disease solely of the kidney. Bright's disease in any of its various forms is never a disease of the kidney alone. Once we get away from that idea, the better we will treat our patients. Let me call your attention to the importance of these extrarenal factors. In chronic glomerulonephritis practically one-third of our patients do not die from their renal disease, but from extrarenal factors before the kidneys become insufficient. In the larger group of chronic vascular nephritides two-thirds die from

cardiac disease or something outside the kidneys.

It is pertinent to repeat here the words of Woodruff. Some years ago he told us that in nephritis albumen occurred in the gallbladder as well as in the urine and if it were as easy to examine the secretion of the gallbladder as it is to test the urine we might be calling nephritis by some other name.

Dr. PETERS. Dr. O'Hare seems to have misunderstood my statement concerning the frequency of rheumatism in nephritis. It occurred in 10 per cent of these cases which were associated with streptococcus infections, not in 10 per cent of the cases of nephritis. In this connection I might add that we have been struck also by the frequency with which rheumatism occurs in conjunction with toxemias of pregnancy. One case seems especially significant. A patient admitted to the hospital in coma died about twenty-four hours later. She had albuminuria and hypertension. But because she was known to have had chorea before her terminal illness she received a diagnosis of chorea not toxemia.

THE CHAIRMAN. I am sure we are all grateful to Dr. Peters for coming up here and giving us such an excellent and instructive paper.

(Dr. Howard B. Sprague of Boston read his paper entitled "The Etiology of Degenerative Vascular Disease.")

## THE ETIOLOGY OF DEGENERATIVE VASCULAR DISEASE\*

BY HOWARD B. SPRAGUE, M.D.†

THE study of chronic disease in man must inevitably be difficult. By definition its development takes place over a long period of time and it is not until the anatomical changes have become largely irreversible, and profound enough to cause symptoms that it is possible to know of their presence. Especially is this true of degenerative vascular disease when it attacks the most important organs of the body, heart, brain, or kidney. No one investigator can expect to live long enough himself to observe the development of vascular disease in any considerable number of individuals. Again the location of blood vessels developing from mesodermal anlagen makes them difficult of access. The main channels of the vascular system, with the exception of those in the retina, are deep in the body, lying in the brain in the abdominal and thoracic cavities or in the muscular and supporting structures, and are not available for such easy study as are structures of ectodermal or endodermal origin.

The student, therefore, is forced to draw conclusions about the natural history of chronic blood vessel disease by observing the condition of the vessels in a cross section of human subjects of all ages by studying vessels which normally undergo rapid regressive changes such as

those of the placenta and ovarian follicles, or by an attempt to accelerate vascular degeneration in experimental animals. In the latter attempt he may be forced into incorrect deductions by the artificial conditions of the experiment. For example, Klotz (1908) was able to produce hypertension in the thoracic aorta with degenerative changes in rabbits by hanging them up by their hind feet but rabbits do not normally emulate monkeys by hanging in this fashion and certainly not for the prolonged periods of this experiment—three minutes a day for 130 days.

Another obvious difficulty has been the complexity of the pathology of the arterial and arteriolar tree. In spite of the possible difference of mechanism in the pathogenesis of medial and intimal lesions it has been so far impossible to divide them satisfactorily and it still remains most practical to group them under the heading of arteriosclerosis. The main types as Long<sup>1</sup> suggests, may be recognized as arteriolar sclerosis related to hypertension reparative thickenings following toxic and infectious injury and the senile changes of age. In other classifications the reactions of small arteries and arterioles are separated from those of the large arteries, but as Ophüls<sup>2</sup> says this merely makes the distinction between nodular and diffuse sclerosis. It seems at present beyond our power to differentiate clearly intimal and medial processes or to subdivide significantly hyaline,

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fatty, fibrous, and calcific changes from each other. The key apparently lies, as Wells<sup>3</sup> suggests, in the mechanism of the aging of coloids and the behavior of elastic tissue.

It is obviously impossible to discuss in twenty minutes the causes of such a large and variable group of chronic progressive changes in blood vessels as those which come under the general heading of arteriosclerosis, but one can indicate the main lines of thought of the past and the present. This has recently been done in the survey of the Josiah Macy, Jr. Foundation in a book of over six hundred pages<sup>1</sup>. To mention the factors held at different times to be responsible for degenerative vascular disease is to catalogue almost all of the environmental influences to which the human race and its lower ancestors have been exposed. In the main, however, we may divide them into groups, and consider vascular disease as having been thought to be due to the following: (1) material voluntarily ingested food and accessory food factors, drink and drugs, or the products of the combustion of tobacco or similar plants, (2) material involuntarily ingested, inhaled, or acquired parenterally bacteria, viruses and their products, poisons (such as lead or noxious gases), (3) toxic products endogenously elaborated in the body such as occur in metabolic disorders like diabetes, gout, and renal disease, (4) general strain on the vascular tree from hypertension or excessive bodily activity, or local strain on special vessels from their anatomical situation or structural peculiarities as in the pulmonary or coronary circulation, (5) an acceleration or exaggeration of the changes normally occurring in old age, chiefly dehydration, loss of muscle cells, elastic tissue and power of regeneration, the deposit of lipoids and calcium salts in the cells and the changes in the colloid state of the tissues, based on an inherited somatic inferiority of the vascular system peculiar to the individual, his family or his race (this view was upheld vigorously by Warthin), (6) endocrine influences through hypoadrenalism, hyperadrenalism or dysfunction, (7) the influence of psychic factors, worry, economic struggle, emotional strain, and the speed of modern life, upon vascular irritability, (8) climatic factors.

One sees in the alternate rise and fall of these various theories of the cause of degenerative vascular disease an, as yet, unavailing attempt to discover, as Cohn<sup>4</sup> says, "to which category arteriosclerosis belongs—to remediable occurrences, or to the inevitabilities." Only great optimism can, at the present time, lead to a belief that arteriosclerosis can be deferred or prevented by any change in human environment. For every theory of etiology instances can be adduced for disproof and for every mechanism an uncontrolled variable in the experiment appears, yet certain factors grow more

insistent as investigation proceeds. A few may be mentioned.

(1) One of the most direct and repeated contacts that an organism has with its environment is through its food, and it is difficult to eliminate this factor from any alteration of the human body. As the Germans say "Mann ist was er isst"—man consists of what he eats. When a substance appears so commonly in a diseased artery as does cholesterol it seems obvious that there is some error in the utilization, or elimination, of cholesterol from the food or from the body stores, or some local cause for its deposition in the vessel wall. And in any discussion of experimental atherosclerosis the work of Ssolowjew and Amitschkow in Russia, Versé in Germany, and other investigators, with the production of atherosclerosis in rabbits by high cholesterol feeding must be given a major place. This work has been continued in Boston by Leary whose demonstration of coronary atherosclerosis and occlusion in rabbits has been dramatic. Objections have been raised to this work on the basis of the very large amounts of cholesterol administered, the fact that atherosclerosis is not a normal reaction of rabbits, and that the conditions are, therefore, highly artificial. In spite of these objections we cannot escape the fact that this demonstration is a most significant step in that atherosclerosis has actually been produced for our further study and in its production has shown some analogy with the arterial degeneration so strikingly frequent in diabetes in which disturbed cholesterol metabolism is a factor. Why it attacks specific areas of the vascular tree is yet to be determined.

So far as other foods than those containing cholesterol are concerned it becomes constantly less obvious that any can be convicted of causing vascular degeneration except the very high calcium diets in experimental animals. High protein diets are no longer attacked except by the red meat fearers and Katase<sup>5</sup> has removed some of the misconceptions about acid-forming diets in showing that such diets when fed to rabbits produce tall slender animals while alkali-forming diets develop broad muscular animals. He called attention to the fact that in man the latter type are more prone to arteriosclerosis. Vitamine deficiency, especially that of vitamine C, may play a part in vascular disease and arteriosclerotics are said, by Weiss and Minot<sup>6</sup>, to feel better when fed a diet rich in complete proteins, vitamins and fruit. Total food intake is another problem. McCay and Crowell<sup>7</sup> have recently shown that rats fed a balanced diet so low in calories as to retard growth and maturity have a measurably longer life than those on so-called optimal diets, which brings up the question of whether the nutritionist's ideal of high calorie diets causing rapid growth in childhood may not influence the susceptibility of the individual to degenerative disease in adult life.

(2) Tobacco has been a popular miscreant in the causation of vascular disease. This much can be said, that the modern work with skin temperature measurements by thermocouple has shown that smoking produces a rapid and measurable drop in skin temperature due to vasoconstriction. That this is harmful is not proved but peripheral vasoconstriction may be the primary mechanism of essential hypertension and it would also be undesirable in the coronary circuit. Like many of man's activities tobacco smoking is probably well tolerated by most of us but definitely harmful to some.

(3) Alcohol has lost much of the odium attached to it as a poison responsible for arterial destruction and there is even a tendency for opinion to swing to the opposite pole and attribute relative freedom from arteriosclerosis to the ingestion of alcohol. This belief may be partly wishful thinking but, Leary<sup>8</sup> has noted "the frequent absence of 'nodular' arteriosclerosis of the aorta among individuals who chronically drink alcohol." It seems fair to say that alcohol, of itself, does not produce arteriosclerosis but that excesses in other directions, as in overeating, may be promoted by the lack of judgment at times induced by alcohol.

(4) With regard to the influence of hypertension on vascular integrity we are still uncertain as to cause and effect. Experimentally hypertension from adrenalin produces arterial calcification in rabbits. However it has been quite well established that the fault in the system productive of high blood pressure in man is in the arterioles, the total caliber of which is reduced. The work of Weiss and his associates is showing that the vessel change is present very early but whether due first to vasoconstriction or intimal thickening has not yet been demonstrated. The reverse seems to be true when we study the effects on blood vessels due to increased local pressure or strain upon the walls. In the coronaries the position of the arteries, with their branches acting as fixed points in the muscle, leads to torsion and angulation which are considered elements in their degeneration and perhaps as determining the local for deposits of cholesterolesters and other constituents of atheroma. In a similar fashion the effect of strain from hard work can be seen in the high degree of medial sclerosis and calcification seen in the arm and leg arteries of laborers and in Marchand's<sup>9</sup> observation (cited by Bell) of a man of thirty five years who had poliomyelitis in childhood and showed marked calcification in the femoral artery of the normal leg but none in the artery of the paralyzed leg.

In the pulmonary circuit one is impressed with the frequent sclerosis secondary to increased blood pressure. Mitral stenosis with its

resulting pulmonic hypertension very often leads to vascular degenerations limited to the lesser circulation. We may be justified therefore in saying that essential hypertension derives from general arteriolar sclerosis whereas special examples exist which show that degenerative changes occur in larger arteries from localized increase in vascular tension.

(5) An appealing analogy between the normal atrophy of disuse of various organs and the processes of old age in the whole body was drawn by A. S. Warthin<sup>10</sup> in 1929. According to him structures which are no longer of use to the individual such as the ductus arteriosus at birth, the placenta at term, and the ovary at the menopause undergo precisely the same regressive changes as does the whole body when it has lived its biological limit and fulfilled its function. Pathological or premature death from vascular disease or other degenerative process is, in his view, a matter of inferior germ plasma and like death from cancer is to be prevented only by a slow elimination of such germ plasma from the race by selective breeding.

(6) Much has been said in recent years about the influence of the acceleration of our present life and the strains of competitive existence in the production of disease of blood vessels especially of the coronaries. Critical analysis of the statistics as undertaken by Cohn and Lugg<sup>11</sup> casts considerable doubt upon the existence of any marked increase in vascular disease. Many other factors enter into the interpretation of figures of mortality from heart disease, such as accuracy of diagnosis, fashions in diagnosis and the decrease of infectious disease not only in youth but in the decades in which a rise in circulatory disease has taken place. Biological death, it must be remembered, is essentially vascular death and the more of us that live to attain this major involuntary period, the more of us will succumb to vascular pathology.

As regards the effect of the nervous competitive life in the production of arteriosclerosis a paradoxical situation might be mentioned. It has been shown that the African Negro in a state of nature is quite free from hypertension and arterial disease but on exposure to white civilization proceeds to become a victim to them. Hypertensive heart disease is the most frequent cardiac disease of the American Negro. If it is true that nervous strain is the cause of this, how can one explain on the same basis the freedom of the American Negro from angina pectoris, popularly attributed to nervous tension of modern life?

(7) Finally, it may be asked why arteriosclerosis in youth and middle age is so predominantly a male disease. We have recently analyzed the histories of twenty five patients, forty years of age or younger who had coronary

thrombosis Every one was a male No plausible theory seems obvious for this sex linkedness especially as more and more the lives of young men and young women are becoming similar in physical and emotional activity, work, play, and normal vices The answer to this question may lie in endocrine factors as yet undiscovered

#### SUMMARY

The cause of degenerative vascular disease is unknown but the boundaries of the problem are being progressively narrowed by the study of experimental arteriosclerosis, of chemical analysis of vessels, of the properties of colloidal gels, and of human biology No theory of etiology is wholly satisfactory to explain premature death from disease of blood vessels Acceleration of the normal changes of age seems to be inherent in certain familial or racial groups and can only be abolished by a wide, and probably impossible, application of human genetics However, enough evidence exists to make it probable that there are controllable factors of environment which, in some cases, can be altered in such ways as to delay the process of aging or change its manifestations

#### REFERENCES

- 1 Cowdry Edmund V Arteriosclerosis A Survey of the Problem New York The Macmillan Co 1933 Chap 1 Esmond R Long p 50
- 2 Ibid Chap 9 William Ophüls p 267
- 3 Ibid Chap 11 H. Gideon Wells
- 4 Ibid Chap 21 Alfred E Cohn p 579
- 5 Katase A Der Einfluss der Ernährung auf die Konstitution des Organismus Ergebnisse experimentell-biologischer Forschungen. Berlin, 1931.
- 6 See reference 1 Chap 8 Soma Weiss and George R. Minot
- 7 McCay C M. and Crowell M F Scientific Monthly 39: 405 (Nov) 1934
- 8 Leary T Therapeutic value of alcohol New Eng J Med 205: 231 1931
- 9 See reference 1 Chap 17 E R. Bell p 485
- 10 Warthin A S Old Age—The Major Involution. The Physiology and Pathology of the Aging Process. New York Paul B Hoeber Inc. 1929
- 11 Cohn A E and Lingg C Heart disease from point of view of public health—1933 Am Heart J 9: 283 1934

#### DISCUSSION

DR HENRY A CHRISTIAN Dr Sprague has presented to us a very excellent résumé of present-day knowledge of the etiology of degenerative vascular disease However, this must be sized up as a confession of ignorance, not on the part of Sprague but of medical science After account is taken of all past investigation we must confess that we know almost nothing definite as to the real cause of degenerative vascular disease

From time to time various causes have been assumed and, based on these assumptions, methods of prevention and of treatment have been applied Viewed with a critical mind it must be admitted that all of these methods have failed both in prevention and in cure Medical men have tried low protein diets salt free diets, alkaline ash diets, vitamin rich diets, cholesterol poor or fat poor diets, purin low diets, vegetable diets, fruit diets, semi starvation diets, sweats, purges, bleeding, heat and electrical currents, nitrites, nitrates, iodides, cyanates, liver extracts, these and more One by one all have been admitted by the most thoughtful clinicians to fail in their intent The lesson for the clinician from all of this is, be slow to accept and use therapeutic procedures as efficacious in the prevention or treatment of degenerative vascular disease and particularly be

slow when said method brings discomfort and debility to your patients We are justified today only in advising moderation in all aspects of life and in treating symptomatically, as best we can, disturbances as they appear in patients with degenerative vascular disease

In all the welter of ideas as to causes of degenerative vascular disease three things stand out prominently

1 Degenerative vascular disease most often is a manifestation of the aging process, the real why and wherefore we know not The quest of the fountain of youth still baffles Some individuals age prematurely as if they had been endowed with subnormal structures and particularly subnormal vascular systems Preventive and curative medicine alike are helpless when confronted with the problem of what to do with the aging process After all it is but physiological to grow old The late Charles Sedgwick Minot pointed out that senility began in embryo, meaning thereby that development of the normal fetus involved the degeneration of certain structures and throughout life such degenerations continued.

2 Heredity plays an important part in predetermining early degenerative vascular lesions Steadily we are spreading and deepening our knowledge of what determines heredity Human eugenics still remains the fanciful dream rather than the practical possibility of the lore of heredity Like the weather we can talk about its importance but we, as practical physicians, cannot do anything to influence it

3 Hypertension is associated with degenerative vascular disease in a large proportion of our patients Still we do not know the cause of hypertension We are ignorant whether at first it results primarily from peripheral vascular constriction of nervous origin or is due to primary disease of the arterioles We are not sure whether the degenerative lesions that appear in larger arteries in the train of hypertension result merely from the continued strain of high blood pressure or are due to whatever causes hypertension acting in turn first on arterioles and later on arteries Histological study of the arterioles in the high pressure regions of the body in patients with coarctation of the aorta in contrast to the study of similar vessels in low pressure areas in the same patient revealed no differences in structure, which is some argument against high pressure alone being an important primary causative factor in the vascular lesions of hypertension Certain it is that today we can accomplish very little in the treatment of hypertension so far as the primary condition is concerned

Notwithstanding our present manifest ignorance about the causes, prevention and treatment of degenerative vascular disease, we need not be entirely pessimistic as to future progress More undoubtedly can be learned of degenerative vascular disease It is probable that some remedial cause may be found and better therapeutic effects be obtained Essential vascular hypertension seems to me to be the type of degenerative vascular disease most likely to be clarified by further investigation and from such newer knowledge may come definite improvement in ways of prevention and methods of treatment.

DR R S PALMER Widespread vascular changes, especially in the minute blood vessels, associated with hypertension, have interested me especially It appears that hypertension hastens the aging of the vascular tree The final step in the mechanism of hypertension and indeed of the maintenance of normal blood pressure is the tone of these minute blood vessels The normal postural vascular tonus is a reflex, the afferent impulses of which come from all parts of the body, both peripheral sensory,

and visceral afferent and meet the efferent side of the reflex arc in the hypothalamus, the efferent impulses going to the minute vessels by way of sympathetic fibers. The questions are Why the unusual tonus of this reflex in hypertensives? Can the condition be controlled by interrupting this reflex arc by surgery on the sympathetic system? Or finally as I believe may not the solution lie in the higher centers, thalamic or cortical representations of the sympathetic nervous system? The problem may be one of conditioning of the so-called total response. The questions are easier to ask than to answer. Nevertheless attempts are being made in different places. At the Massachusetts General Hospital we have convinced ourselves that denervation of adrenals, adrenal resection, splanchnic nerve resection, x-ray of adrenals and pituitary are in fact

tive. We believe from our experience and that of others that extensive sympathetic resection or possibly anterior root section in certain selected relatively advanced cases may prove effective in staying the course of this disease.

In some cases we find psychogenic factors importantly related to sharp rises in the blood pressure and in a few of these simple psychotherapy has been a fairly successful therapeutic measure in a number of advanced cases symptomatic improvement has been very gratifying but with no marked change in the blood pressure.

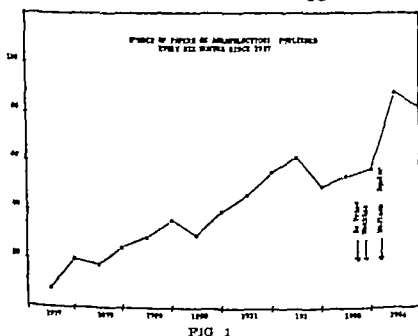
(Dr Francis T Hunter read his paper entitled *Drug or Protein Allergy as a Cause of Agranulocytosis and Certain Types of Purpura*\*)

## DRUG OR PROTEIN ALLERGY AS A CAUSE OF AGRANULOCYTOSIS AND CERTAIN TYPES OF PURPURA\*

BY FRANCIS T HUNTER, M.D.†

### INTRODUCTION

AGranulocytosis or agranulocytic angina was first described by Schultz<sup>1</sup> in 1922. Since 1927 there has been marked increase of interest in the condition, as is shown by the curve of the number of papers published in each six months' period during these eight years (fig 1). Since the first suggestion that



amidopyrine might be a causative factor this interest in the syndrome has become even keener. To De Vries<sup>2</sup> must go the credit of making the first observation in this respect. In September 1933, he reported a case of agranulocytosis with many recurrences. Five different attacks occurred, each time promptly after the ingestion of certain sedative drugs, most of which contained amidopyrine. One month later Madison and Squier<sup>3</sup> read a paper on the same subject at Chicago, and in November a group of cases was published by Watkins<sup>4</sup> of

the Mayo Clinic. The latter therefore, was the first in this country to call attention to the etiological importance of this class of drugs, as Madison and Squier's complete paper did not appear in print until March, 1934.<sup>4</sup> From September 1933 to January 1935, twenty-nine different papers on amidopyrine as a cause of agranulocytosis have been published.

The objects of this communication are to survey the world literature in respect to etiology, to outline the arguments for an allergic mechanism and those for the syndrome's being a manifestation of primary physiological liver injury, to collect the reported cases of agranulocytosis ascribed to amidopyrine to other drugs, and to other substances which seem to produce the same clinical picture, to inspect all cases to see if mention of allergy or of liver damage can be elicited from the case reports themselves, and to investigate what relationship, if any, drug and protein agranulocytosis bears to leukopenia associated with purpura and to leukopenia associated with purpura and anemia.

As far as can be learned, allergy as a cause of the condition was first suggested by Pepper<sup>5</sup> in 1931. He noted allergy in the history of many of his patients and pointed out the relationship of leukopenia to Widal's hemoclastic liver function test. In the past few years several other authors have also suggested allergy as a cause, but without producing any clear-cut evidence to substantiate such a hypothesis. More recently there has been a growing suspicion among some investigators and clinicians that agranulocytosis and allied blood dyscrasias, following the ingestion of certain coal tar derivatives or the injection of protein or of drugs belonging to the arsphenamine group, may be manifestations of an acute liver injury. There is only scattered indirect evidence in support of these hypotheses but the arguments

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which have been advanced for each are as follows

#### ARGUMENTS FOR ALLERGY

(1) There has not been found any constantly present organism to account for agranulocytosis, the blood-stream infection being in all probability, a terminal event. Harris and Schattenberg<sup>3</sup> claim to have demonstrated in guinea pigs the blood picture found in human cases by means of prepared toxins of *B. enteritidis* and *Streptococcus hemolyticus*. *Staphylococcus aureus* from a fatal human case brought about depression of the total leucocytes and neutropenia in guinea pigs, but failed to do so in rabbits. Fried and Dameshek<sup>4</sup> claim to have produced agranulocytosis in rabbits by intravenous injections of *Salmonella supestifer*. Kracke<sup>5</sup>, however, points out that temporary neutropenia results from the intravenous injection of a wide variety of substances, such as milk, nonspecific proteins, dead and living bacteria and various types of inert, finely divided material. Similar experimentation has been pursued by Ricci<sup>7</sup>, who inoculated rats with living cultures of *Salmonella supestifer* and *B. pyocyaneus* and obtained varying degrees of leukopenia and agranulocytosis. His animals developed abscesses in the liver. Dennis<sup>8</sup> placed cultures of *Staphylococcus aureus*, *Streptococcus hemolyticus*, *Streptococcus viridans* and *Proteus septicus* in parchment capsules, inserted these capsules in the abdominal cavity of rabbits and observed what he thought was agranulocytosis. A critical examination of his work leaves much to be desired. Most of the rabbits showed no drop but rather a rise in the total number of leucocytes, but some did show moderate to marked decrease of the polymuclear percentage. This was repeated by Meyer and Thewlis<sup>9</sup> who were unable to confirm the work of Dennis with pyogenic bacteria. With *B. pyocyaneus*, however, they produced acute leukopenia in rabbits with death in forty hours, without decrease in the number of polymuclear cells. From this it would seem that the blood-stream infection is not the primary cause of agranulocytosis and that injection of the various organisms obtained from human cases has not satisfactorily reproduced the picture in animals.

(2) The observation that the "benzamine drugs"<sup>10</sup> (amidopyrine, etc.) and the drugs containing metals (arsphenamine, the gold compounds, etc.) do not produce the syndrome except in certain individuals has been constantly made. This is so obviously true that it hardly needs comment. If it were not true, everyone who took a sufficient amount of these compounds would develop agranulocytosis. This manifes-

tation, then, is not a true drug poisoning, but an injury, possibly allergic-like, occurring only in certain predisposed individuals.

(3) The frequently observed sudden onset of agranulocytosis with chills, rigors and fever is similar to that which follows foreign protein injection. This is a phenomenon too well known to deserve prolonged discussion. The not uncommon occurrence of the same train of symptoms following blood transfusion is, in all probability, due to the transfer of minute amounts of foreign protein contained in the donor's serum. These symptoms are at times accompanied by leukopenia, and the whole disturbance may be markedly diminished in frequency, as Price<sup>11</sup> has shown, by insisting upon fasting blood donors. It must be pointed out, in all fairness, that a similar abrupt onset occurs in many acute infections due to specific organisms, for example, lobar pneumonia. Some investigators have even suggested that this, too, is a manifestation of allergy, but the matter is possibly still open to question. The most one can say is that the violent onset of agranulocytosis and of certain specific infections is suggestive of, but has not been proved to be, an allergic mechanism.

(4) Neutropenia similar to agranulocytosis is seen constantly in acute allergic shock in animals, and has also been observed in serum sickness in human beings. Because many authors, particularly those investigating problems of allergy, have noted this, it may be regarded as an established fact. Of the arguments in favor of the allergic nature of agranulocytosis this one seems to be of great significance.

(5) In a number of cases in which the agranulocytic syndrome occurred following the ingestion of certain drugs, after the patient was well, the signs and symptoms recurred upon ingestion of the same or similar drugs. This has been demonstrated for amidopyrine by Benjamin and Biederman<sup>12</sup>, Corelli<sup>13</sup>, Costen<sup>14</sup>, De Vries<sup>15</sup>, Johnson<sup>16</sup>, Madison and Squier<sup>17</sup> (two cases), Grant<sup>12</sup>, Rawles<sup>18</sup>, Squier and Madison<sup>12</sup> (two cases), Zinberg et al.<sup>19</sup>, and Plum<sup>13</sup>. The last mentioned investigator administered 0.2 grams of amidopyrine by mouth to the patient reported by Knudsen<sup>20</sup>, after the patient had fully recovered from the first attack. Total leucocyte and differential counts were made every half hour the first day, every hour the second day, four times on the third day and three times on the fourth day, and from then on once a day. All counts were doubly checked and the differential count was made on 400 cells. The patient, shortly after ingestion of the drug, developed chills and rigors, and a temperature of 40.1° C. The temperature returned to normal on the following day, but when it was at its highest point there was a positive

\*Substances containing a benzol ring with an attached amine ( $\text{NH}_2$ ). A comparative analysis of the chemical structure of this class of compounds has been made by Herz<sup>21</sup>.

urobilin reaction in the urine. The agranulocytosis in this experiment was not complete, but the immediate drop in the total number of leucocytes and the relative fall in the polymorph cell percentage was so striking that there seems to be no doubt of the causal relationship between the phenomenon seen in the blood and the ingestion of the drug (fig 2). The author

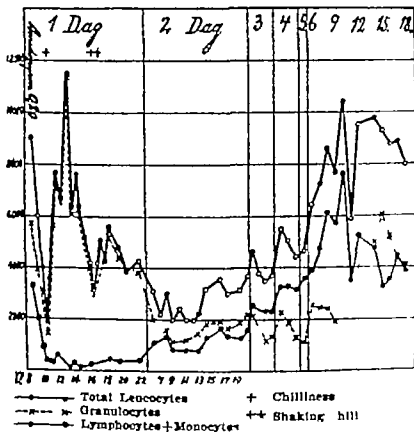


FIG. 2. Effect on white blood cells of Amidopyrine (0.1 Gm.) in a patient who had recovered from agranulocytosis due to amidopyrine (Plum).

makes the comment that on the tenth day, when the monocytes and lymphocytes outnumbered the polymorph cells, the blood smear showed an appearance similar to that seen in infectious mononucleosis. A case of agranulocytosis occurring after the ingestion of amidopyrine and injections of vaccine has been reported by Andersen<sup>102</sup>. He noted a neutropenia in his patient on two later occasions, each instance occurring after the use of amidopyrine without vaccine. In the first recurrence twenty-five tablets of the drug were taken over a period of six weeks and in the second, twenty-five tablets over a period of sixteen days. It would appear that in this case the vaccine played no part in the causation of the first attack since amidopyrine alone produced the second and third.

The long lapse of time frequently seen between the commencement of drug ingestion and the onset of symptoms might raise doubts as to the etiological importance of amidopyrine, but it must be remarked that similar conditions may be seen in generally admitted cases of arsenphenamine "poisoning". The latter, however, is widely thought to be due to an idiosyncrasy to the drug, or in other words, drug allergy; therefore, in view of the careful observations of

Plum, and the scattered reports in the literature of recurrence of agranulocytosis after ingestion of amidopyrine, the only possible explanation of these findings is that of drug allergy.

(6) It has not been demonstrated that drugs of the aliphatic series (straight chain carbon compounds containing no benzol rings) can produce clinical agranulocytosis. A special report of the Council on Pharmacy and Chemistry of the American Medical Association<sup>14</sup>, June 1934, stated that up to that time no definite case of agranulocytosis had been reported in which barbitol alone (a straight chain compound) was responsible. There are no cases in the literature from the Council's report until January 1935 which deny this statement, and since straight chain carbon proteins, such as gelatine do not produce allergy when injected into animals, these facts may be regarded as further evidence that the mechanism of agranulocytosis, from either drugs or protein, is in all probability an allergic one.

(7) There seems to be a close relationship between certain of the blood dyscrasias due to drugs. Varying in degree of severity from slight leukopenia to aplastic anemia they appear at first sight to be different clinical syndromes. But, that the same drug may produce purpura in one individual, in another agranulocytosis, and in a third agranulocytic purpura argues for a mechanism common to all. At times in these cases there is a history of former intolerance to the drug, such as nausea, vomiting, fever, dermatitis, or mild anemia. This has been noted by Alexandersen Dersea et al<sup>115</sup>, Carnot et al<sup>116</sup>, Farley<sup>117</sup>, Plá and Bennati<sup>118</sup>, and Rodriguez<sup>119</sup>. McCarthy and Wilson<sup>120</sup> reported a case of thrombopenic purpura following arsenphenamine. After recovery from the first attack, the patient again received a small amount of the drug (0.1 gram). At the end of a half hour there was a slight chill with immediate development of purpura and bleeding of the gums. Observations such as these clearly point out that certain individuals are, or can be made, remarkably susceptible to certain drugs, and therefore they must be considered in a state of allergy toward them.

(8) Agranulocytosis has been noted after injections of foreign protein, such as vaccines, serum, and malaria. Bromberg and Murphy<sup>101</sup> for instance, reported a fatal outcome in a patient who had had bronchitis and asthma ten years prior to hyperthyroidism for twenty years and who did not tolerate thyroid substance. This patient received an injection of typhoid vaccine and six hours later developed malaise and fever lasting two days. A second injection was given and a few days later a low grade fever was noted. The fever soon became continuous and by the fourth day sore throat and jaundice had developed. On the ninth day

after the second injection of vaccine the total leucocyte count was 7,000 and no polynuclear cells could be found in the fixed preparation. Kracke<sup>105</sup> also reported a case in which the patient received various vaccines over a ten-year period. She had taken large amounts of coal tar derivatives for three years and showed definite methemoglobinemia. Four weeks prior to the first attack of agranulocytosis she completed a course consisting of five injections of typhoid vaccine. Soon thereafter the temperature rose to 103° F and the fever persisted in a milder form for the next four weeks. At the end of this period agranulocytosis with a total leucocyte count of 900 and complete absence of polynuclear cells was noted. She recovered from this and a subsequent one, but died in a third attack. There was no evidence in Kracke's report that vaccine was given between the attacks.

Reed<sup>107</sup> observed agranulocytosis with recovery in a girl of twelve. The child developed tetanus from a small wound and was treated intensively with antitetanic serum, both intramuscularly and intraspinally, a total of 185,000 units being given over a nine-day period. On the tenth day serum sickness developed accompanied by an urticarial rash. As the symptoms gradually subsided, the patient steadily improved until the twenty-first day, when the temperature suddenly rose. Investigation showed the presence of agranulocytosis. Whether the serum was solely responsible is impossible to say as, because of convulsions, sodium luminal and avertin had been used in considerable amounts.

Jacobson and Abel<sup>104</sup> described agranulocytosis in two patients while undergoing malarial therapy for neurosyphilis. With the administration of quinine the blood returned to normal and the patients recovered. Meyer<sup>108</sup> also reported two cases following malarial therapy, but one of these must be omitted as a case of malarial agranulocytosis as the patient was at the same time receiving arsenic.

If one is willing to accept the examples given here as cases of agranulocytosis, and there was nothing in the protocols inconsistent with the diagnosis, the conclusion is justified that the syndrome occurs on rare occasions after foreign protein injections and is a manifestation of allergy.

(9) The drugs which have been implicated in the causation of agranulocytosis, namely the amidopyrine group\* and the arsphenamines, at times produce skin eruptions without changes in the blood picture. These skin eruptions frequently itch or may be scarlatiniform. Culley et al<sup>15</sup> observed a patient with a past history of jaundice, who, after his second injection of neoarsphenamine, had a chill followed by en-

largement of the lymph glands and a scarlatina rash on the body. Taussig<sup>16</sup> reported the case of a patient who developed urticaria, angioneurotic edema of the lips, and bronchial asthma on two different occasions immediately after taking a five-grain tablet of amidopyrine. Meredith<sup>17</sup> published observations upon a woman who on two occasions took allonal and immediately afterward developed itching lesions on the neck and thighs. Curiously enough, pure amidopyrine, when used, did not produce this disturbance. Hansen<sup>18</sup> observed a twenty-year-old woman who had jaundice from neoarsphenamine, and after recovery, took one tablet of a drug containing amidopyrine. Five hours later she developed chills, itching and a generalized exanthem. Recovery took place within two days. Later the patient took one tablet of a similar drug and the phenomenon repeated itself. Crohn<sup>19</sup> reported urticaria and angioneurotic edema in himself on three different occasions following the ingestion of drugs containing phenacetine. Unger<sup>20</sup> observed a patient with hay fever who developed urticaria and angioneurotic edema the day after taking three allonal tablets. Twelve days later the same phenomenon appeared after taking six grains of amidopyrine.

Skin eruptions from arsphenamine have been universally recognized for many years. A detailed discussion of this subject would add nothing new. In certain individuals sensitivity to the drug, with allergic-like skin manifestations, appears to have been demonstrated not only for arsphenamine but for the amidopyrine group as well, this makes it quite likely, therefore, that the development of agranulocytosis from these drugs belongs in the category of allergic phenomena.

(10) Agranulocytosis has been observed rather frequently in patients known to be allergic. Kopelowitz<sup>21</sup> reported a case of agranulocytosis in a woman who had had giant urticaria fifteen years previously and recently dermatitis apparently due to sea-food. The patient was studied in a hospital and was given unnamed sedatives. After going home she had a chill, followed by malaise, sore throat, and a temperature of 102° F. On the fifth day the leucocyte count was 5300 with no polynuclear cells, the blood examination in all other respects was normal. The patient died on the eighth day with jaundice. Fondé and Fondé<sup>22</sup> reported a case of agranulocytosis, apparently unrelated to drug ingestion, in a patient who had sensitivity to eggs. Each parent was known to be allergic. Fitz-Hugh<sup>23</sup> has recently restudied twenty-six of his cases and was able to state that six of the twenty-six had a history of allergy, three having migraine associated with urticaria, eczema or vasomotor rhinitis, one with asthma and two with food sensitivity. Whether these six developed agranulocytosis

\*For a list of proprietary compounds containing amidopyrine see table 1.

after the ingestion of drugs could not be deduced from his paper

Before amidopyrine had been suspected as an etiological factor in agranulocytosis Pepper noted four instances of the syndrome in allergic patients. The first had violent urticaria following a blood transfusion from a donor who had recently eaten a food to which the patient

is doubtful that arsphenamine and gold salts act as simple poisons and therefore it is more reasonable to suppose that all these reactions are allergic in nature.

#### ARGUMENTS FOR LIVER INJURY

(1) Leukopenia, sometimes accompanied by neutropenia, has been observed in a number of conditions in which it is known that the liver if not anatomically, is at least functionally damaged. Leukopenia occurs frequently in cirrhosis, it is a constant finding in typhoid fever with its focal liver necroses, it is a well known phenomenon in pneumonia occurring in chronic alcoholics, and it has been amply demonstrated in experimental anaphylaxis in dogs. Other examples will readily come to mind, but this type of argument, as is obvious, has no validity unless taken in conjunction with all other known facts bearing on the relationship of agranulocytosis to liver injury.

(2) There is a high incidence of jaundice in agranulocytosis, both in the idiopathic type and in that due to drugs, and is particularly frequent in the group caused by arsphenamine. Schultz's first five idiopathic (!) cases all showed icterus. In the last few years, however, an increasing number of cases without jaundice have been reported, so that at the present time a case incidence of 50 per cent would not be regarded as too high. In my own series of cases it occurred rarely and usually terminally. Even so, any clinical sign occurring in 50 per cent of the reported cases deserves more than passing interest, and it seems strange that jaundice has not led to more comment, speculation, or even investigation into the condition of the liver in this syndrome.

(3) Eosinophilia has been observed not only as a finding in certain forms of allergy but occasionally in patients with liver disease. In cases of agranulocytosis thrombopenic purpura, agranulocytic purpura and aplastic anemia following gold and arsphenamine therapy an 'eosinophilia of cure' has been noted by many authors, following gold therapy by Amenille and Brailion<sup>21</sup>, Achard et al<sup>22</sup>, Brailion<sup>23</sup>, and Chabaud et al<sup>24</sup> following arsphenamine, by Andrews<sup>25</sup>, Brants<sup>26</sup>, Cassoute et al<sup>27</sup>, Carnot et al<sup>28</sup> Essfeld<sup>29</sup>, Meyer<sup>30</sup>, and Monquon and Fleury<sup>31</sup>. The significance of this is obscure since eosinophilia occurs in parasitic infestations, after splenectomy, and at times in cases of pernicious anemia adequately treated with liver extract. It may, perhaps, indicate that the liver is not splitting foreign protein in a normal fashion.

(4) There is repeated reference to vacuolization of the liver cells, central necrosis or even early cirrhosis in some postmortem cases of agranulocytosis. Larsen<sup>32</sup> and Rawles<sup>33</sup> observed liver changes in cases of agranulocytosis.

TABLE 1

#### DRUGS CONTAINING AMIDOPYRINE

Afenal	Gynalgos
Allonal	Hexin
Alphabin	Ipral amidopyrine
Amarbital	Kalms
Amido-Neonal	Klimaxid
Amidophen	Lealgin
Amifeline	Leamon
Am-Phen Al	Lumordrin
Ampyridin	Midol
Amytal Compound	Mylin
Asclatine	Neonal Compound
Baramid	Neurodyne
Barbromide (Columbus)	Optalidon
Barbipyrin	Peralga
Barbitpropyrim	Phenamidol
Benzedo Compound	Proklman
Butapyrin	Propyrim
Cansyth	Pyramidon
Cibalgaie	Pyramidal
Cineopyrino	Pyralyl
Compral	Sal Ethyl Carbonate
Diallpyrin	Compound
Dlanalgin	Sedallyl
Dolarin	Trigemin
Dyaco	Vepydol
Gardan	Veramon
Geamin	Veropyrim

was sensitive. The total leucocyte count, which had been rising, fell back sharply. A second had hay fever and migraine attributed to food allergy. A third was proved food sensitive, a fourth had asthma, was sensitive to a number of foods and always exhibited an eosinophilia. This patient similarly to the first, developed urticaria after transfusion. In spite of these reports, however, a careful survey of the whole literature does not substantiate the claim that agranulocytosis occurs with great frequency in allergic individuals. This fact will be demonstrated later.

(11) Most observers admit that a high proportion of the reactions occurring during the course of arsphenamine or gold therapy such as dermatitis, jaundice, and disturbances of the blood occurs in the second course of treatment or after the second or third injection following a period of no treatment. Furthermore in three cases Emile Weil and Bousser<sup>34</sup> twice found in tridermal positive reactions to the salts of gold. They also claim that in cases of purpura due to arsphenamine, but not in cases of purpura resulting from gold therapy, specific precipitins can be found in the blood. These facts seem to indicate that a building up of sensitivity to this class of drugs may take place. If this is so it



sis from amidopyrine, Pellegrini<sup>87</sup> and Schultz and Jacobowitz<sup>28</sup>, in cases ascribed to arsphenamine, Brailon<sup>92</sup>, in cases following gold therapy, Silver<sup>101</sup>, in a case due to dinitrophenol, and Mazet and Daumas<sup>121</sup>, in a case of aplastic anemia caused by arsphenamine. In the earlier literature prior to the suspicion that drugs were an etiological factor, similar postmortem hepatic changes were observed in idiopathic (?) agranulocytosis by various authors. Aubertin and Robert-Levy<sup>27</sup>, Bacaloglu, Litarczek and Litarczek<sup>8</sup>, Benatt and Pfeuffer<sup>20</sup>, Lande<sup>40</sup>, and more recently by Winslow<sup>31</sup>. In sixteen autopsied cases reported by Lichtenstein<sup>32</sup> liver changes of varying degree, ranging from vacuolization of the liver cells to central necrosis, were noted. In one of my patients who recovered from the agranulocytosis, but who suddenly died on the ninth day from rupture of the jugular vein, the liver showed evidence which strongly suggested a recently healed central necrosis. In none of the reported instances has there been any attempt to correlate the degree of liver damage with the stage of the disease in which the patient died. These lesions, moreover, are so frequently seen postmortem in a great variety of other conditions that they have no claims to specificity.

(5) Kracke and Parker<sup>33</sup> and Roberts and Kracke<sup>34</sup> have attempted to correlate the first appearance of agranulocytosis in 1922, its high incidence among individuals connected with the medical profession and among those of the laity in better economic circumstances, and its geographical distribution chiefly in Germany and the United States, with the commercial production and use of sedative drugs of the benzamine group. This has led to experimental attempts to reproduce the syndrome in animals. Kracke<sup>35</sup> claims to have obtained leukopenia and neutropenia with intravenous injections of hydroquinone and subcutaneous injections of orthoxybenzoic acid, and with sufficiently small parenteral doses of benzol in olive oil, he produced agranulocytosis without anemia or purpura. It is unfortunate that no studies of the liver were undertaken, for it is well known that drugs of the benzol group have a tendency to injure this organ. Jaundice or central necrosis of the liver is at times seen in chronic benzol poisoning (Hunter and Hanflig<sup>36</sup>, Hamilton<sup>37</sup>). Of the benzamine drugs, phenylhydrazin has been shown by Fliessinger and Laur<sup>38</sup> to produce vacuolization of the liver cells. That cinchophen at times produces acute yellow atrophy is generally accepted, and Quick<sup>39</sup> believes this to be an allergic phenomenon. Finally, a study of the protective effect of certain food substances in agranulocytosis may, in the future, throw some light on the problem, as Bonanno<sup>40</sup> has been able to produce agranulocytosis in guinea pigs by means of x-ray irradiation only in those animals placed

on an alkaline diet. It is possible that the diet used by him, besides being an alkaline one, failed to furnish a protective substance to the liver itself.

(6) Lastly, the argument is advanced that as the liver is known to be an important storehouse for hematopoietic maturation factors in pernicious anemia, it might be assumed that to it is delegated the function of manufacturing and storing maturing factors for the myeloblastic series as well and that this hypothetical function may be gravely disturbed or utterly destroyed without giving specific microscopical changes. This would accord with the theories advanced by Beck<sup>41</sup>, who feels that there are two factors in white cell development (a) a growth stimulating substance probably manufactured in the liver and not contained in commercial liver extract, and, (b) a chemotaxic factor which causes the neutrophils to be delivered into the blood stream. Custer<sup>42</sup>, while believing that "idiopathic" agranulocytosis can be differentiated from that produced by arsphenamine or sepsis by a careful study of the bone marrow, feels that the lack of a maturation factor in the "idiopathic" type is unique and that it therefore is a clinical entity. Should it be demonstrated in the future that the liver does contribute a maturing factor for the formation of leucocytes in the marrow, new fields for investigation would be opened up and possibly many conflicting opinions reconciled.

#### CASES IN THE LITERATURE

Turning now to the cases in the literature which have been reported under the term agranulocytosis due to various agents, there is obviously great laxity in the use of the term. Although it is believed by some (Kracke<sup>43</sup>) that agranulocytosis, thrombopenic purpura, etc., are closely allied conditions, so much confusion has resulted from the grouping of these several syndromes under the one term agranulocytosis that, for the sake of clarity, it was found necessary in surveying the literature to reclassify the cases into the following four clinical groups: (a) *pure agranulocytosis* with leukopenia and neutropenia, the rest of the blood being relatively normal; (b) *agranulocytic purpura* in which neutropenia is associated with purpuric manifestations without anemia; (c) *pure thrombopenic purpura* unassociated with changes in the white or red blood cell picture; (d) *aplastic anemia*, in which all the formed elements of the blood are markedly depressed.

Table 2 shows all of the cases reported in the literature of pure agranulocytosis ascribed to drugs and foreign protein. It is to be noted that of the 139 cases ascribed to amidopyrine, only forty-one were detailed case reports, the rest were cases inadequately reported or merely mentioned. There were twenty-one clinical

TABLE 2  
AGRANULOCYTOSIS

No of Cases

## Drugs

Amidopyrine	139*
Antipyrine	2
Phenacetine	4
Luminal	1
Amidopyrine + Phenacetine	3
“ + Acetanalid	1
“ + Arsphenamine	3
Arsphenamine	21
Gold Salts	7
Dinitrophenol	6

Total

186

## Protein

Vaccine	2
Malaria	3
Vaccine + Amidopyrine	1†
“ + Acetanalid	1
Malaria + Arsphenamine	1
Serum + Avertin + Sod Luminal	1

Total

9

Grand Total

195

Forty-one full case reports. Thirteen of the 139 relapsed with the drug.  
†This patient relapsed with Amidopyrine alone.

cases of agranulocytosis without purpura or anemia following arsphenamine, many other cases have been reported but upon close inspection of the clinical evidence one is forced to place them in one of the other groups, either agranulocytic purpura, thrombopenic purpura or aplastic anemia. In addition to those tabulated there were twelve other papers reporting cases of agranulocytosis following arsphenamine therapy. These were published in foreign journals difficult to obtain. It was not believed worth while to undertake an investigation of them as it seemed fairly certain no new facts would have been brought to light, to this extent the bibliography and survey are incomplete.

In table 3 there is tabulated for the reported cases of drug and protein agranulocytosis the instances (a) in which an allergic history was noted (even including dubious phenomena such as arthritis and migraine), (b) in which a past history of liver injury was obtained, (c) in which relapse took place upon again receiving the drug, (d) in which the occurrence of clinical signs during the acute illness suggested an allergic mechanism or liver damage, and (e) in which changes in the liver were noted at

TABLE 3

ALLERGIC HISTORY AND INSTANCES OF LIVER INJURY IN CASES OF AGRANULOCYTOSIS FOLLOWING DRUGS OR PROTEIN IN THE WORLD LITERATURE AND IN THE AUTHOR'S SERIES

	Total Cases	Arthritis	Migraine	Food Sensitivity	Asthma	Vasomotor Rhinitis	Past Skin Disease (Urticaria, Etc.)	Past Liver Disease (Jaundice—Cholecystitis)	Drug Test Positive (Ingestion)	Jaundice	Skin Eruption	Eosinophilia	Liver Pathology (P.M.)	Case Incidence
<i>Drugs</i>														
Amidopyrine	189	13	5	4	1	1	4	13	4	1	1	2	33	
Luminal	1										1		1	
Amidopyr + Phenac.	3											1	1	
Arsphenamine	21						1		7	4	5	1	14	
Gold Salts	7	1			1		1		2	1	2	1	6	
Dinitrophenol	6						1		1	1	1	1	4	
Total	177	14	5	4	2	1	2	5	13	14	8	8	5	59
<i>Protein</i>														
Vaccine	2				1		1		1				2	
Malaria	3								1				1	
Vaccine + Amidopyr	1	1							1*				1	
Serum Avertin Sod Lum	1									1			1	
Total	7	1			1		1		1	2	1		5	
<i>Author's Cases</i>														
Amidopyrine	9		2	1			1						1	3
Protein	2											1		1
? Drugs	2						1							1
No Drugs	2													1
Nothing Known	12								3		1		5	
Total	27		2	1			2		3		2	2	7	11

This patient relapsed with Amidopyrine alone.

postmortem [The discrepancy between the totals in tables 2 and 3 is due to the fact that there were no positive instances in the cases due to antipyrin, phenacetin, amidopyrine and acetanilid, amidopyrine and arsphenamine vaccine and acetanilid, and malaria and arsphenamine, and they were therefore omitted in table 3] A similar tabulation has been carried out for my own series of twenty-seven cases of agranulocytosis, but of these amidopyrine could be considered as an etiological factor in only nine

A glance at the table shows that in the world literature a past history of allergy did not occur in any of the groups with notable frequency. The same holds true for a past history of liver injury. After the use of drugs, jaundice was observed only fourteen times, seven of which followed arsphenamine. In only fourteen cases was a relapse noted after taking drugs again. Fifty per cent of the skin eruptions occurred after arsphenamine, and seven out of eight instances of eosinophilia, after arsphenamine or gold salts. Evidence of liver pathology was scant (Lichtenstein's cases are not included here for they were not reported as cases of agranulocytosis due to drugs)

My own series likewise showed nothing striking. In the twenty-seven cases, of which sixteen are dead, I have tried to ascertain a past history of drugs or allergy in as many as could be reached. In twelve cases nothing is known in respect to either, ten of these patients are dead. In nine cases the onset occurred after the ingestion of amidopyrine, five of these patients are dead. Of the three allergic patients, one had migraine, a second had migraine associated with sensitivity to wheat, and the third had a past history of skin allergy in the form of recurrent urticaria (possibly due to food) and hypersensitivity to insect bites. This patient at postmortem showed extreme vacuolization of the liver cells, apparently similar to many other reported cases in the literature, but which, it must be emphasized again, is not a specific histological picture. Two cases followed protein injections. In one, the patient, who gave no history of allergy, had received vaccines for bronchitis. In the second, the patient had been given 1,000 units of diphtheria antitoxin with considerable reaction. About four weeks later a marked leukopenia and fever were discovered, but as there was relatively slight neutropenia it is doubtful whether this case should be included here, it has been, however, because for several months after recovery blood examinations revealed an eosinophilia of 14 per cent. Two cases of typical agranulocytosis occurred in which it is problematical whether drugs played any part in the etiology. In two other non-fatal cases the patients stoutly denied the use of drugs or injections of foreign protein. One of these patients is of interest because a year later she developed vasomotor rhinitis

Of the twenty-seven cases, therefore, there are only eleven instances which could by the greatest stretch of the imagination be said to have had any phenomena which remotely suggested either allergy or liver injury.

In table 3 are listed cases from the literature

TABLE 4

	Agranulocytic Purpura	Thrombopenic Purpura	Aplastic Anemia
Arsphenamine	6 (a)	2 (b)	12 (c)
Gold Salts	0	3 (d)	3 (e)
Quinine	1	0	0
" + Amidopyrine	1 (f)	0	0
(a) 3 cases with skin eruption			
(b) 2 jaundice—1 case drug test positive			
(c) 1 case jaundice			
(d) 1 history of asthma			
(e) 1 jaundice			
(f) 1 " history of urticaria			

which have been carelessly called agranulocytosis. These fall into the three other classes mentioned above, agranulocytic-purpura, thrombopenic purpura and aplastic anemia. Of the cases of agranulocytic-purpura, one-half of the patients manifesting this syndrome after arsphenamine developed skin eruptions, in another instance occurring after the use of quinine and amidopyrine, there was a history of urticaria. In the thrombopenic-purpura group, two instances of jaundice occurred after arsphenamine, and in one there was a recurrence of purpura when the drug was again administered. Of the three patients with this syndrome following therapy with gold salts, one had a history of asthma. Among the cases of aplastic anemia due to arsphenamine or gold salts, jaundice occurred once after each drug. It can therefore be stated that to date there is no evidence in the literature that agranulocytosis and the allied blood disorders following the use of benzamine drugs or the injection of foreign protein occur more frequently in the frankly allergic individual than in the normal. The one significant fact which points to these four blood dyscrasias as being closely allied is that arsphenamine can clinically produce all of them.

## SUMMARY

- (1) The world literature from 1927 to 1935 in regard to the causation of agranulocytosis by drugs and foreign protein has been carefully surveyed.
- (2) The arguments that the syndrome is a manifestation of allergy, and those which have been advanced to show that it is a result of primary injury to the liver, have been outlined.
- (3) Agranulocytosis occurs in susceptible individuals following the ingestion of amidopyrine, but in less than 10 per cent of the

- reported cases has thus drug been proved, by further ingestion tests, to be the causative factor
- (4) Typical clinical agranulocytosis may result from injections of arsphenamine, gold salts, or foreign protein, or from the ingestion of dimethylphenol
- (5) Agranulocytic purpura has been reported as caused by arsphenamine and by quinine, thrombopenic purpura and aplastic anemia, by arsphenamine and by gold salts, but many of these cases have been incorrectly referred to as pure agranulocytosis (type Schultz)
- (6) In view of the difficulty of drawing sharp dividing lines between these various blood dyscrasias, and since arsphenamine can produce any of them, they may well be manifestations of a physiological mechanism similar to allergy, which, in turn may be dependent upon injury to the liver
- (7) There is not enough evidence in the literature or in the author's series of cases to state that injury to the blood forming organs from the use of drugs or foreign protein occurs more frequently in frankly allergic individuals than in normals, or often in patients with evidence of past liver injury than in those without it

## CONCLUSIONS

Agranulocytosis is a syndrome rather than a clear-cut clinical entity of established etiology, and may be occasioned by a number of substances such as amidopyrine, arsphenamine, gold salt, dimethylphenol and foreign protein. It, together with some allied blood disorders, must probably be placed in the category of allergic phenomena, and may even be conditioned by functional damage to the liver

## REFERENCES

- Schultz, Werner. Ueber eigenartige Halskrankheiten. Deutsche med. Wchnschr. 48: 1405 1922
- Pepper O. H. P.: Leukopenia—a review: with special reference to agranulocytic angina. California & West. Med. 55: 42, Aug. 1922, Sept. 1922.
- Harris, W. H. and Schattner, H. J. Experimental studies in so-called agranulocytic angina. I. Effects upon leucocytes by toxic products of bacteria from stool of human case. Proc. Soc. Exper. Biol. & Med. 81: 542 (April) 1922
- Schattner, H. J. and Harris, W. H. Experimental studies in so-called agranulocytic angina. II. Effects upon leucocytes by toxic products of Staphylococcus aureus from blood of human cases. Proc. Soc. Exper. Biol. & Med. 81: 547 (April) 1922
- Fried, B. M., and Danneberg, W. V. Experimental agranulocytosis; infection of rabbits with Salmonella suispestifer by way of the blood stream. Arch. Int. Med. 49: 94 (Jan.) 1922.
- Kracks, R. R.: [Communication.] Arch. Int. Med. 49: 708 (Apr) 1922.
- Ricketts, C. C.: Sulla agranulocitosi sperimentale. Arch. Ital. di otol. 48: 461 (June) 1924
- Dennis, E. W.: Experimental granulocytopenia due to bacterial toxins elaborated in vitro. J. Exper. Med. 87: 932 (June) 1922
- Meyer O. O. and Thewlis, E. W.: A report of failure to produce granulocytopenia with bacterial toxins. J. Clin. Investigation 25: 487 (May) 1924
- Hertz, L. P.: The role of amidopyrine in the etiology of granulocytopenia with special reference to its chemical structure. J. Lab. & Clin. Med. 20: 32 (Oct.) 1924.
- Pries, A. S.: Donor's diet as a possible cause of blood transfusion reactions. Rev. Gastroenterol. 1: 192 (Sept.) 1924
- Grant, R. B.: (See Reference No. 63 discussion)
- Plum, Preben. Experimental og klinisk Undersogelse af Amidopyrin som Aarsag til Agranulocytose. Sæks nye doedeligt forloebende Tilfaelde. Ugeskr. f. Læger 96: 816 (Aug. 23) 1924
- Coomall on Pharmacy and Chemistry. Special Report. The relation of amidopyrine and the barbituric acid derivatives to granulocytopenia. J. A. M. A. 102: 2182 (June 30) 1924
- Culley J. C., Guyton, B. S. and Simms, J. R., Jr.: Symptomatic agranulocytic angina following neoarsphenamine therapy. New Orleans M. & S. J. 55: 141 (May) 1924
- Tausell, A. R.: Cutaneous allergy following the ingestion of amidopyrine. J. Allergy 6: 81 (March) 1925
- Meredith, F. L.: Reactions to certain barbituric derivatives. J. A. M. A. 102: 2099 (June 3) 1924
- Hansen, Preben. Et Tilfaælde af Amidopyrinexanthem uden Diodforandringer. Ugeskr. f. Læger 95: 431 (April) 1924
- Orehn, W. H.: Ein schwarzer Fall von Überempfindlichkeit. Med. Klin. 26: 1451 (Sept. 24) 1920
- Unger L.: Drug idiosyncrasy. J. Allergy 5: 76 (Nov.) 1925
- Koprowski, J. C.: Agranulocytic angina. J. Missouri M. A. 25: 320 (July) 1925
- Fondé E. C. and Fondé G. H.: Allergy as the direct etiologic factor in malignant granulopenia: a clinical study based upon one fulminant case. J. M. A. Alabama 9: 24 (May) 1924
- Zmille-Wall, P. and Bousquet J.: Les états hémorragiques post aortiques. Sang 6: 235, 1922.
- Ameuille P., and Brailion, J.: Sept cas des syndromes agranulocytaires aigus. Bull. et mém. Soc. méd. d. Paris 49: 1627 1922.
- Brailion, Jean.: Agranulocytose au cours de l'aurothérapie: guérison reprise de l'aurothérapie sans incidents. Sang 8: 25 1924
- Schultz, W., and Jacobowitz, L.: Die Agranulocytose. Med. Klin. 21: 1443 (Oct.) 1925
- Amberlin, C., and Robert Levy: Sur un cas d'agranulocytose pure. Bull. et mém. Soc. méd. des Hôp. de Paris 49: 466 1923
- Bacalogu C., Litarsczak, G. and Litarsczak S.: Streptococci et syndromes agranulocytaires type Schultz. Sang 6: 441 1922
- Benatti, A. and Pfeuffer, F.: Grippe und Agranulocytose. München. med. Wchnschr. 70: 1322 (Aug. 2) 1923
- Landé Kurt: Der agranulocytotische Symptomenkomplex bei Infekten. Klin. Wchnschr. 9: 2016 (Oct. 15) 1920
- Winslow, Kenneth: Malignant neutropenia due to military tuberculosis of bone marrow. Northwest Med. 33: 176 (May) 1924.
- Lichtenstein, A.: Agranulocytose (Typus Schultz) (Granulocytopenia Maligna). Acta med. Scandinav. Supp. 49: 1 1922.
- Kracks, R. R. and Parker, F. P.: The etiology of granulocytopenia (agranulocytosis) with particular reference to drugs containing the benzene ring. J. Lab. & Clin. Med. 18: 799 (May) 1924
- Roberts, S. R., and Kracks, R. R.: Further studies on the etiology of granulocytopenia with a report of twelve cases. Ann. Int. Med. 9: 129 (Aug.) 1924
- Kracks, R. R.: The experimental production of agranulocytosis. Am. J. Clin. Path. 3: 11 (Jan.) 1923
- Hunter F. T., and Handig S. R.: Chronic benzol poison: the report of four cases. Boston M. & S. J. 197: 322 (Aug. 23) 1927
- Hamilton, A.: Benzene (benzol) poisoning. Arch. Path. 11: 424 (March) 30: 1 (April) 1921.
- Fleissinger N., and Laur C. M.: Recherches expérimentales sur l'intoxication par la phénylhydrazine. Sang 6: 816 1922
- Quick, A. J.: The probable allergic nature of cinchonin poisoning with special reference to the Arthus phenomenon. Am. J. M. Sc. 187: 35 (Jan.) 1924
- Bonazzi, A.: Agranulocitosi da raggi roentgen. Haematologica 18: 445 1924
- Beck, R. G.: The pathogenesis of neutropenia; a theoretical consideration. Am. J. Clin. Path. 4: 129 (March) 1924
- Campbell, R. P.: Studies on the structure and function of bone marrow. IV. Bone marrow in agranulocytosis. Am. J. Med. Sc. 129: 507 (April) 1925
- Kracks, R. R.: The significance of the leukopenias; with special reference to agranulocytosis. U. S. Nav. M. Bull. 59: 16 (Jan.) 1922.

## CASE BIBLIOGRAPHY

I. AGRANULOCYTOSIS  
(a) Amidopyrine and Allied Drugs

- Bernhardson E., Nouchy A., and Sodaka Planty A. M.: Remarque sur un cas d'agranulocytose. Bull. et mém. Soc. de Paris 49: 35 1922
- Benjamin, J. E., and Biederman, J. D.: Agranulocytic leukopenia: report of a case successfully treated with x-rays and some observations on the effect of amidopyrine. J. A. M. A. 103: 161 (July 21) 1924
- Correa, Ferdinando: Esistono le terapie delle agranulocitosi sull'importanza etiologica del piramido, del barbiturico e del chinino. L'epitoterapia paracetamoli nelle agranulocitosi primarie e secondarie. Haematologica 18: 683 1924

- 47 Costen J B Agranulocytosis appearance of the early pharyngeal lesion three cases one apparent recovery Ann Otol Rhin & Laryng 42: 372 (June) 1933
- 48 De Vries S I Jr Recidiverend agranulocytair Syndroom Nederl tijdschr v geneesk. 77 4443 (Sept. 30) 1933
- 49 Fisher J H Two cases of agranulocytic angina one following the administration of allonal Lancet 2: 1217 (Dec 1) 1934
- 50 Fitz Hugh Thomas Jr Drug Idiosyncrasy with special reference to amidopyrine as a cause of agranulocytic angina Ann Int Med 8: 148 (Aug) 1934
- 51 Groen, J and Gelderman C J Agranulocytose (maligne Neutropenie) door Geneeskmiddelen Nederl tijdschr v geneesk 78 3444 (July 23) 1934
- 52 Hall Donald Agranulocytic angina four cases treated with pentnucleotide Lancet 2: 1441 (Dec 29) 1934
- 53 Hoffman A M Butt E M and Hickey N G Neutropenia following amidopyrine J A M. A. 103: 1213 (April 14) 1934
- 54 Holten C Nielsen H E and Transbol K. 5 nosocomiale Tilfaelde af Agranulocytose hos Patienter behandlede med Amidopyrin Ugesk. f Laeger 96: 155 (Feb 8) 1934
- 55 Holten C Nielsen H E and Transbol K Et nyt nosocomialt Tilfaelde af Agranulocytose Ugesk. f Laeger 96: 245 (March 1) 1934
- 56 Holten C Nielsen H E and Transbol K Endnu et dodeligt forlobende Tilfaelde af Agranulocytose efter Amidopyrin (Cibalgin) Ugesk. f Laeger 96: 1162 (Oct. 26) 1934
- 57 Jackson Henry Jr The relation of amidopyrin and allied drugs to the etiology of agranulocytic angina. Am J M Sc. 188: 482 (Oct.) 1934
- 58 Johnson W M A case of granulopenia following amidopyrine with two recurrences J A M. A. 103: 1290 (Oct 27) 1934
- 59 Jorgenson Ugesk. f Laeger 96: 225 1934 [Cited by Plum<sup>42</sup>]
- 60 Knudsen Ole Et Helbredt Tilfaelde af Agranulocytose opstaaet efter en meget lille Amidopyrindosis Ugesk. f Laeger 96: 923 (Aug 23) 1934
- 61 Kracke R R and Parker F P The etiology of granulopenia (agranulocytosis) with particular reference to drugs containing the benzene ring Am J Clin Path 4: 453 (Nov.) 1934
- 62 Larsen Berge Tilfaelde af Agranulocytose hos en Amidopyrin behandlet Patient. Ugesk. f Laeger 96: 430 (April 19) 1934
- 63 Madison F W and Squier T L Primary granulocytopenia after administration of benzene chain derivatives J A M. A. 101: 2076 (Dec. 23) 1933
- 64 Madison F W and Squier T L The etiology of primary granulocytopenia (agranulocytic angina) J A M. A. 103: 755 (March 10) 1934
- 65 Moltke Otto Amidopyrin agranulocytose og Achylhypophished Ugesk. f Laeger 96: 1160 (Oct. 26) 1934
- 66 Plum Preben Agranulocytosis due to amidopyrin an experimental and clinical study of 7 new cases Lancet 1: 14 (Jan 5) 1935
- 67 Randall C L Severe granulopenia following the use of barbiturates and amidopyrine report of a case J A M. A. 102: 1137 (April 7) 1934
- 68 Ransom F T Case of agranulocytic angina Lancet 1: 609 (March 16) 1935
- 69 Rawles W B Neutropenia developing during amidopyrin medication with a report of 2 cases Am J M Sc. 187: 837 (June) 1934
- 70 Seemann Herbert Om Amidopyrin som aetiologisk Faktor ved Agranulocytose Ugesk. f Laeger 96: 241 (March 1) 1934 *ibid* p 565
- 71 Smith G S Agranulocytosis treated with pentnucleotide. Lancet 1: 607 (March 16) 1935
- 72 Squier T L and Madison F W Primary granulocytopenia due to hypersensitivity to amidopyrine J Allergy 6: 9 (Nov.) 1934
- 73 Videbeck Hemming Agranulocytose medicamenteuse (?) s accompagnant d exanthème Acta Oto Laryng 19: 92 1933
- 74 Watkins C H The possible rôle of barbiturates and amidopyrine in causation of leukopenic states. Proc. Staff Meet. Mayo Clin 8: 713 (Nov 22) 1933
- 75 Witt W H Agranulocytosis with report of a case and with special reference to certain barbiturates as a cause of the disease. J Tennessee State M. A. 27: 283 (Aug) 1934
- 76 Zinberg I S Katzenstein L and Wice L E Neutropenia following the administration of amidopyrine report of a case J A M. A. 102: 2098 (June 23) 1934
- 77 Zinliger Pauline Granulocytopenia report of two cases. J A M. A. 102: 518 (Feb 17) 1934
- (b) *Arsphenamine*
- 78 Andrews C L A case of granulocytopenia in a native of Guam U S Nav M. Bull 32: 345 (July) 1934
- 79 Brants J Deux cas d agranulocytose observés au cours du traitement de la syphilis Ann d mal vén. 28: 903 (Dec.) 1933
- 80 von Domarus A. Zur Lehre von der Agranulocytose Klin Wchnschr 8: 779 (April 23) 1929
- 81 Farley D L Depressed bone-marrow function from the arsphenamines Am J Med. Sc. 179: 214 (Feb) 1930
- 82 Foster J M Jr Agranulocytic angina following the administration of neo arsphenamine report of a case with recovery following the use of sodium thiosulphate. Colorado Med 27: 388 (Oct.) 1930
- 83 Hellich I Über Agranulozytose nach Neosalvarsanbehandlung Med Klin 28: 1133 (Aug 12) 1932
- 84 Landsberg Manfred Agranulocytose mit monocytärer Reaktion Klin. Wchnschr 8: 507 (March 12) 1929
- 85 Meyer Albert Toxische Schädigung des Granulocytenapparates als wahrscheintliche Folge von Salvarsanbehandlung Med Klin 28: 774 (May 23) 1930
- 86 Mouquin and Fleury Syndromes agranulocytaires frustes suivis de guérison chez deux syphilitiques traités l'un par le novarsénobenzol l'autre par le bismuth. Bull. et mém Soc. méd. d hóp de Paris 53: 693 1929
- 87 Pellegrini Giuseppe Sindrome di agranulocitosi in paziente affetto da epatite ipertrofica infettiva splenomegalica Riforma med 48: 1246 (Aug 13) 1932
- 88 Pouzin-Maléque (Mme) A propos d'un cas d agranulocytose post arsenobenzolique Bull et mém Soc. méd. d Hóp de Paris 52: 1786 1928
- 89 Spanier Fritz Salvarsandermatitis mit agranulozytarem Symptomenkomplex. Dermat. Wchnschr 93: 1227 (Aug 1) 1931
- 90 Wilson C P Marked monocytosis accompanied by a neutrophilic leukopenia following antisyphilitic treatment. Am J M Sc. 177: 88 (Jan) 1929
- [See also Ref No 50]
- (c) *Gold Salts*
- 91 Achard C Coste F and Cahen, R A propos des désordres hématologiques provoqués par les sels d'or Bull et mém Soc. méd d hóp de Paris 48: 547 1932
- 92 Brullion Jean Agranulocytose et ictère grave au cours de laurothérapie Sang 8: 356 1934
- 93 Chabaud J Ginsbourg B and Langlet, L. Un cas de syndrome agranulocytair aurique fruste. Bull et mém. Soc. méd hóp de Paris 49: 1238 1933
- 94 Flandin C Escalier A Sasser F and Joly F Un cas d agranulocytose mortelle par intolérance à l'or chez tuberculeux pulmonaire Bull et mém Soc. méd. d hóp de Paris 49: 650 1933
- 95 Jacob and Douady D Un cas d'agranulocytose chez une tuberculeuse traitée par la crisalbine. Bull et mém Soc. méd d hóp de Paris 54: 798 1930
- 96 Margarat J Rimbaud P and Bétouillères P Syndrome agranulocytair au cours d'un traitement aurique Bull Soc franç de dermat et syph (Réunion dermat. de Lyon) 41: 545 (April) 1934
- 97 Rheinheimer E W and Smith L M Granulopenia report of a case following injection of gold and sodium thiosulphate Southwestern Med. 17: 239 (July) 1933
- (d) *Dinitrophenol*
- 98 Dameshek W and Gargill L Studies in agranulocytosis IV Report of two cases of agranulocytosis following the use of dinitrophenol New Eng J Med. 211: 440 (Sept 6) 1934
- 99 Bohn S S Agranulocytic angina following ingestion of dinitrophenol J A M. A. 103: 249 (July 28) 1934
- 100 Davidson E N and Shapiro M Neutropenia following dinitrophenol with improvement after pentnucleotide and leukocyte cream J A M. A. 103: 480 (Aug 18) 1934
- 101 Silver Solomon A new danger in dinitrophenol therapy Agranulocytosis with fatal outcome J A. M. A. 103: 1038 (Oct. 6) 1934
- [See also Ref. No 52]
- (e) *Foreign Protein*
- 102 Andersen Siggaard En Forelæsning om Agranulocytosis Recidivans Ugesk. f Laeger 96: 237 (March 1) 1934
- 103 Bromberg L and Murphy P Agranulocytic angina following prophylactic typhoid vaccination. J A. M. A. 92: 1266 (April 13) 1929
- 104 Jacobson E and Abel W Agranulozytose nach Impfmalaria. Deutsche med. Wchnschr 59: 371 (March 10) 1933
- 105 Kracke, R R Recurrent agranulocytosis report of an unusual case Am J Clin Path 1: 385 (Sept.) 1931
- 106 Meyer August Agranulozytose nach Impfmalaria. Deutsche med Wchnschr 57: 226 (Feb' 6) 1931
- 107 Reed James Report of a case of tetanus followed by agranulocytic angina Maine M. J 25: 150 (July) 1934
- [See also Ref. No 51]
- II **AGRANULOCYTIC PURPURA**
- (a) *Arsphenamine*
- 108 Benhamou E Temim P and Lofrani R Agranulocytose post stovarsolique Bull. et mém Soc. méd. d hóp de Paris 49: 1162 1933
- 109 Bocage A and Filliol L Angine agranulocytair et purpura hémorragique au cours d'un traitement anti syphilitique Bull et mém. Soc. méd. d hóp de Paris 52: 1807 1928
- 110 Carnot P Delafontaine P and Vèran P Gomme ulcéreuse de la joue. Purpura hémorragique et syndrome agranulocytair au cours du traitement arsenical. Eosinophile de guérison Bull et mém Soc. méd d hóp de Paris 55: 993 1931

111. Esenfeld, Emanuel: Ueber Agranulocytose nach Neosarsenbehandlung. München. med. Wchnschr 78: 924 (Nov 7) 1931.  
[See also Ref. No. 45]

- (b) Quinine Quinine and Amidopyrine  
[See Ref. No. 45]

## III. THROMBOCYTOPENIA

## (a) Arphenamine

112. McCarthy P P and Wilson, R. Jr.: The blood dyscrasias following the arphenamines. J. A. M. A. 99: 1587 (Nov 6) 1932.

## (b) Gold Salts

113. Emile-Vall, P.: Le grand purpura hémorragique d'origine arique. Paris 1931. 137 (Aug. 3) 1931.  
114. Gerner Kurt: Et Tilfeldet af ekstrem Thrombopeni med konsekutiv hæmorrhagisk Diathese efter Sanoce vain ledigt. Ugesk. f. Læger 96: 199 (Feb 15) 1931.  
[See also Ref. No. 45]

The bibliography here given does not purport to be complete.

## IV. ANEMIC ANEMIA

## (a) Arphenamine

115. Alexandrescu-Dercu, Claudiu, I. and Ghioiu, I.: Syndrome agranulocytair avec anémie et purpura pendant le traitement au néosarsen et bismuth. Rev. 71 721 (April) 1932.  
116. Aubertin, C., Blaudet, and Lehmann P.: Deux cas d'agranulocytose chez des syphilitiques traités par la-styl arsen et le bismuth. Bull. et mém. Soc. méd. d. hôp. de Paris 43: 478 1932.  
117. Casoute Polono Zussoli Montus, and Guillard. Agranulocytose pure après deux injections de nova sên benzol Syndrome cardio-rénal transitoire. Eosinophilie. Gué. J. Soc. Bull. et mém. Soc. méd. d. hôp. de Paris 43: 14 1932.  
118. Delgado, G.: Angina agranulocytica post-arsen bei Riforma med. 47: 169 (Nov 2) 1931.  
119. Dodd, K., and Wilkinson, S. J.: Severe granulocytic aplasia of the bone marrow: report of a case following arsenic amine treatment in congenital syphilis. J. A. M. A. 95: 663 (March 3) 1931.  
120. Jacquelin, A., Callos, J., and Langlois: Sur un cas d'agranulocytose post-arsénobenzolique. Bull. et mém. Soc. méd. d. hôp. de Paris 43: 8, 1932.  
121. Mazer, and Daumas: Contribution à l'étude de l'agranulocytose et des syndromes agranulocytaires. Paris méd. 41: 215 (Sept. 25) 1931.  
122. Pila, J. C., and Besset, D.: Syndrome agranulocytair. Bull. et mém. Soc. méd. d. hôp. de Paris 43: 1547 1931.  
123. Haillet, Delattre Glimbourg and Nicolle: Syndrome hémogramme mortel. Essai de traitement par I. adi. am. Bull. et mém. Soc. méd. d. hôp. de Paris 43: 1591 1931.  
124. Rodriguez, Calixto: A case of agranulocytic anemia complicating neosarsenamine treatment. Urol. & Cutan. Rev. 58: 131 (Feb) 1934.  
[See also Ref. No. 45]

## (b) Gold Salts

125. Amoult, P., Kodolski, C., and Joseph R.: Aleucie hémorragique d'apparition retardée observée au cours d'un traitement par la cristaïne. Bull. et mém. Soc. méd. d. hôp. de Paris 43: 14 6 1932.  
126. Angéras, and Glimbourg: Aleucie hémorragique (agranulocytose) post-chrysothérapie. Bull. 6: 788 1932.  
127. Jacquelin, A., and Allaire, A.: Sur un nouveau cas d'agranulocytose post-chrysothérapie. Bull. et mém. Soc. méd. hôp. de Paris 43: 129 1932.

## DISCUSSION

DR. HENRY N. PRATT: I want to make just one point in the discussion. You are all familiar with the five criteria which Dr Rackemann has laid down for the diagnosis of the usually accepted allergic diseases. These are a family history of allergy, a presenting symptom which is an accepted allergic manifestation, a past personal history of some other allergic disease, positive skin test, and an eosinophilia. Such diseases are asthma, hay fever, urticaria, eczema and some cases at least of migraine. Dr Arthurs Coca refers to these diseases as atopic and sets them aside as a distinct group because heredity or an inherited tendency plays such an important part in them.

If we analyze Dr Hunter's personal cases and those reported in the literature for the criteria of atopy we find first, the data on family history are inadequate; secondly the presenting symptom leucopenia is the point in question, thirdly omitting arthritis, which is a very questionable allergic mani-

festation, we find a past personal history of atopy in twenty-one of two hundred and eleven cases or ten per cent, a figure approximating closely the percentage of atopic diseases in the general population, fourthly ten cases or less than five per cent showed positive skin tests in spite of many trials to elicit the phenomenon, fifthly eosinophilia was only occasionally demonstrated. It seems reasonable to conclude therefore that agranulocytosis does not fall into the group of accepted allergic or atopic diseases.

But the term allergy has a wider implication. Literally it means altered reactivity. It implies an antigen-antibody reaction which has not been proved in all instances. Into this wider group of allergic diseases fall such phenomena as the tuberculin reaction, serum disease, drug eruptions, and industrial dermatoses. Such reactions are not dependent on an inherited tendency and are therefore not atopic. Skin tests may be positive by patch test instead of scratch or intradermal. Eosinophilia is absent or less constant. It is in this wider group of non-atopic but allergic diseases that it seems reasonable to classify agranulocytosis at least those cases where symptoms can be precipitated at will by administering the offending drug.

Finally the fact that the syndrome of agranulocytosis can be produced by several agents is a strong argument in favor of the allergic interpretation of the etiology for multiple sensitivity is characteristic of allergy.

DR. HENRY JACKSON, JR.: There is but little I can add to Dr Hunter's very complete and excellent paper. I will make only one or two remarks.

In the first place I question seriously whether the extreme leukopenia secondary to arphenamine poisoning should be classed with true agranulocytosis. The peripheral blood picture differs notably in the two conditions and the histological changes in the bone marrow of arphenamine poisoning bear little resemblance to those seen in agranulocytosis.

In the second place I would emphasize strongly the necessity of adhering to certain rather sharply defined criteria of diagnosis when the etiology of a condition is under discussion. The term agranulocytosis has been loosely applied to a variety of pathological conditions some of which are but remotely connected with the true disease. The French hematologists, in particular, have been responsible for much confusion. We must define our disease before its etiology can be logically discussed.

In the third place few authors have given careful consideration to the actual temporal relation of the administration of the drug amidopyrine to the development of the clinical picture.

From my series of cases of pure agranulocytosis I have been able to find twenty-seven in which there was available unequivocal evidence as to the administration of amidopyrine and allied drugs. In seven of these the drug was taken in such quantities and in such relation to the development of symptoms that it must be considered as having caused the disease. In eight the drug was taken for varying periods and in varying amounts, but careful study shows that no causal relation whatever can be made out. For instance, one patient took amidopyrine consistently before each attack, but took still larger quantities during the height of the disease from which she eventually recovered. In another the patient took amidopyrine in considerable quantities prior to an attack, recovered and continued to use the drug without the slightest ill effect. In a third amidopyrine therapy preceded an attack, and was omitted thereafter yet the patient had two more equally severe attacks. In twelve

cases of the twenty seven no drug allied to amidopyrine was taken at any time. So far, therefore, as my own series is concerned, one may conclude that amidopyrine is of etiological importance in about one quarter of the cases.

Finally one hears the statement that the disease is rapidly disappearing and that this is to be attributed to the lessened use of the drug. Yet the fact remains that the sales of amidopyrine for the last six months of 1934 were approximately 28 per cent greater than for any other six months' period.

That amidopyrine is of etiological importance in a considerable proportion of the cases is not denied, but for the present, at least, it would appear wise to be cautious before stating that it is the sole or even the major cause.

DR HUNTER (closing discussion). In reply to Dr Pratt, I feel myself incompetent to discuss the type of allergic phenomenon which agranulocytosis might represent. I should like to see in the future more detailed histories in regard to allergy in patients who develop agranulocytosis. I do not feel that the negative evidence in the literature will necessarily remain true for all time.

I am glad that Dr Jackson has injected doubt into the discussion, because I am going to repeat that these cases of agranulocytosis after arsphenamine

were, so far as I could determine, typical cases with out anemia or purpuric manifestations. If we doubt these cases as being agranulocytosis, I can see no reason why we should not doubt all cases due to drugs reported in the literature. Whether the bone marrow in arsphenamine agranulocytosis differs histologically from so-called idiopathic agranulocytosis is not for me to say. I understand that the pathologists themselves are not as yet in full agreement on this point.

As a final remark I should like to call attention to the fact that the therapy of this condition has not helped us in the least in elucidating its etiology and, since doubts are in order, I propose to doubt the efficacy of nucleotide. Of the twenty seven cases in my series, twenty one were treated with nucleotide. Of these nine recovered and twelve died (57 per cent mortality), of the untreated cases two recovered and four died (67 per cent mortality)—a difference of mortality too insignificant to warrant confidence in the therapy. Furthermore, the reappearance of the polynuclear cells and the improvement on the fourth or fifth day which has been noted after nucleotide may also be seen in untreated cases and in drug ingestion tests, such as that reported by Plum.

(Meeting adjourned at 5 45 P M)

## ELECTROSURGICAL CHOLECYSTECTOMY\*

### II Clinical Application

BY LESTER R. WHITAKER, M D †

**E**XPERIMENTAL results with the high-frequency electric current for cholecystectomy<sup>1</sup> have indicated that it is valuable in the treatment of the markedly inflamed, or sclerotic gall-bladder, the chief advantage being better control of hemorrhage. Investigation also showed that certain types of current should not be used alone for this purpose. Both the tissue-dissolving or so called "cutting current" and the unterminal coagulating, or "desiccating" current produced too much tissue destruction and not enough coagulation to prevent postoperative hemorrhage. The preferable operative method (described below) leaves the section attached to the liver in place and obliterates it by coagulation. The *biterminal coagulating current* has proved to be the best for this purpose. In the work here presented both fulguration<sup>2</sup> (sparkling), and contact coagulation with a needle electrode were used. Thorek of Chicago<sup>3</sup>, as a result of his experimentation, came to the conclusion that only slow electrocoagulation to considerable depth by contact of a flat electrode should be used, and not the intense heat and superficial charring of fulguration. Since Thorek produces a firm coagulum which effectively controls hemorrhage, and at the same time thoroughly destroys the section of the gall-blad-

der left in place by this method, such an application of the current seems preferable.

*A brief description of the operation follows.* The viscera are packed away and retractors placed, the gall-bladder is aspirated and split longitudinally to the cystic duct, or near it, with "cutting current", high dehydration. Fluid and stones are removed by the aspirator and a spoon. Then by the same means the tissue of the gall-bladder is cut away at about a centimeter from its attachment to the liver. The bleeding vessels are tied. To avoid serious hemorrhage the section of gall-bladder adherent to the liver is not removed. This tissue is thoroughly coagulated and dehydrated by fulguration. If any considerable portion of mucosa is left it may regenerate, resulting in a persistent sinus. If the cystic duct can be readily located it is tied or drained as indicated, if not it is ignored. The region is well drained. Omentum is packed in to protect other viscera and prevent crippling adhesions<sup>4</sup>.

Thorek has employed this procedure with unselected cases of gall-bladder disease. Results in this laboratory and clinic, however, indicate that it should be confined to those cases where careful preliminary studies, including cholecystograms, show that the gall-bladder is considerably inflamed or thickened. Previous experimental attempts upon the non-sclerotic gall-bladder have not been so satisfactory as with the markedly inflamed or sclerotic gall-bladder and it seems that cases for this method should be carefully selected.

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The first operation with the high frequency current was performed before the method just described was perfected on animals. From this patient, the gall bladder, which was moderately sclerotic, was removed by dissection from above downward. The "cutting current" with low voltage, moderate dehydration was used, keeping close to the gall bladder itself, even in places cutting through its wall rather than to risk damaging adherent viscera. As the cystic duct was approached the cutting with the electric current was discontinued for fear of injury to an adjacent bile duct or hepatic artery. Only a few vessels had to be clamped and tied during this process. A little more blunt dissection isolated the cystic duct, which was tied. The gall bladder fossa was drained with cigarette drains without exposure of gauze. The patient made an excellent recovery. After experimental development of the method described, however it was considered so much safer that actual dissection of the gall bladder with the "cutting current" was never again attempted.

The new method was an outgrowth of that of Pribram's "mukoklase" which consisted in tying the duct, splitting the gall bladder, charring the mucosa with the actual cautery sewing the leaves of the vesicle together, and closing the abdomen without drainage. Pribram obtained excellent clinical results, but experimentally with the actual cautery we had post operative sloughing and hemorrhage. It seemed preferable to remove redundant tissue of the gall bladder and electrocoagulate the remainder.

The first patient in whom the new operation was tried was a physician, an old personal friend. The diagnosis of chronic and acute cholecystitis with probable empyema had been made. The patient understood the condition, and since it appeared from animal experimentation that the new procedure would not only be allowable but probably would be the best adapted to his particular case, he agreed to its use.

Since the sixteen cases, in which electrosurgical cholecystectomy was performed, were selected, and since all furnish points of interest for discussion, brief histories, with comment, are presented.

Case 1 (Hosp. No. 224864) Operation September 28 1931. The gall bladder was freed from numerous adhesions by blunt dissection then about two ounces of purulent material were withdrawn by aspiration. The inflamed gall bladder was treated in general according to the method described above.

In this particular case the cystic duct was not easily outlined on account of much inflammatory swelling of the whole region. The duct was left open a soft rubber tube being stitched to its cut edge. Cigarette drains with no gauze exposed were placed. The patient made a rapid and excellent recovery. The bowels began to move on the second postoperative day indicating practically no general disturbance of the peritoneal cavity. There were no signs of infection. Bile drainage stopped after a

few days and the sinus closed in due time. After three years the patient was in good health. He had had no symptoms referable to the biliary or gastrointestinal systems.

Case 2 Operation January 11 1932. The gall bladder was so markedly thickened and firmly attached to the liver that sharp dissection was difficult and dangerous. It was split to the cystic duct with the cutting current and trimmed off about a centimeter from the liver all the way around. The cystic duct was so embedded in adhesions that no attempt was made to tie it. The fulgurated gall bladder tissue left attached to the liver was folded over with a suture. Two Penrose drains showing no gauze were placed in the kidney pouch running through the gall bladder fossa.

The patient made an easy recovery. She began to pass gas two days after operation. There was a profuse bile drainage for thirteen days. She was discharged on the twenty-fifth day. Two years afterwards she was in excellent health.

Comment. If the cystic duct is not tied, it is preferable to attach a soft tube at or near the stump rather than to depend on Penrose drains. It is not apparent that drainage delayed recovery in this case, and where the cystic duct can not be dissected free and securely tied drainage is imperative.

Case 3 Operation March 26 1932. The gall bladder was tremendously thickened and fibrotic with pronounced adhesions, and rather small and shortened. It was split down the front with the cutting current. At the lower end the tissues were tremendously thickened with an angulated mass which the operator believed to be the common bile duct and which might have been easily damaged in dissection. Anterior angulation of the common bile duct to a pronounced degree has been noted in several cases where the gall-bladder was shrunken and fibrotic. Apparently it was pulled up in the process of shrinkage. Redundant portions of the vesicle were trimmed away and the remaining section thoroughly coagulated. It was unsafe to dissect the cystic duct, so this was split a short distance and since it was not known whether the common duct also had been cut in this process the cystic duct was sewn together over a catheter which was left in it and brought to the outside. On account of the anomalous condition of the ducts and the tremendous inflammatory thickening about them the common duct could not be adequately palpated or explored with the probe. The patient however had never been jaundiced.

Bile drainage was profuse from the first day. Five days after the operation the patient developed scarlet fever. There was tremendous infection with sloughing of the drainage tract which remained open for three months. About a month after it closed the patient had an attack resembling biliary colic, followed by jaundice with reopening of the sinus. Injection of iodized oil under the fluoroscope (followed by radiogram) at this time showed a filling defect at the lower end of the common bile duct indicating a stone. Incidentally the whole biliary tract was injected and the patient suffered no reaction. Even though the stone was not removed the sinus tract has now closed. The patient will probably have a recurrence of the jaundice from blockage of the common duct by the stone.

Comment. This was a suitable case for electrosurgical cholecystectomy on account of the tremendous thickening of the gall bladder and



fibrous attachment to the liver. It illustrates angulation of the common duct by shrinking of the gall-bladder with the danger to the duct this carries at operation. Since the cystic duct could not be safely dissected free, drainage was imperative. The tube in the duct was preferable to flaccid drains as it minimized soiling of the local peritoneum. Before the patient contracted scarlet fever he was making a rapid recovery.

**CASE 4** Operation May 10, 1932. Adhesions were so dense that the duodenum had to be cut away from the gall bladder with sharp dissection. The gall bladder was small and contained mucopurulent material. The cystic duct was apparently closed by fibrosis. The viscus was split, the excess trimmed away, and the remainder coagulated. The stump of what appeared to be the cystic duct, though surrounded by much thickened tissue, was whipped over with fine chromic catgut stitches and two Penrose drains were placed near the stump.

The patient made a rather difficult recovery, having a good deal of distention, but no severe complications. There was moderate discharge of bile which began nine days after the operation and continued for three weeks. The patient left the hospital in good condition after four weeks.

**Comment.** This was an ideal case for electro-surgical cholecystectomy. Since the cystic duct apparently was not securely closed, drainage was probably a life-saving procedure. On the other hand, one might consider that the presence of the drain, by promoting inflammatory reaction and tissue solution, contributed to opening of the cystic duct. It seems much more likely that it was pressure in the biliary passages which produced seepage from an insecurely closed stump.

**CASE 5** Operation November 12, 1932. The gall bladder was only slightly thickened and electro-surgical cholecystectomy was not at first planned. The cystic duct and artery were dissected free, cut off and tied separately. Then it became necessary to terminate the operation speedily on account of difficulty with the anesthesia. The vesicle was too firmly attached to the liver and too vascular to allow stripping it away, so it was split, stones removed, the lower third cut away and the remainder hastily coagulated. Penrose drains were placed and the abdomen closed. The patient soon developed a postoperative pulmonary collapse, probably from a plug of mucus inhaled at the time of operation. There was also considerable wound infection. The sinus persisted, an injection of iodized oil six weeks afterwards disclosed a connection with a spherical cavity deep in the abdomen, probably a sac formed by regeneration of the gall bladder and its mucosa.

The second operation was performed December 28, 1932. Through a transverse incision below the sinus tract, the sac of regenerated gall-bladder tissue was located, split open, and coagulated thoroughly, drainage was instituted. The wound closed in due time, but the patient continued to have indigestion and a great deal of discomfort in the right upper quadrant of the abdomen.

The third operation was performed July 1, 1933. There were tremendous fibrous adhesions in the form of a cord as big as the thumb, attaching the duodenum to the site of removal of the sac of

regenerated gall bladder, which had to be cut away with sharp dissection. The common duct was not involved in adhesions, or dilated. Careful palpation revealed no thickening or stones. Drainage was instituted. The patient made an uneventful postoperative recovery. The pain, however, continued over the right upper quadrant of the abdomen and over the right lower chest in front. X-rays demonstrated that there was an adhesion producing partial obstruction of the jejunum. After consultation it was decided to operate for the obstructing adhesion and explore the common bile duct. This was done but no stones were found in the duct. Again the patient made an uneventful postoperative recovery.

The pain over the right front chest continued, more or less constant, of an aggravating nature, at times with sharp twinges. Finally in view of lack of other symptoms it was considered that this symptom was not referable to the biliary or alimentary systems. Careful study of the spinal canal indicated that there was some sort of block at the nerve roots supplying this area. Exploration revealed adhesions from an old arachnoiditis producing marked pressure on the nerve roots. This was relieved, and the patient made a perfect recovery.

**Comment.** Several lessons are to be learned from this case. (1) If the tissue of the gall bladder is to be treated electrosurgically, it must be thoroughly destroyed. Any remaining mucosa may regenerate to form a miniature gall-bladder or permanent sinus tract. (2) Coagulation of any considerable mass of tissue in this region may result in pronounced fibrous tissue proliferation, with dense adhesions. This is one of the disadvantages which have to be accepted with this method, indicating that it is best adapted to those cases where there are already pronounced adhesions, or fibrosis of the gall-bladder. (3) This patient was addicted to alcohol and after so many operations had developed a morphine habit which masked symptoms. The exploration of the common bile duct at the last operation was not necessary, though the patient had such definite symptoms that several experts in this field deemed it advisable. After the greatest difficulty the correct diagnosis of arachnoiditis with nerve root pressure was made and relieved by operation. Certainly this is an unusual condition to be confused with symptoms of disease of the biliary system.

**CASE 6** Operation June 14, 1933. This patient had persistent jaundice. A thickened and narrow fibrotic gall bladder with a little mucus in it was treated electrosurgically in the usual way. The common bile duct was opened and a single, non-faceted stone removed. A probe could not be inserted into the duodenum, but no stone could be palpated, and on account of the rather precarious condition of the patient it was decided not to open the duodenum to approach the ampulla of the common bile duct.

The patient made a good recovery but when the sinus tract closed she again became jaundiced, developed chills, hyperpyrexia, and died. Autopsy showed a stone firmly impacted in the ampulla of the common bile duct, with cholangitis and multiple abscess formation in the liver.

**Comment** There was no difficulty here with the application of electrosurgery, it was in over looking a stone in the common bile duct, or in considering further exploration inexpedient. In this work the high frequency current has not been used in incisions of the common bile duct on the theory of producing just as little tissue destruction here as possible. However where the duct is dilated and thickened, with considerable inflammation and a tendency to bleed, incision with the "cutting current" and heavy dehydration would be helpful in controlling hemorrhage which is sometimes very troublesome after incisions of the duct.

**CASE 7** This patient was operated upon three years before at another hospital a cholecystostomy and appendectomy being performed. The sinus had persisted in discharging mucopurulent matter at intervals. An attempt at sterilization of the tract was made by injection of antiseptics for several days before the second operation October 3 1933 (Massachusetts Memorial Hospitals). From an elliptical incision dense adhesions about the sinus tract were dissected with sharp instruments. Hemorrhage from the liver was controlled by deep electrocoagulation. The thickened thumb-sized gall bladder was deep in the abdomen. Upon splitting longitudinally it was found to contain mucopurulent material and several mulberry gallstones about a centimeter in diameter. The cystic duct had apparently been closed by fibrosis. Some of the gall bladder tissue was cut away with the cutting current and that left attached to the liver was scooped away with the loop electrode. The gall bladder fossa was treated by electrocoagulation and fulguration. Penrose drains were inserted to the gall-bladder fossa.

There was a slight discharge of bile for a few days followed by more or less serous oozing which was still present in small amounts at time of discharge twenty five days after the operation. Three months later the wound was solidly healed though there was considerable bulging of the upper abdomen from absence of the right rectus muscle.

**Comment** The most important lesson to be learned from this case is that a patient who is in good enough condition to have an incidental appendectomy performed should have a cholecystectomy instead of a cholecystostomy. Furthermore, from the character of the stones it is likely that they were produced in a strawberry gall bladder long previous to the first operation three years ago. They must have been overlooked in the gall bladder itself at the time of the cholecystostomy. The factor causing the persistent discharging sinus may have been the postoperative closure of the cystic duct by fibrosis.

**CASE 8** Operation February 24 1934. The gall bladder was chronically inflamed 6 to 7 millimeters in thickness. It contained a muddy brownish-green material and stones no mucosa being present. No outlet to the cystic duct could be seen. The redundant portions were trimmed away as usual and the remaining parts thoroughly coagulated by inserting the needle at intervals over the surface to destroy the large amount of excess fibrous tissue

of the gall bladder. Two Penrose drains were inserted.

There was a moderate serous discharge for a few days the patient making a good recovery and leaving the hospital twenty three days after the operation.

**Comment** Here is one case in which, as it worked out, drainage was not essential. However, it did not appear to have delayed her recovery, and there was no way of knowing at the operation that the cystic duct (although its opening could not be found) would not open up afterwards, discharging bile into the peritoneal cavity.

**CASE 9** Operation March 12 1934. The gall bladder was chronically inflamed twice normal thickness. It was treated in the manner previously described except that the gall bladder fossa was closed by a continuous stitch. The cystic duct in this case was dissected free and tied. Penrose drains were inserted.

There was no drainage of bile. She was discharged the eighteenth day after the operation the wound dry and in good general condition.

**Comment** Since the cystic duct was carefully tied in this case, and the fossa closed with a stitch, with no apparent hemorrhage, probably it would have been safe to omit drainage. However, recovery was not apparently delayed by it.

**CASE 10** (Wyman House Cambridge Hospital) Operation June 4 1934. The gall bladder was thickened and contained stones. It was removed in the usual manner a soft tube was attached to the stump of the cystic duct.

The patient had some pulmonary congestion and made a rather slow postoperative recovery. The wound healed after about two months.

**Comment** This patient was old and had been refused operation by competent advisers on account of being a poor surgical risk. It is almost certain that electrosurgical cholecystectomy allowed removal of the gall bladder with greater safety, and that drainage with the tube was a wise procedure. At least here is a patient, who was a poor risk, in whom both these devices were used with success.

**CASE 11** A man over sixty had had a total thyroidectomy for angina pectoris. Study showed the presence of gall-stones and the patient was having such severe attacks of what was almost surely biliary colic that in face of the danger he decided to have surgery attempted for relief. Operation July 10 1934. The gall bladder was only slightly thickened not adherent, but contained stones. An effort was made to remove it under local anesthesia but either had to be given. Although cholecystectomy only with removal of stones was planned at first, the gall-bladder was so easily delivered that electrosurgical cholecystectomy was decided upon. It was done in the usual manner.

The patient died the afternoon of the day following the operation having been in apparently good condition until just before death. Necropsy demonstrated an infarct of the heart which had been

present before operation The coagulated tissue of the gall bladder had remained attached to the liver but there was no damage to the liver itself or to adjacent structures

CASE 12 Operation July 16, 1934 The gall-bladder was twice normal thickness, not adherent. Removed by the usual electrosurgical method, drained

Uneventful postoperative recovery and, although an arthritic cripple, the patient was discharged from the hospital twenty days after the operation, wound solidly healed

Comment Drainage in this case, although probably not necessary, did not apparently delay his recovery

CASE 13 Operation July 27, 1934 Gall bladder was only slightly thickened, nonadherent, contained stones The usual electrosurgical operation was performed and drainage employed

Although the patient made a good recovery, drainage of mucopurulent material continued for about a week Discharged the thirteenth day

Comment It is to be noted that in this patient the gall-bladder was neither sclerotic nor acutely inflamed Probably the drainage of mucopurulent material could have been avoided if the regular sharp dissection operation had been performed Apparently then in thin-walled gall-bladders electrosurgical cholecystectomy is not advantageous

CASE 14 Operation October 19, 1934 The gall-bladder was thin walled, non adherent and contained stones The usual electrosurgical procedure was carried out, with drainage

The patient made a good immediate recovery Drainage of seropurulent material continued for about a week The sinus closed after about two weeks but at the end of a month there was swelling in the wound and about four ounces of pus were evacuated After this, rapid recovery ensued

Comment In most of the cases observed where electrosurgery has been employed with drainage, there has been a discharge of considerable muco- or seropurulent material for one to two weeks With ordinary gall-bladder cases, where clean dissection has been made, there has not been a similar discharge This indicates the necessity for drainage after electrosurgical cholecystectomy, and again that with a thin-walled gall-bladder which can be removed cleanly by sharp dissection electrosurgery is more of a disadvantage than otherwise

CASE 15 Operation October 20, 1934 Gall bladder thin walled, not adherent Removed by the usual electrosurgical method It was accidentally torn away from the liver slightly on one side Hemorrhage, there, was controlled by coagulation and fulguration of the liver tissue The cystic duct was tied and drainage instituted Since the patient had had symptoms pointing to the appendix, this was removed through a separate incision

This patient had an immediate hyperpyrexia and died three days after the operation There were no signs of intra abdominal disturbance There had been severe reactions to intravenous administration

of glucose Necropsy showed nothing significant in the abdomen The operative site was surgically clean with a small coagulum of gall bladder tissue remaining attached to the liver without apparent damage to that viscus or to any other surrounding structures The patient had a severe acute and chronic gastritis, and it is believed that she was alcoholic, which may have had something to do with her death

Comment It is almost certain that the high-frequency current did not produce damage of the liver or other tissues which led to the death of this patient In none of my experimental animals or other patients have such results been observed

CASE 16 Operation December 5, 1934 Pronounced adhesions of the omentum and other viscera to the gall bladder and liver The gall bladder was shrunken to the size of a thumb and markedly sclerotic It was opened with the "cutting current" and contained only mucopurulent material The cystic duct had apparently been closed by fibrosis A little of the gall bladder was trimmed away with the "cutting current," practically no bleeding being encountered, the rest of it was coagulated and fulgurated The common duct in this case had been pulled up and markedly angulated by the shrunken gall bladder, a stone about a centimeter in diameter was removed from the duct Its outlet was dilated to about a centimeter with graduated probes A T-tube was placed in the common duct This patient was moderately jaundiced at the time of operation Although she did not bleed excessively, care was taken to stop all bleeding points

A few days after the operation, material resembling old blood began to be discharged in considerable quantities from the drainage tract around the T-tube, coincidental with lowering of the red blood count and the appearance of a sizable tumor in the right side of the abdomen Blood transfusion was given and the bleeding stopped After a few days a colon-bacillus pus began to be discharged, the whole mass, probably a hematoma, was reduced considerably in size but pressure on it below would cause the welling out of pus, the quantity gradually lessened and the patient recovered

Comment It is possible that the hemorrhage, resulting in the abdominal hematoma, arose from the coagulated gall-bladder tissue remaining attached to the liver, but this is doubtful because the amount of tissue was very small and no definite bleeders were encountered in it It is possible that the hemorrhage came from some adhesion which had been cut, or from the incision into the common bile duct, or from damaged vessels of the abdominal wall Since this is the only patient of the group who had postoperative hemorrhage it would seem that other circumstances than the use of electrosurgery account for it

Three of the sixteen patients died after electrosurgical cholecystectomy by the modified Pribram method The cause of death in the first was a blockage of the common bile duct by stone, overlooked at the operation, which led to recurrence of jaundice, cholangitis, and multiple liver abscesses The second death came in a patient who was known to be an extremely

poor risk, having had a thyroidectomy for an *gyna pectoris*. Biliary colic, however, rendered life intolerable. Postmortem examination revealed that a cardiac infarct had been present at the time the operation was performed. Yet, in neither of these cases would the method of operation seem to have had anything to do with the unfortunate result. The third patient was supposed to be a good operative risk. The gall bladder itself was not severely diseased and could have been removed readily by the usual dissection method. The patient developed immediately following intravenous glucose injection, a hyperpyrexia and died the third day, having been in coma most of the time. There had been no unusual abdominal signs. Necropsy showed that the operative site was clean, with no damage to the liver or other viscera. The gall bladder fossa contained the coagulated tissue that remained of the gall bladder. All ducts were normal. There were no signs of peritonitis or hemorrhage. There was a severe acute and chronic gastritis probably from alcoholism. In this case there was no obvious relation that could be made out between electrosurgery and death of the patient. Thus none of the three deaths in the sixteen cases of electrosurgical cholecystectomy could be attributed to the use of the electrosurgery itself. The only poor result was in the patient with whom on account of emergency at the operation there was insufficient time for thorough electrosurgical treatment of the gall bladder, resulting in partial regeneration which necessitated a second operation.

The best results experimentally<sup>4</sup> as well as clinically were obtained with the markedly inflamed or sclerotic gall bladders. There would seem to be little advantage in using electrosurgery by this method at least, in the thin walled gall-bladder which can be readily dissected by the usual method.

#### DISCUSSION OF THE THOREK METHOD OF ELECTROSURGICAL OBLITERATION OF THE GALL-BLADDER

In November 1933<sup>3</sup>, and in July 1934<sup>6</sup>, Thorek published a criticism of the Pribram method<sup>5</sup> of treating the gall bladder and presented important developments of his own. Briefly, the Thorek method is as follows. The field is isolated with moist laparotomy sponges. The gall bladder is aspirated. The cystic duct is ligated and divided. The gall bladder is incised from above downward with special diathermy scissors or knife. Stones are removed. The bile ducts are carefully explored. Redundant portions of the gall bladder are removed by diathermy, and the section remaining attached to the liver is thoroughly coagulated by contact with a flat electrode. Charring by fulguration is carefully avoided. The gall bladder tissue is coagulated to a sufficient depth to destroy the whole of it. The peritoneal edges are carefully approximated over the coagulated area with a running stitch. Then a graft of falciform ligament, either by

pedicle flap or free transplant, is stitched over the gall bladder fossa. The stump of the cystic duct is "peritonized", either by stitching the peritoneal edges over it or by attaching a free graft. The abdominal wound is tightly closed without drainage.

The method was employed in unselected cases of acute and chronic cholecystitis, cholelithiasis, gangrene of the gall bladder, early perforation with escape of bile, suppurative. Thorek's first article gives the impression that, given a patent common duct, drainage should never be employed if this method is used. In the body of the second paper, he admits the necessity of drainage in the case of inability to "peritonize" the cystic duct and gall bladder bed, but the summary says that in cases where the part of the gall bladder left attached to the liver is thoroughly coagulated and the falciform ligament superimposed, the cystic duct being "peritonized", drainage is entirely omitted, even in unselected cases, in which the method was used seventy five consecutive times without a fatality.

Results are important but no matter how apparently favorable they may be, other considerations, such as mechanical factors in surgical technique, physiological and pathological conditions, have to be taken into account.

A discussion of drainage follows. Thorek attributes almost every complication in biliary surgery to seepage of bile. In one hundred recent cases of cholecystectomy I have seen only one where a complication could be attributed to seepage, and it seems that this is not often serious provided the bile can find its way out readily through a drainage tract. The one case mentioned had pronounced seepage, probably from a needle hole in the common bile duct placed with the intention of exploration, but which was not carried out on account of poor condition of the patient. She had a profuse flow of bile through the drainage tract and died of subhepatic abscess.

Seepage of bile after cholecystectomy by the usual dissection method depends more upon the way the dissection is done than on any other factor. If the gall bladder is removed from below upward, the cystic duct and cystic artery tied, and then the gall bladder stripped off the liver with the fingers, a raw oozing surface will be left on the liver which will drain bile in considerable amounts whether or not there were aberrant cystic ducts running from liver to gall bladder. It is probable that the number of these ducts is overestimated, and that in the great majority of cases the reason why there is seepage after cholecystectomy is that an impatient surgeon snatches the gall bladder roughly off the liver. Explanation of bile seepage by the "blowing off" of the ligature from the cystic duct is overemphasized. There is no high explosive present to increase pressure in the biliary system. In the absence of mechanical blockage the common-duct sphincter can hardly

support more than three or four hundred millimeters of water. To be sure the ligature on the cystic duct probably does come off at times, but this is because the duct is friable or too much other tissue, including perhaps the cystic artery and considerable fat, is included in the ligature. This tissue rapidly liquefies and the ligature loosens. If the cystic duct is dissected cleanly, and tied not too tightly, with an adequate stump, there will almost never be leakage of bile from the stump. This has been demonstrated in our laboratory many times on dogs.

If the gall-bladder is removed from above downward, dissecting carefully, tying off all large strands of tissue which carry blood vessels (and possibly aberrant bile ducts), taking care to keep close to the gall-bladder and to leave a normal layer of areolar tissue over the liver, and then if the cystic duct is carefully dissected and tied according to the above method, there will almost never be seepage, whether or not the gall-bladder fossa and cystic duct stump are "peritonized." These cases when drained with soft Penrose drains, no gauze exposed, will discharge a little sero-sanguineous material for a day or two, and then heal quickly with extremely little discomfort to the patient.

With regard to electrosurgical cholecystectomy Thorek emphasizes the importance of covering the fossa of the gall-bladder with peritoneum, preferably after stitching it up, from a graft of the falciform ligament, either with a pedicle or free. He also emphasizes the importance of a peritoneal covering over the stump of the cystic duct. It would seem very difficult to make such a graft waterproof with a few stitches, and it is my opinion that if bile seeps from the liver bed, or the coagulum liquefies, or the ligature on the cystic duct loosens, the peritoneal graft will not be effective in preventing leakage, because there is almost always some tissue liquefaction and loosening of a cat-gut suture in a day or two after it is placed in the tissues. In ordinary cholecystectomy the important thing in preventing leakage is that the liver and the bile ducts must not be wounded, and the cystic duct must be dissected free and securely tied. Even though there is some liquefaction about the tie on the duct, the swelling from the inflammatory reaction in this firm tissue will maintain closure of the lumen. Such is not the case with a line of sutures.

Thorek speaks of "a sequestered coagulated mass" after electrosurgical cholecystectomy. In two dogs I removed sections of liver and stopped the hemorrhage by deep coagulation of the tissue by inserting the needle at intervals (circumvallation). One was sacrificed after two days and one after two years. In the former the coagulum was encapsulated by omental adhesions, in the other it had been absorbed. How-

ever, one dog in which electrosurgical coagulation of the gall-bladder was done according to Thorek's method was discovered one month later to have a large, cold, subhepatic abscess. In most of the patients upon whom electrosurgical cholecystectomy was performed, even by the coagulation method of Thorek, drainage of mucopurulent material persisted for a week or more. It seems preferable that this matter should come out of a drainage tract rather than be absorbed in the peritoneal cavity, or result in a collection of fluid.

Thorek, in his condemnation of drainage in surgery of the biliary system, makes no distinction as to type of drain. Drains in which gauze comes in contact with the tissues may produce all the dire results outlined by him, including erosion of vessels, predisposition to infection, etc. There is only one excuse for a gauze drain or gauze packing after cholecystectomy and that is a case of hemorrhage uncontrollable by another method. Even so, we recognize it as an evil. On the other hand, soft drains of gauze covered by rubber dam are not so easily accused of these sins. Of course there is a certain amount of fibrinous deposit and inflammatory reaction, with resulting slight increase of adhesions and the accompanying discomfort to the patient, but these are to be preferred to the danger of a collection of blood, bile, or infective material in the peritoneal cavity. The soft rubber tube-drain is for drainage of a tube, either the common bile duct or the stump of the cystic duct. Where the cystic duct cannot be adequately closed, the attachment of a rubber tube at or near its stump will give more effective drainage than the flaccid rubber drain, and the extra irritation of the firmer tube is preferable to the increased soiling from less effective direction of the outflow around soft rubber. I have, however, used rubber dam (Penrose) drains placed near an open cystic duct with excellent results. Thorek says "many patients succumb because of drainage." On the other hand, since drainage is still employed by the majority of surgeons, we might say that probably many more would have succumbed if drainage had not been done. If the gall-bladder can be dissected cleanly without wounding the liver, and a normal cystic duct freed and securely tied, or if by the electrosurgical method, the fossa of the gall-bladder is well coagulated, and the duct also securely tied, drainage is probably not essential. But if there is any expectation of oozing of bile from the liver, or leakage from the cystic duct, or bleeding anywhere, drainage should be employed. Drainage should always be employed in cases of markedly acute or gangrenous cholecystitis or empyema, no matter what surgical method of handling the condition is used.

In electrosurgical obliteration of the gall-

bladder, Thorek depends upon the collapse and coagulation of the vessel walls to prevent post-operative hemorrhage. It is doubtful that with the cystic artery and its larger branches this would always be sufficient. I prefer to clamp the larger vessels as they are cut across when the redundant portions of the gall bladder are removed with the electric knife, and then tie them off with catgut. In the subsequent coagulation of the attached portion of the gall bladder these tied vessels are avoided. In other words more dependence is placed upon the tie than upon coagulation of the vessel walls.

The coagulum is likely to loosen sooner than the tie.

Thorek implies that shock is reduced by cutting and coagulating the tissue, thus not leaving exposed nerve ends as would be done by ordinary dissection. However, in operations upon the biliary system shock is also produced by other means such as prolonged or rough handling of peritoneum and viscera, exposure and chilling or by hemorrhage. When the gall bladder is cleanly dissected through a small incision care being taken to pack away viscera and stop all hemorrhage, the patients suffer extremely little shock, and make surprisingly easy and rapid recoveries.

#### SUMMARY

The clinical results on sixteen cases of electrosurgical cholecystectomy by a special method previously worked out on animals are presented. Essentially the method is as follows. The gall bladder is split to the cystic duct which is tied, the redundant portions of the gall bladder are removed by the electrosurgical "cutting current", the part of the gall bladder remaining attached to the liver is thoroughly coagulated.

The gall bladder best adapted to this method is one markedly inflamed or sclerotic. The method is not so safe or so effective in the non thick-

ened gall bladder, and the patients should be carefully selected with this point in mind.

The preferable current is the biterminal coagulating, contact should be made by the active electrode and the tissue treated to considerable depth. The tissue dissolving or "cutting current", and the uniterminal or "desiccating current" are not recommended for the treatment of the section of gall bladder left attached to the liver.

There were three deaths in the sixteen cases, none of them could be definitely related to the use of electrosurgery. The other patients made uneventful recoveries, for the most part with few complications, and the final results in all have been satisfactory, some of them having been followed for two and three years.

The question of drainage is discussed in the body of the paper. Where there has been considerable coagulated tissue left in place, where there has been pronounced inflammatory reaction, and where it has not been possible to tie the cystic duct securely, it has seemed advisable to drain. The type of drain has been the soft rubber tube inserted or attached to the stump of the cystic duct, or the rubber-dam cigarette drain (Penrose) with no exposure of gauze.

When the above principles are adhered to in carefully selected cases, those with markedly inflamed or sclerotic gall bladders, the method is recommended.

#### REFERENCES

1. Whitaker, L. R. Electrosurgical cholecystectomy. I. Experimental observations. *New Eng. J. Med.* 213: 596 (Sept. 26) 1935.
2. Idem: Surgical management of gallbladder disease. *New Eng. J. Med.* 253: 719 (Oct. 9) 1935.
3. Thorek, M. C. Cholecystelectrocoagulation without drainage in the treatment of gall bladder disease. *Illinois M. J.* 64: 45 (Nov.) 1933.
4. Whitaker, L. R. Extract from Practitioner's Library of Medicine and Surgery. New York, D. Appleton-Century Co., Vol. 4, 1934, p. 24.
5. Pribram, B. O.: Mikroklaase und Drainage. *Gallenchirurg. Zentrabl. f. Chir.* 55: 773 (March 31) 1933.
6. Thorek, M. C. Electrosurgical obliteration of the gallbladder. *J. A. M. A.* 102: 189 (July 31) 1934.

#### IRONIZED YEAST—KRUSCHEN SALTS—RADOX BATH SALTS

Among representations prohibited by the Federal Trade Commissioner's recent order to cease and desist were Ironized Yeast, Kruschen Salts and Radox Bath Salts. It has been alleged that Ironized Yeast will cure or relieve indigestion, constipation, nervousness, or skin eruptions except when such conditions result from a deficiency of vitamin B or iron or both, and that it will free users thereof of such diseases overnight. Other assertions banned were that Ironized Yeast is more effective than yeast and iron used separately and that persons deficient in shape or form will be transformed into well developed persons by its use, unless such representations are limited to improvement in health resulting from increased appetite and gain in weight where such persons have been deficient in vitamin B or iron or both.

#### WILL NOT REDUCE FAT

The "Kruschen Salts" case was decided by the

court, New York City. It arose on petition for review filed by F. Griffiths Hughes Inc. of Rochester, N. Y. The court affirmed the Commission's cease and desist order against Hughes Inc., and in its opinion discussed the findings and evidence at length, reaching the conclusion that the findings were supported by the evidence.

The order to cease and desist prohibited representations that "Kruschen Salts" constitutes a cure or remedy of obesity or that it will of itself reduce excess fat. Representations were also prohibited to the effect that "Radox Bath Salts" has therapeutic value when used in the bath, that it releases great quantities of oxygen when so used that its use at home combines the properties of world famous spas or produces the effects of treatment at such places that it stimulates or energizes the body or that it is imported from England.

Several reports on Kruschen Salts were issued by the Boston Bureau to local radio stations and newspapers as far back as 1930—*The Boston Better Business Bureau*.

# CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

## CASE 21401

### PRESENTATION OF CASE

A sixty-three year old American housewife entered complaining of abdominal pain and constipation.

For the past thirty-five years the patient complained of frequent severe aching pain in the pit of the stomach coming on regularly about 5 a.m. and relieved by lying on the left side. It never occurred at any other time and she had never tried soda or food for relief. Seven years before admission, after a fall in which she struck her back, she began to notice a dull aching pain in the left side of the back at the level of the waist which was brought on and made worse by long-continued standing and was relieved by sitting down. During the past four months it had been more severe even while lying down. It was more or less completely relieved by aspirin. Four months before admission she gradually became constipated, a condition which she had never had previously. This became more severe during the past month and on one occasion she went without a bowel movement for four days. There were no bloody, tarry or clay-colored stools. Five weeks before admission she began to complain of soreness over her entire abdomen around the right costal margin. At about the same time her appetite began to fail rapidly and since then she had nausea two or three times a day but no vomiting. She remained in bed almost constantly during the past month, during which time she lost ten pounds in weight. She had lost twenty-two pounds during the past seven months.

Her family and marital histories are non-contributory. There was no history of carcinoma or tuberculosis.

She had an attack of acute tonsillitis and grippe five years before admission and pneumonia one year before admission. At that time she was hospitalized for three weeks.

Physical examination showed a groaning woman constantly moving her lips and swallowing frequently. Her upper teeth were false. The tonsils were large and cryptic. The chest was slightly barrel shaped and showed bronchovesicular breathing. The heart was not remarkable. Abdominal examination showed an

enlarged, slightly tender liver and marked tenderness around the umbilicus. Upon pelvic examination three nodules, each about 1.5 centimeters in diameter, could be felt high up in the vaults.

The temperature was 98°, the pulse 80. The respirations were 20.

Examination of the urine was negative except for an occasional epithelial and white blood cell. The blood showed a red cell count of 4,180,000, with a hemoglobin of 60 per cent. The white cell count was 14,000, 71 per cent polymorphonuclears. The stools were hard and showed negative guaiac tests. A Hinton test was negative. A liver function test showed 0 to 5 per cent retention. The icteric index was 7, the nonprotein nitrogen of the blood 29 milligrams. A gastric analysis showed free hydrochloric acid. A guaiac test was negative.

X-rays of the chest were negative. A barium enema passed through the ileocecal valve. There was a considerable amount of air and fluid present. Several redundancies in the region of the sigmoid were noted. There was a questionable defect present in the region of the sigmoid. The cecum was never well outlined. No conclusions could be drawn because of the large amount of air present. A reexamination three days later showed that the entire large bowel as far as the rectum was still full of barium which had been introduced three days before. Another examination two days later showed that some of the barium introduced five days before was still present in the colon. No obstruction could be shown.

Operation was considered inadvisable and she was discharged nine days after admission. She did poorly while at home, gradually went downhill and died twelve days after discharge, approximately eight months after the onset of her illness.

### DIFFERENTIAL DIAGNOSIS

DR. WILLIAM B. BREED: This is a very unusual story and one gets the impression of some mechanical element here. She may have a diaphragmatic hernia. That is the first thing that comes to mind because of the nature of the pain, occurring as it does only at five o'clock in the morning and relieved by change in position, also because of the duration of thirty-five years. The backache of seven years' duration can best be explained on the basis of hypertrophic changes in the spine following a blow.

It seems to me that there are three other distinct phases to the present illness: (1) the mechanical story of upper abdominal pain occurring at five o'clock in the morning, and relieved by change in position, (2) the blow on the left side of her back which seems to be unrelated to the first symptom, and (3) the abdominal pain associated with constipation. Of

course, there is no reason why a person with diaphragmatic hernia should not develop cancer of the intestine

Except for the abdomen the physical examination does not contribute anything. The tonsils are large and cryptic. She might normally have an emphysematous chest at sixty. The heart was not remarkable. There is no question of a mass in the abdomen other than the liver. She is not vomiting so she presumably does not have upper intestinal obstruction. She has no fever, the pulse is good and the respiration is good. The physical examination does not help me very much.

She apparently was not given barium by mouth because of the question of obstruction, and so we cannot go farther into the question of diaphragmatic hernia which should interest us a good deal. It comes down really to the question of what this later process is. Presumably she has some low colonic obstruction some where in the region of the sigmoid although they say definitely no obstruction could be made out. There is a partial obstruction because of retention of barium and because at one examination they found some defect. She may have an annular carcinoma of the sigmoid, a scirrhous process which may not produce fecal blood but which gradually has been constricting the large intestine. They did not think they had to operate on her. The prognosis was evidently considered hopeless, so they sent her home. Apparently someone attended her while she was at home and succeeded in getting a post mortem examination.

We have to make a diagnosis on this case purely on the history. I am willing to say she had diaphragmatic hernia as a chance. I think the blow that she had was just incidental and that the pain was explainable on the basis of hypertrophic changes in her spine. Then, what caused her death? Presumably a new growth in the lower colon with metastases to the liver. I do not know what she had in the chest. She may have had fluid. Three masses were felt in the vaults. They may be metastatic nodules in the pelvic peritoneum or the broad ligaments.

Perhaps the tumor may have been primary in the ovary with metastases to the colon and to the liver.

DR. BENJAMIN CASTLEMAN. Ordinarily, Dr. Breed, if a tumor is primary in the ovary you should be able to feel an abdominal mass.

DR. BREED. Yes, that is true at this stage. Of course, there is tenderness around the umbilicus. That does not mean anything to me at all. Does it mean anything to anyone?

A PHYSICIAN. Could it mean pancreatic involvement?

DR. BREED. Yes it could. I think that she has malignant disease in the lower abdomen, but where it is primary I believe would be somewhat of a guess. We have

nothing that will locate it either in the pelvic organs or in the sigmoid.

A PHYSICIAN. Do you think she has metastatic involvement in the liver?

DR. BREED. Yes.

A PHYSICIAN. Could that fall have precipitated a metastatic process in the spine?

DR. BREED. If you have so much metastases to the spine that a fall would cause symptoms I should think she would have had pain before, because you often get pain in metastatic carcinoma of the spine before you find anything by x-ray at all. Aspirin does relieve pain from malignancy surprisingly well. In this case, however, it was used over a period of seven months and that would make it seem benign.

A PHYSICIAN. Do you think that malignancy around the duodenum or pancreas would cause that pain in the back?

DR. BREED. Yes, but we have the story that it followed a blow. A person of sixty-five who has a sharp blow in the back may very often have continued pain because of hypertrophic changes. I would rather take that than go afield, that is what I think is afield, and try to explain it by metastatic disease.

A PHYSICIAN. Do you think that the nodules point in any way to abdominal Hodgkin's disease?

DR. BREED. I should not think so since they were felt on pelvic examination in the vaults and broad ligaments and there were no masses anywhere else.

#### CLINICAL DIAGNOSIS

Carcinoma of the colon with generalized metastases.

#### DR. WILLIAM B. BREED'S DIAGNOSES

Carcinoma of the sigmoid with metastases to the liver and pelvis.

Diaphragmatic hernia?

#### ANATOMIC DIAGNOSES

Adenocarcinoma of the tail of the pancreas with metastases to the peritoneum, pelvis, uterus, liver, diaphragm, mesenteric and retroperitoneal glands, lung and pleura. Endocarditis, acute bacterial, mitral and aortic.

Endocarditis, chronic rheumatic, aortic and mitral.

Thrombophlebitis of the left common iliac vein.

Pulmonary thrombosis.

Pulmonary infarction.

Pulmonary atelectasis.

Arteriosclerosis. Marked aortic and coronary, slight renal.

#### PATHOLOGIC DISCUSSION

DR. CASTLEMAN. We found the abdominal cavity completely filled with tumor. All the



glands along the aorta, mesentery and omentum were replaced with tumor. This was especially marked around the sigmoid and rectum, a fact that may explain her recent constipation. The pelvis was completely filled with tumor but we found no evidence of any intrinsic disease of the colon or pelvic organs. The site of the primary tumor was the tail of the pancreas, which apparently accounts for her left back pain. The tumor measured about five centimeters in diameter and was hard and fibrous. The medial margin of the tumor was poorly defined as it merged with the body of the pancreas. Histologic examination showed a well-differentiated scirrhous adenocarcinoma. The liver was filled with metastases and weighed 2,000 grams. There were also metastases to the lungs and gall bladder, the latter possibly responsible for her right upper quadrant pain. The lungs showed pulmonary thromboses with infarction which probably were embolic from a well-marked thrombophlebitis of the left common iliac vein. In one of the infarcts there was a small focus of metastatic carcinoma. She had a terminal acute bacterial endocarditis in addition to an old chronic rheumatic endocarditis without stenosis of the mitral and aortic valves. The heart itself was not enlarged.

DR BREED Was there any diaphragmatic hernia?

DR CASTLEMAN None were noted but one may have been present and, if so, it was probably a small one. There was no evidence of peptic ulcer.

DR BREED I do not see how you can explain her symptoms of thirty-five years' duration except on the basis of a small mechanical defect.

A PHYSICIAN Would gall stones ever produce anything like that?

DR BREED I do not think so. It is a mechanical story.

A PHYSICIAN How often do you see carcinoma originate in the tail of the pancreas?

DR CASTLEMAN It is very rare. We recently had a patient with a similar story in which a clinical diagnosis of carcinoma of the colon with liver metastases was also made. In this case the tumor was in the body of the pancreas. Tumors of the body as well as the tail of the pancreas almost always have left upper back pain.

DR BREED Yes, the pain in the left back here turns out to be a very important symptom.

A PHYSICIAN How much involvement of the pancreas do you have to have before you get sugar in the urine?

DR BREED Considerable.

A PHYSICIAN Apparently the pain about the umbilicus indicated pancreatic involvement?

DR BREED Either that or liver.

A PHYSICIAN She probably did have arthritis of the spine.

DR CASTLEMAN Although an x-ray film of the spine was not taken, one of the knees showed hypertrophic changes.

## CASE 21402

### PRESENTATION OF CASE

A seventy-seven year old unemployed American entered complaining of vomiting.

Twelve years before entry the patient began having attacks of abdominal cramps with indigestion, flatulence and occasional vomiting. Four years before entry he vomited after meals about twice a week. He also had slight epigastric pain after meals relieved by soda. The pain occasionally came on at night and was severe enough to wake him. The vomitus was sometimes blood streaked. He also had cough with the production of a cupful of yellowish sputum a day, often streaked with blood. The cough and vomiting continued. One year before entry he began having occasional attacks of diarrhea characterized by five or six movements a day. These attacks occurred about once a month and lasted about two days. No blood, pus or mucus had been noticed in his stools. Three months before entry he began having dizzy spells in the morning and also some difficulty in swallowing. The epigastric pain had become worse and he frequently vomited small amounts about ten minutes after each meal. Two weeks before admission the vomiting became more frequent and for the past two days he had almost continuous vomiting. Questionable tarry stools had been noticed during the past few weeks.

His family and marital histories are non-contributory.

During the past two years he had had rather marked shortness of breath on exertion and some ankle edema. He had had nocturia two or three times for the past four years.

Physical examination showed an elderly, thin, cyanotic man in no acute distress. The skin was pale. The pupils were slightly irregular and fixed to light. His chest was pigeon-shaped in type, with an increased anterior posterior diameter. The spine was stiff. The right lung posteriorly was dull and showed numerous medium moist râles. The heart was not enlarged to percussion. There was a rough systolic murmur at the apex. The blood pressure was 140/90. The liver was felt two to three finger-breadths below the costal margin. The prostate was slightly enlarged and firm.

The temperature was 101.8°, the pulse 135. The respirations were 30.

Examination of the urine showed a slight trace of albumin and an occasional hyaline and granular cast. The blood showed a red cell count of 3,460,000, with a hemoglobin of 60 per

cent. The white cell count was 12 000, 86 per cent polymorphonuclears. The sputum was very tenacious and bloody and no tubercle bacilli could be found. The stools were negative. A Hinton test was negative. The non-protein nitrogen of the blood was 56 milligrams. A phenolsulphonethalein test gave 20 per cent excretion in one hour. A tuberculin test 1:1000 was negative.

X-ray examination of the chest showed a soft, irregular mottled dullness extending from the right hilus region to involve the greater portion of the right lung field. The dullness was ill defined and hazy. The diaphragm on that side was flat and irregular in outline. The costophrenic angles were obliterated by a band of dullness which rose along the axillary line. The entire left lung field was clear. The heart was not remarkable. A gastrointestinal series showed slight irregularity on the lesser curvature, one inch in length just below the esophagus, and also an irregularity in the last inch of the stomach. This incomplete examination showed 100 per cent residue in the stomach.

The temperature remained around 101°. On the fourth day digitalis was begun. His condition remained about the same except for a chill on the fifth day. During the third week, however, he developed attacks of severe cyanosis associated with dyspnea and a weak rapid pulse. Several times he appeared dead but was revived with caffeine. He died approximately three weeks after admission.

#### DIFFERENTIAL DIAGNOSIS

DR. OLIVER COPE. In order to arrive at a diagnosis in this case it is necessary to limit colonic symptoms, demonstrable gastric disease, and unusual extensive unilateral disease in the chest. It would definitely be easier to make two diagnoses but I shall try to account for them all in one.

The history suggests a long standing gastric lesion. The duration of twelve years suggests an ulcer as a background although syphilis must be considered. It would be rare for a primary malignancy to have lasted so long. The episode of diarrhea one year before entry suggests to my mind a possible perforation into or involvement of the colon. The difficulty in swallowing might be due either to involvement in the cardia or compression of the esophagus by a mediastinal mass such as metastatic carcinomatous lymph nodes. The dizzy spells I think we can dismiss as part of the cachexia. The recent frequency of vomiting very shortly after the meal suggests again involvement of the esophagus or of the cardia. The tarry stools are of no help since malignancy, ulcer, syphilis or other infection can cause them. The shortness of breath and ankle edema are also explicable on the basis of the cachexia and the anemia. In the presence of an enlarged pros-

tate, nocturia is of no importance in the differential diagnosis.

On physical examination the cyanosis is the first thing of interest, since this points to the pulmonary complication. The irregular and fixed pupils must be taken seriously, even in the presence of the negative Hinton test, and lend definite weight to the diagnosis of syphilis of the stomach. I shall refer to this later in relation to the chest findings. The record states that the liver was felt well below the costal margin but it does not say whether the liver was irregular or tender. The enlarged liver may therefore be either chronic passive congestion or possibly metastatic malignancy. Gumma of the liver is also possible.

The laboratory data are not helpful except for the negative Hinton and the absence of tubercle bacilli in the sputum. The sputum is stated to have been tenacious and bloody but it does not state whether other cells or spores were present. If actinomycosis were present in the lung the spores probably would have appeared in the sputum. The elevated non-protein nitrogen could be accounted for by either the high intestinal obstruction, which was obviously present, or by diminished renal function from an enlarged prostate. It is of no significance in the diagnosis of the primary disease.

The x-ray findings are of course most important. The physical examination has already told us of disease in the right lung. That the disease by x-ray is limited entirely to the right side is of importance since, were the areas in the right lung due to blood borne metastatic malignant disease, they should also have appeared on the left side. This is not so true, however, of metastases from the abdomen to the chest by the lymph channels. The x-ray is also of aid in that it shows no shift of the mediastinum. Had there been compression of a major bronchus by either a primary tumor or by a tumor metastatic to the glands in the mediastinum there should have been either complete bronchial occlusion with atelectasis or partial occlusion with probable abscess formation. The x-ray suggests neither atelectasis nor an abscess localized to the area of any one bronchus. The findings in the lung are not consistent with the usual type of bronchopneumonia since again the left side is not affected. It is not a terminal lobar pneumonia. The diffuse areas of mottled dullness with a fixed low diaphragm suggest to me a chronic infection. It could also be produced by syphilis, actinomycosis, lymph borne malignancy or lymphoma. The gastrointestinal x-rays bear out the probable diagnosis made from the history of involvement high in the stomach. Involvement of the stomach in two places and also possibly of the colon suggests lymphoma. From the history the most

probable diagnosis would be a gastric ulcer which later became malignant with mediastinal and pulmonary metastases. The x-ray findings make this less likely as there is too little in the stomach and disease on only one side in the chest. Lymphoma is a possible diagnosis but the chest plate suggests infection more than malignancy. The negative Hinton rules out one of the best diagnoses to explain both the gastric and pulmonary findings. In spite of the fixed pupils I am forced to abandon the diagnosis of syphilis. Tuberculosis could also account for the whole picture but the absence of bacilli in the sputum absolutely rules this out in view of the active disease in the chest. I am left with those infections which may present a picture similar to widespread tumor formation, the most likely of these is actinomycosis. It is possible but not probable that actinomycosis would have lasted as long as twelve years without a sinus in the chest.

#### CLINICAL DIAGNOSES

Carcinoma of the lung, probably metastatic  
Arteriosclerosis  
Arteriosclerotic heart disease

#### DR OLIVER COPE'S DIAGNOSES

In order of preference  
Actinomycosis  
Lymphoma.  
Gastric malignancy with pulmonary metastases

#### ANATOMIC DIAGNOSES

Duodenal ulcer, obstructing  
Arteriosclerosis marked coronary, aortic, renal and cerebral  
Myocardial infarct, left ventricle  
Pulmonary abscess, right  
Thrombosis with occlusion of a branch of the pulmonary artery, right  
Straddling non-occluding thrombus of the secondary bifurcation of the pulmonary artery, left.  
Pulmonary infarct, right  
Mural thrombi of the aorta.  
Organized thrombus of the superior mesenteric artery  
Small infarcts of basal ganglia  
Focal necrosis of the adrenal  
Hydrothorax, right  
Peripheral edema  
Pleuritis, chronic fibrous, bilateral  
Diverticula of the large intestine  
Perisplenitis, old

#### PATHOLOGIC DISCUSSION

DR TRACY B MALLORY Dr Cope's effort to fit all the complicated sections of the puzzle together on the basis of a single diagnosis is

always the most interesting way to treat a differential diagnosis. In the majority of cases in which it can be done, moreover, it probably leads to success. This method, however, is apt to be more fruitful in the case of young or middle-aged people than in the case of men who have reached the senile period. In many of these individuals the various parts of the mechanism often seem to break down simultaneously, much like the famous one-horse shay. A single case often presents in itself a veritable museum of different pathologic conditions, each of which in itself might well have been adequate to cause death. The present patient was an example of such a situation and I believe a correct diagnosis of any large proportion of his various ailments was quite impossible.

The single most important lesion and the one which undoubtedly accounted for his gastric symptoms and vomiting was a deep penetrating ulcer on the posterior wall of the duodenum which had constricted the lumen to a diameter of barely a centimeter and deeply invaded the head of the pancreas. We were not able to find in the stomach itself any second lesion and the esophagus was likewise negative.

The second important finding for which almost no leads except edema and dyspnea were provided in the record was an extreme grade of coronary sclerosis with complete old calcified obliteration of the descending branch of the left coronary artery and a large area of infarction in the anterior wall of the left ventricle. This showed both old fibrous scarring and fresh necrosis of muscle fibers, indicating that the lesion had not been produced all at one time. A rather large, fairly adherent thrombus overlay the infarct on the ventricular surface. The lungs showed a rather complicated combination of infarction, abscess and pneumonic consolidation. One large abscess, 4 centimeters in diameter, was found near the hilum of the right lung. Several partially adherent pulmonary emboli were present in the arteries of both right and left lungs. The most probable explanation would seem to be multiple septic emboli with secondary abscess formation. A totally unexpected finding was another organized embolus partially occluding the mouth of the superior mesenteric artery. This may have had something to do with one of the episodes of diarrhea in the earlier part of the history. The liver, far from being large, was markedly atrophic and weighed only 850 grams. It was not cirrhotic, however, and the sizes of all the other organs confirmed the impression of senile atrophy. Other findings which probably have nothing to do with the symptomatology were severe atheroma of the aorta with multiple ulcers and adherent thrombi, scattered small areas of infarction of the basal ganglia, marked fibrous pleuritis, benign prostatic hypertrophy and multiple uninflamed diverticula of the large intestine.

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## "POLIO" VACCINES

With the wave of infantile paralysis that has come rolling up from the South, there is a new surge of alarm, and, as a consequence, a revival of fervent hope that some means may be found to shield our young against its afflictions. Parents do not have to be persuaded or urged to volunteer their children for the trial of new biologic agents—they demand them. It was this parents' plea that disrupted the carefully planned investigations on the value of convalescent serum. Means for a careful appraisal were easy to devise, impossible to carry out. Each individual lot of convalescent serum should have been tested for its potency, the serum should have been given only to alternate cases, and in large amounts. With these provisions the supply of serum would have sufficed for only a small proportion of the cases that eventually received it. Donors were all too few, the preliminary testing of the serum was expensive but the main difficulty encountered was the

inability of our special investigators to with hold this promising agent from any stricken child. The plea for serum was too impassioned to be resisted. Our sentiment overruled our reason. The Australians, especially Jean Mac namara, were more coldly scientific. They were more interested in ultimate rather than proximate results, and unless we are mistaken, they, with reason, still have faith in the specific inhibiting action of convalescent serum on the unknown virus of anterior poliomyelitis.

We grant that the final results of the American trials are unimpressive, but we still feel that they were not fair trials, and we hold that the true value of convalescent serum is yet unknown. We cannot detach our thoughts from the facts that this disease, by an attack, sets up in nearly all cases a lifelong immunity, and that the serum of those recently convalescing has strong protective power against the virus. This power may not be great enough to arrest the progress of the infection once it is established, but we feel that we should not say that it has not this power until all the resources of exact experimental measures have been exhausted.

From serum we have now turned to vaccines, and again the situation is repeated. Thousands of mothers beg for its trial and the supply of vaccine is limited. Before we again let our eagerness confuse our reason, it may be well to consider some of the facts of the matter.

The manner in which the vaccine is prepared may or may not be of importance—whether the living virus in the infected monkey's cord is rendered innocuous by formaldehyde or by a soap. Experience only can tell which method, or some other yet untried, is the most efficacious. But lest we decide too hastily from the results of a few treatments (and it takes many subjects to make the results significant), it may be well to recall some of the information regarding active immunization that has come from the Harvard Infantile Paralysis Commission. If we remember their laboratory experiences correctly, it would seem that the injection of subinfective amounts of living, virulent virus, repeated many times, failed to produce sufficient active immunity to protect a susceptible monkey against a subsequent inoculation with a fatal dose of virus. If the active, living virus thus administered, fails to establish immunity, it would seem reasonable to expect that a killed or greatly attenuated virus would be no more antigenic. There may, of course, be some biological law operating here of which we are ignorant, but we cannot heartily share the optimism that now prevails over the possibilities of vaccine treatment.

At the risk of being called even more pessimistic, we venture to call attention to a question of simple arithmetic. If we grant with Avecock and others that an appreciable proportion of

the population have at some time been infected with the virus of poliomyelitis and thereby have become immune, then any rational approach to the evaluation of a prophylactic agent would include a preliminary test for susceptibility. For each test one monkey would be required. Since, for the production of vaccine by present methods, one monkey furnishes at the most, sufficient vaccine for ten injections, then each single injection would require one-tenth monkey. If we are to determine if the vaccine treatment has established active immunity then another monkey is called for, and if we are to ascertain the period for which protection exists, then still more monkeys would be needed—one monkey for each individual test. Another factor in our equation is the number of Rhesus monkeys available. Disregarding the monkeys for all supplemental immunity tests, excepting the first one after the vaccine injections, we could express the problem, in its simplest terms, in an equation somewhat in this form

Let A equal the number of children born each year, and

A<sup>1</sup> the number found to be immune by the susceptibility test

Let M represent the number of monkeys required for test and vaccine production, and

M<sup>1</sup> the number of monkeys available each year, then with

R standing for the ratio of the monkey supply to the demand

$$\frac{AM + (A - A^1) \frac{M}{10} + (A - A^1) M}{M^1} = R$$

It is not necessary for statisticians to supply the exact figures for A, M and M<sup>1</sup>, and it requires no profound knowledge of mathematics to arrive at R. Its value is significant.

However, such baffling problems have never discouraged the scientist, and we favor the trial of any agent or procedure that will spare us from the afflictions that anterior poliomyelitis imposes on us. But we hope that our eagerness will be tempered with reason and that any trial of any preventive or curative agent will be conducted with full and rigid controls, so that we may be spared the disappointment that has too often followed some of our earlier attempts.

### CONSERVATION OF HEALTH

'CONSERVATION is the effort to insure to society the maximum present and future benefit from the use of natural resources.'

If man is regarded as a part of nature and the mind is at least natural in its origin, we may without violence, transfer to man the application of some ideas which have come into

prominence in dealing with extra-human factors in national life.

The physician is concerned with disease, its relief, its cure and often as an after-thought, its prevention. The negative view of health as being "not sick" has often received just criticism. The idea of health as something positive has been emphasized by persons interested in preventing disease and in public health.

But most persons though perhaps fearing disease are actually well most of the time, and the needed point of view is less the prevention of disease and more the conservation of the health we already possess. There is here a shade of difference in meaning and emphasis which colors the whole outlook. For those who are sick, health is something to be achieved. For the well, it is a conservation of what we have. We eat, we work, we play, we sleep, not to prevent disease but to conserve and preserve that which we already have, that is to say, our well.

We have no word which connotes nicely just what we have in mind when we refer to a person who conserves health. "Health conservationist" is barbaric. "Hygienist" we cannot rescue from its present plight. A "conservative" is popularly anathematized from the start.

Yet it is a very fine and at the same time a very robust idea that we should conserve the resources of mind and body which have been given us by nature, and that we should by art insure to ourselves and society the maximum present and future benefit which those resources make possible. It represents a point of view we should more often seek to occupy, until it dominates our instinctive and habitual reactions.

### THE REAPPOINTMENT OF DR HENRY M POLLOCK

READERS of the *Journal* will be glad to know that Governor Curley has reappointed Dr Henry M Pollock, Superintendent of the Massachusetts Memorial Hospitals, as Associate Commissioner of the Massachusetts Department of Mental Diseases and that the appointment has been confirmed by the Executive Council. Dr Pollock who had had many years' experience as Superintendent of a State hospital before coming to Massachusetts, has served continuously, and with distinction, as Associate Commissioner of the Department of Mental Diseases since it was organized in 1916 and has given freely of his time and service without any compensation. The *Journal* and the medical profession it represents are appreciative of this recognition by His Excellency, Governor Curley, of efficient service in developing and maintaining the high standards of this important Department of the State.

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## The Massachusetts Medical Society

SECTION OF OBSTETRICS  
AND GYNECOLOGY\*

C. J. KICKHAM M.D.,  
Chairman

R. S. TITUS M.D.  
Secretary

524 Commonwealth Ave., Boston Mass. 472 Commonwealth Ave. Boston Mass.

POSTPARTUM HEMORRHAGE—ETIOLOGY  
AND TREATMENT

Much bleeding is unusual between the birth of the baby and the expulsion of the placenta. Should it occur one must consider as possible causes, lacerations of the genital tract or cervix and partial separation of the placenta.

Hemorrhage occurring after the delivery of the placenta may be due (1) to a flabby, atonic poorly contracted uterus, (2) retention of a portion of the placenta, or (3) laceration of the cervix.

The diagnosis is usually easily determined and must be made especially in all cases of severe hemorrhage so that prompt and appropriate treatment may be given to check it.

Bleeding from a lacerated vessel in the perineum or labia is easily discovered and stopped by ligation or suture.

Although it is always lacerated during labor the cervix is seldom the source of much bleeding or it does not cease spontaneously. If after the placenta has been delivered and the uterus is firmly contracted bleeding continues unaffected by contraction or relaxation of the uterus, cervical lacerations must be considered as the possible cause. This is especially probable in cases of difficult operative delivery undertaken when the cervix was not fully dilated and always when the presenting part has been pulled through the cervix. In such a situation the cervix must be carefully examined under direct vision and any extensive lacerations closed by sutures.

Partial separation of the placenta is a frequent cause of bleeding. So long as it remains attached over its entire area and the uterus is contracted hemorrhage does not occur. While partial detachment may occur spontaneously it is often the result of undue haste in attempting to express the placenta. Gentle kneading of the uterus will usually stimulate contractions and check the bleeding. Pituitrin given intramuscularly is a powerful oxytocic and in many hospitals it is given routinely immediately after the birth of the baby. Usually the technique of merely holding the uterus plus the effect of pituitrin, which may be repeated

A series of short selected articles by members of the Section will be published weekly.  
Comments and questions by subscribers are solicited and will be discussed by members of the Section.

Dr Thomas C Quirk of Watertown, Associate Medical Examiner of the Seventh Middlesex District.

These appointments were confirmed by the Council as were the nominations of Dr Brickley and Dr O'Leary previously referred to in this Journal

#### DR. TRUESDALE TO ADDRESS THE ASSOCIATION FRANCAISE DE CHIRURGIE AT PARIS, FRANCE

Dr Philemon E Truesdale, of Fall River, has gone to France to give an address on "Operative Technique and Physiological Consequences of Diaphragmatic Hernia" before the Association Francaise de Chirurgie on, or about, October 10

#### ANTERIOR POLIOMYELITIS CASES FOR 1935

WEEKLY LIST, SEPTEMBER 23 28

City or Town	
Dartmouth	1
Dennis	1
Fall River	1
Halifax	1
North Attleboro	1
Norton	1
Somerset	1
Taunton	2
Abington	1
Avon	1
Brockton	1
East Bridgewater	1
Franklin	1
Medfield	1
Norwood	2
Quincy	1
Walpole	1
Weymouth	1
Arlington	1
Belmont	1
Boston	17
Cambridge	8
Chelsea	2
Lexington	2
Malden	1
Medford	1
Newton	3
Revere	4
Somerville	3
Watertown	2
Wellesley	1
Amesbury	1
Haverhill	2
Lawrence	1
Lowell	1
Lynn	1
Manchester	1
Methuen	2
Peabody	1

Fitchburg	1
Hudson	1
Marlboro	1
Northbridge	1
Uxbridge	1
Worcester	1
Longmeadow	2
Springfield	1
Greenfield	2
Lenox	1
North Adams	1
Total	88

#### DR. SPECTOR BECOMES THE SECRETARY TREASURER OF THE BOSTON MEDICAL HISTORY CLUB

Dr Benjamin Spector, Professor of Anatomy, Tufts College Medical School, has been made Secretary-Treasurer of the Boston Medical History Club

#### RECENT DEATHS

**MACDONALD**—WILLIAM LEWIS MACDONALD, M.D. died in Malden, Massachusetts, September 24, 1935, at the home of his nephew, Dr W C MacDonald.

Dr Macdonald was born July 29, 1834, at Cambridge, New Brunswick, the son of Alexander Black Macdonald and Janet Hendry Macdonald. He came to Boston in 1859 and studied dentistry for a time, probably in connection with attendance at the Harvard Medical School, receiving his M.D. degree in 1865. He served as district physician on the staff of the Boston Dispensary but, preferring dentistry, followed that professional work until 1910.

He joined the Massachusetts Medical Society in 1865 and retired in 1903. He was also a member of the Massachusetts Dental Society, the Harvard Medical Alumni Association, and was a Mason.

Since 1900 he had lived with his stepdaughter, Miss Grace Wilbur Conant, 95 Mt Vernon Street, Boston.

He was taken ill while on a visit to New Brunswick a short time before his death and was taken to Malden in an ambulance. His wife died in 1900. Dr Macdonald is survived by his stepdaughter, a stepson, Walter A. Conant of Temple, New Hampshire, and several nephews and nieces.

**PFEIFFER**—ALBERT PFEIFFER, M.D., died in the Memorial Hospital at Albany, N.Y., September 24, 1935, as the result of an automobile accident August 27.

Dr Pfeiffer was a member of the Massachusetts Medical Society from 1919 to 1925.

He was born in Franklinville, New Jersey, in 1882. During his residence in Massachusetts, he was active in public health work, and for the past ten years had been director of the Division of Social Hygiene of the New York State Department of Health.

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POSTPARTUM HEMORRHAGE—ETIOLOGY  
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Partial separation of the placenta is a frequent cause of bleeding. So long as it remains attached over its entire area and the uterus is contracted, hemorrhage does not occur. While partial detachment may occur spontaneously it is often the result of undue haste in attempting to express the placenta. Gentle kneading of the uterus will usually stimulate contractions and check the bleeding. Pituitrin given intramuscularly is a powerful oxytocic and in many hospitals it is given routinely immediately after the birth of the baby. Usually the technique of merely holding the uterus plus the effect of pituitrin, which may be repeated

A series of short selected articles by members of the Section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the Section.



if necessary, and waiting a reasonable period will be sufficient for the placenta to become separated and easily expressed. Rarely in the course of many deliveries the placenta does not entirely separate from the uterus and because of hemorrhage must be removed manually

Frequently after the placenta has been expressed considerable bleeding may occur because the uterus does not contract well. It is flabby and atonic. Such a condition often occurs after long-drawn-out labors or following difficult operative deliveries when the patient shows evidences of shock. Occasionally the situation may be alarming because of the amount of bleeding, the failure of the uterus to contract well and the fact that the patient is already in shock with low blood pressure and rapid thready pulse. The uterus should be held and kneaded to promote contractions. An ampule of ergot should be given intramuscularly and pituitrin repeated either intramuscularly or intravenously. Salt solution given by hypodermoclysis, hypertonic glucose intravenously, heaters and blankets and morphine or pantopon hypodermically should be used as supportive treatment for the relief of the surgical shock. If the condition of the uterus does not improve it should be packed to check the hemorrhage. Rarely a hysterectomy may be necessary because of uncontrollable bleeding. A transfusion, of course, should be done if the patient has bled enough to make it necessary.

Every placenta should be carefully examined to make certain that it is intact and that none of it is still within the uterus. Should the examination show that any considerable part or an accessory lobe is missing, it should be removed manually lest it cause bleeding.

A real postpartum hemorrhage is a serious condition demanding prompt, appropriate, and energetic treatment. Many will be avoided by careful, conservative obstetrics. To accomplish this, one should watch the parturient patient carefully. Keep her as comfortable as possible and thus conserve her strength. See that she is delivered with the minimum of trauma to the cervix and perineum. Insist that the uterus be held intelligently after delivery and that no attempt be made to express the placenta until it has separated.

#### ANNOUNCEMENT

##### POSTGRADUATE EXTENSION COURSES 1935-1936

The districts listed below will begin their courses this fall, the others are scheduled for the spring of 1936. You may obtain programs from your district chairman. Please see him for further details.  
REGINALD FITZ, M.D., *Chairman*  
LEROY E. PARKINS, M.D., *Secretary*  
Executive Committee on Postgraduate Instruction

#### BARNSTABLE

(Meetings on Sundays at 4 00 P.M. at the Cape Cod Hospital, Hyannis)

##### CANCER (Two Sessions)

October 13—Session 1 Cancer of Breast and Uterus, Sarcomas of Bone, Lymphoma and Leukemia. Their Early Diagnosis  
Discussion of Life History of Cancer and Grades of Malignancy

October 20—Session 2 Cancer of Stomach, Bowel and Genito-Urinary Tract.  
Modern Care of Inoperable and the Incurable, the Development of Improved Methods of Caring for these Cases with Less Pain and Discomfort with Minimum of Drug Therapy

##### ARTHRITIS (One Session)

October 27

- (a) Medical Care of Patient in the Home
- (b) Orthopedic Treatment in Hospital and Aids in Home Treatment.

##### LUNG DISEASES (Two Sessions)

November 3—Session 1

- (a) Differential Diagnosis and Treatment of Lobar Pneumonia
- (b) The Surgical Problems of Empyema

November 10—Session 2

- (a) The Significance of Symptoms and Signs in Chronic Lung Disease, Tuberculosis, Bronchiectasis, etc
- (b) The Value of Surgery in Above Disease Problems

##### KIDNEY AND BLADDER DISEASES—A (Two Sessions)

November 17—Session 1 (Medical)

Acute Nephritis—Etiology, Diagnosis and Treatment.

Nephrosis and its Treatment.

November 24—Session 2 (Surgical)

Hematuria, its Significance in Surgical Diseases of Kidney and Bladder

##### KIDNEY AND BLADDER DISEASES—B (Two Sessions)

December 1—Session 1 (Medical)

Chronic Nephritis  
Cardiorenal Disease  
The Use of Diuretics

December 8—Session 2 (Surgical)

Prostatism and Related Diseases  
Cystitis and Pyelitis

##### LATEST DEVELOPMENTS IN ENDOCRINOLOGY (One Session)

December 15

J. I. B. VAIL, M.D., *Chairman*

#### BRISTOL SOUTH (Fall River Section)

(Meetings on Mondays at 4 00 P.M. at the Stevens Clinic of the Union Hospital, Prospect Street, Fall River)

##### ARTHRITIS (One Session)

October 7

- (a) Medical Care of Patient in the Home
- (b) Orthopedic Treatment in Hospital and Aids in Home Treatment.

##### DERMATOLOGY (One Session)

October 14—Ten Common Skin Diseases—Diagnosis and Treatment

- (1) Impetigo Contagiosa
- (2) Scabies
- (3) Acne Vulgaris
- (4) Psoriasis and Seborrheic Dermatitis

- (5) Epidermophytosis
- (6) Herpes Simplex and Zoster
- (7) Eczema
- (8) Erythema Multiforme
- (9) Verruca Vulgaris
- (10) Dermatitis Medicamentosa and Dermatitis Venenata

October 21—Neurological Aids in the Diagnosis and Treatment of Disease from the Medical Viewpoint. Problems of History and Examination with Special Reference to

- (a) Neurosyphilis Multiple Sclerosis and Other Degenerative Conditions.
- (b) Diseases with Acute Onset, Such as Meningitis and Cerebral Accidents (One Session.)

#### PEDIATRICS (Two Sessions.)

October 23—Session 1

Abdominal Disease in Childhood Medical and Surgical Aspects

November 4—Session 2

The Neonatal State and its Diseases Medical and Surgical Aspects.

#### LUNG DISEASES (Two Sessions.)

November 18—Session 1

- (a) Differential Diagnosis and Treatment of Lobar Pneumonia.
- (b) The Surgical Problems of Empyema.

November 25—Lung Collapse Therapy (One Session)

#### LUNG DISEASES

December 2—Session 2

- (a) Significance of Symptoms and Signs in Chronic Lung Disease Tuberculosis Bronchiectasis, etc.
- (b) The Value of Surgery in Above Disease Problems.

#### DISEASES OF THE LIVER. (Two Sessions)

December 9—Session 1

Hepatitis and Painless Jaundice. Problems in Diagnosis and Treatment.

December 16—Session 2

Surgical Problems in Diagnosis of Acute Disease of Gall Bladder and Liver

EUGENE A. MCCARTHY, M.D., *Sub-Chairman*

#### ESSEX NORTH

(Meetings on Fridays at 4 00 P.M. at the Hotel Bartlett, 95 Main Street, Haverhill.)

#### ARTHRITIS (One Session)

October 11.

- (a) Medical Care of Patient in the Home.
- (b) Orthopedic Treatment in Hospital and Aids in Home Treatment.

#### CANCER. (Two Sessions)

October 18—Session 1

Cancer of Breast and Uterus Sarcomas of Bone Lymphoma and Leukemia Their Early Diagnosis.

Discussion of Life History of Cancer and Grades of Malignancy

October 25—Session 2

Cancer of Stomach Bowel and Genito-Urinary Tract.

Modern Care of Inoperable and the Incurable the Development of Improved Methods of Caring for these Cases with Less Pain and Discomfort with Minimum of Drug Therapy

#### OPHTHALMOLOGY AND OTOLARYNGOLOGY (One Session.)

November 1

- (a) The Major Hazards in Diagnosis of Diseases of the Eye Ear Nose and Throat as Seen in General Practice.
- (b) Special Treatment in Acute Medical and Traumatic Diseases of Eye Emergencies arising in the Treatment of the Ear Nose and Throat

November 8—Neurological Aids in the Diagnosis and Treatment of Disease from the Medical Viewpoint. Problems of History and Examination with Special Reference to

- (a) Neurosyphilis Multiple Sclerosis and Other Degenerative Conditions.
- (b) Diseases with Acute Onset, Such as Meningitis and Cerebral Accidents. (One Session.)

#### KIDNEY AND BLADDER DISEASES.—A (Two Sessions)

November 15—Session 1 (Medical)

Acute Nephritis—Etiology Diagnosis and Treatment. Nephrosis and its Treatment.

November 22—Session 2 (Surgical)

Hematuria its Significance in Surgical Diseases of Kidney and Bladder

November 29—Accident Work in Cases Covered by Insurance Practical and Professional Considerations. (One Session)

#### PEDIATRICS (Two Sessions.)

December 6—Session 1

Abdominal Disease in Childhood Medical and Surgical Aspects.

December 13—Session 2

The Neonatal State and its Diseases Medical and Surgical Aspects.

FRANCIS W. ANTHONY, M.D. *Chairman*

#### ESSEX SOUTH

(Meetings on Tuesdays at 4 00 P.M. in the Nurses' Home of the Salem Hospital, Salem.)

#### ARTHRITIS. (One Session.)

October 15

- (a) Medical Care of Patient in the Home.
- (b) Orthopedic Treatment in Hospital and Aids in Home Treatment.

#### CANCER. (Two Sessions.)

October 22—Session 1

Cancer of Breast and Uterus Sarcomas of Bone Lymphoma and Leukemia. Their Early Diagnosis.

Discussion of Life History of Cancer and Grades of Malignancy

October 29—Session 2

Cancer of Stomach Bowel and Genito-Urinary Tract.

Modern Care of Inoperable and the Incurable the Development of Improved Methods of Caring for these Cases with Less Pain and Discomfort with Minimum of Drug Therapy

#### IMMUNOLOGY (One Session.)

November 5—Latest Developments in Immunization.

- |               |                     |
|---------------|---------------------|
| Smallpox      | Diphtheria          |
| Typhoid       | Whooping Cough      |
| Measles       | Infantile Paralysis |
| Scarlet Fever |                     |

## DISEASES OF THE LIVER (Two Sessions)

November 12—Session 1.

Hepatitis and Painless Jaundice Problems in Diagnosis and Treatment.

November 19—Session 2

Surgical Problems in Diagnosis of Acute Disease of Gall Bladder and Liver

## KIDNEY AND BLADDER DISEASES—A (Two Sessions)

November 26—Session 1 (Medical)

Acute Nephritis—Etiology, Diagnosis and Treatment.

Nephrosis and its Treatment.

December 3—Session 2 (Surgical)

Hematuria, its Significance in Surgical Diseases of Kidney and Bladder

## PEDIATRICS (Two Sessions)

December 10—Session 1

Abdominal Disease in Childhood, Medical and Surgical Aspects

December 17—Session 2

The Neonatal State and its Diseases Medical and Surgical Aspects

WALTER G. PHIPPEN, M.D., *Chairman*

—HAMPTON

(Meetings on Thursdays at 4 00 P.M. at the Academy of Medicine, Professional Building, 20 Maple Street, Springfield, and at 8 00 P.M. at the Holyoke City Hospital, Holyoke)

## DISEASES OF THE LIVER. (Two Sessions)

October 10—Session 1

Hepatitis and Painless Jaundice Problems in Diagnosis and Treatment.

October 17—Session 2

Surgical Problems in Diagnosis of Acute Disease of Gall Bladder and Liver

## KIDNEY AND BLADDER DISEASES—A (Two Sessions)

October 24—Session 1 (Medical)

Acute Nephritis—Etiology, Diagnosis and Treatment.

Nephrosis and its Treatment.

October 31—Session 2 (Surgical)

Hematuria, its Significance in Surgical Diseases of Kidney and Bladder

## CANCER (Two Sessions)

November 7—Session 1

Cancer of Breast and Uterus, Sarcomas of Bone, Lymphoma and Leukemia Their Early Diagnosis

Discussion of Life History of Cancer and Grades of Malignancy

November 14—Session 2

Cancer of Stomach, Bowel and Genito-Urinary Tract

Modern Care of Inoperable and the Incurable the Development of Improved Methods of Caring for these Cases with Less Pain and Discomfort with Minimum of Drug Therapy

## LUNG DISEASES (Two Sessions)

November 21—Session 1

(a) Differential Diagnosis and Treatment of Lobar Pneumonia.

(b) The Surgical Problems of Empyema.

December 5—Session 2

(a) Significance of Symptoms and Signs in Chronic Lung Disease, Tuberculosis, Bronchiectasis, etc

## (b) The Value of Surgery in Above Disease Problems

## DERMATOLOGY (One Session)

December 12—Ten Common Skin Diseases—Diagnosis and Treatment.

(1) Impetigo Contagiosa

(2) Scabies

(3) Acne Vulgaris

(4) Psoriasis and Seborrheic Dermatitis

(5) Epidermophytosis

(6) Herpes Simplex and Zoster

(7) Eczema

(8) Erythema Multiforme

(9) Verruca Vulgaris

(10) Dermatitis Medicamentosa and Dermatitis Venenata

December 19—Neurological Aids in the Diagnosis and Treatment of Disease from the Medical Viewpoint. Problems of History and Examination with Special Reference to

(a) Neurosyphilis, Multiple Sclerosis and Other Degenerative Conditions

(b) Diseases with Acute Onset, Such as Meningitis and Cerebral Accidents (One Session)

GEORGE L. SCHADT, M.D., *Chairman*

## HAMPSHIRE

(Meetings on Wednesdays at 4 15 P.M. in the Nurses' Home of the Cooley Dickinson Hospital, Northampton)

## ARTHRITIS (One Session)

October 16

(a) Medical Care of Patient in the Home.

(b) Orthopedic Treatment in Hospital and Aids in Home Treatment.

## CANCER. (Two Sessions)

October 23—Session 1

Cancer of Breast and Uterus, Sarcomas of Bone, Lymphoma and Leukemia Their Early Diagnosis

Discussion of Life History of Cancer and Grades of Malignancy

October 30—Session 2

Cancer of Stomach, Bowel and Genito-Urinary Tract

Modern Care of Inoperable and the Incurable, The Development of Improved Methods of Caring for these Cases with Less Pain and Discomfort with Minimum of Drug Therapy

## IMMUNOLOGY (One Session)

November 6—Latest Developments in Immunization

Smallpox

Diphtheria

Typhoid

Whooping Cough

Measles

Infantile Paralysis

Scarlet Fever

November 13—Neurological Aids in the Diagnosis and Treatment of Disease from the Medical Viewpoint. Problems of History and Examination with Special Reference to

(a) Neurosyphilis, Multiple Sclerosis and Other Degenerative Conditions

(b) Diseases with Acute Onset, Such as Meningitis and Cerebral Accidents (One Session)

## PEDIATRICS (Two Sessions)

November 20—Session 1

Abdominal Disease in Childhood, Medical and Surgical Aspects

November 27—Session 2

The Neonatal State and its Diseases Medical and Surgical Aspects

PSYCHIATRY (One Session)

December 4—Management of Psychic States in the Care of General Diseases Especially Chronic Disorders.

Subpsychotic States.

KIDNEY AND BLADDER DISEASES—B (Two Sessions)

December 11—Session 1 (Medical)

Chronic Nephritis  
Cardiorenal Disease.  
The Use of Diuretics

December 18—Session 2 (Surgical)

Prostatism and Related Diseases  
Cystitis and Pyelitis.

ROBERT B. BRIGHAM M.D., *Chairman*

MIDDLESEX EAST

(Meetings on Wednesdays at 4 00 P.M. at the McIrose Hospital Melrose, except the session on "Ophthalmology and Otolaryngology" on October 9 which will be held at the Bear Hill Golf Club Stoneham, at 1 30 P.M. Five sessions will be given this fall and the remaining sessions of the series in the spring.)

OPHTHALMOLOGY AND OTOLARYNGOLOGY (One Session.)

October 8

- The Major Hazards in Diagnosis of Disease of the Eye, Ear Nose and Throat as Seen in General Practice
- Special Treatment in Acute Medical and Traumatic Diseases of Eye. Emergencies arising in the Treatment of the Ear Nose and Throat.

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- The Surgical Problems of Empyema

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- Significance of Symptoms and Signs in Chronic Lung Disease Tuberculosis Bronchiectasis, etc.

- The Value of Surgery in Above Disease Problems.

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December 6—Management of Psychic States in the Care of General Diseases Especially Chronic Disorders.

Subpsychotic States.

JOSEPH H. FAY M.D. *Chairman*

MIDDLESEX SOUTH

(Meetings on Tuesdays at 4 15 P.M. at the Cambridge Hospital, Cambridge except the session on "Lung Diseases" on October 16 which will be held at the Middlesex County Sanatorium Waltham at the same hour)

LUNG DISEASES (Two Sessions)

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- The Surgical Problems of Empyema.

PSYCHIATRY (One Session)

October 23—Management of Psychic States in the Care of General Diseases Especially Chronic Disorders.  
Subpsychotic States

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Nephrosis and its Treatment.

November 5—Session 2 (Surgical)

Hematuria its Significance in Surgical Diseases of Kidney and Bladder

ARTHRITIS (One Session.)

November 12

- Medical Care of Patient in the Home.

- Orthopedic Treatment in Hospital and Aids in Home Treatment.

CANCER. (Two Sessions)

November 19—Session 1.

Cancer of Breast and Uterus Sarcomas of Bone Lymphoma and Leukemia. Their Early Diagnosis.

Discussion of Life History of Cancer and Grades of Malignancy

November 26—Session 2

Cancer of Stomach Bowel and Genito-Urinary Tract.

Modern Care of Inoperable and the Incurable the Development of Improved Methods of Caring for these Cases with Less Pain and Discomfort with Minimum of Drug Therapy

DERMATOLOGY (One Session.)

December 3—Ten Common Skin Diseases—Diagnosis and Treatment.

- Impetigo Contagiosa
- Scabies
- Acne Vulgaris
- Psoriasis and Seborrheic Dermatitis
- Epidermophytosis
- Herpes Simplex and Zoster
- Eczema
- Erythema Multiforme
- Verruca Vulgaris
- Dermatitis Medicamentosa and Dermatitis Venenata

OPHTHALMOLOGY AND OTOLARYNGOLOGY (One Session.)

December 10

- The Major Hazards of Diagnosis of Diseases of the Eye, Ear Nose and Throat as Seen in General Practice.

- Special Treatment in Acute Medical and Traumatic Diseases of Eye Emergencies arising in the Treatment of the Ear Nose and Throat.

December 17—Neurological Aids in the Diagnosis and Treatment of Disease from the Medical Viewpoint. Problems of History and Examination with Special Reference to

- Neurosyphilis Multiple Sclerosis and Other Degenerative Conditions

- Diseases with Acute Onset Such as Meningitis and Cerebral Accidents. (One Session)

EDMUND H. ROUBINS, M.D. *Chairman*

NORFOLK SOUTH

(Meetings on Mondays at 8 30 P.M. at the Quincy City Hospital Quincy)

Dr Thomas C Quirk of Watertown, Associate Medical Examiner of the Seventh Middlesex District.

These appointments were confirmed by the Council as were the nominations of Dr Brickley and Dr O'Leary previously referred to in this Journal

DR. TRUESDALE TO ADDRESS THE ASSOCIATION FRANCAISE DE CHIRURGIE AT PARIS, FRANCE

Dr Philemon E Truesdale, of Fall River, has gone to France to give an address on "Operative Technique and Physiological Consequences of Diaphragmatic Hernia" before the Association Francaise de Chirurgie on, or about, October 10

ANTERIOR POLIOMYELITIS CASES FOR 1935

WEEKLY LIST, SEPTEMBER 23 28

City or Town	
Dartmouth	1
Dennis	1
Fall River	1
Halifax	1
North Attleboro	1
Norton	1
Somerset	1
Taunton	2
Abington	1
Avon	1
Brockton	1
East Bridgewater	1
Franklin	1
Medfield	1
Norwood	2
Quincy	1
Walpole	1
Weymouth	1
Arlington	1
Belmont	1
Boston	17
Cambridge	8
Chelsea	2
Lexington	1
Malden	1
Medford	1
Newton	1
Revere	4
Somerville	3
Watertown	2
Wellesley	1
Amesbury	1
Haverhill	1
Lawrence	1
Lowell	1
Lynn	1
Manchester	1
Methuen	2
Peabody	1

Fitchburg	1
Hudson	1
Marlboro	1
Northbridge	1
Uxbridge	1
Worcester	1
Longmeadow	1
Springfield	1
Greenfield	1
Lenox	1
North Adams	1
Total	81

DR. SPECTOR BECOMES THE SECRETARY TREASURER OF THE BOSTON MEDICAL HISTORY CLUB

Dr Benjamin Spector, Professor of Anatomy Tufts College Medical School, has been made Secretary-Treasurer of the Boston Medical History Club

RECENT DEATHS

MACDONALD—WILLIAM LEWIS MACDONALD, M.D. died in Malden, Massachusetts, September 24, 1935, at the home of his nephew, Dr W C MacDonald

Dr Macdonald was born July 29, 1834, at Cambridge, New Brunswick, the son of Alexander Black Macdonald and Janet Hendry Macdonald. He came to Boston in 1859 and studied dentistry for a time, probably in connection with attendance at the Harvard Medical School, receiving his M.D. degree in 1865. He served as district physician on the staff of the Boston Dispensary but, preferring dentistry, followed that professional work until 1910.

He joined the Massachusetts Medical Society in 1865 and retired in 1903. He was also a member of the Massachusetts Dental Society, the Harvard Medical Alumni Association, and was a Mason.

Since 1900 he had lived with his stepdaughter, Miss Grace Wilbur Conant, 95 Mt Vernon Street, Boston.

He was taken ill while on a visit to New Brunswick a short time before his death and was taken to Malden in an ambulance. His wife died in 1900. Dr Macdonald is survived by his stepdaughter, a stepson, Walter A. Conant of Temple, New Hampshire, and several nephews and nieces.

PFEIFFER—ALBERT PFEIFFER, M.D., died in the Memorial Hospital at Albany, N.Y., September 24, 1935, as the result of an automobile accident August 27.

Dr Pfeiffer was a member of the Massachusetts Medical Society from 1919 to 1925.

He was born in Franklinville, New Jersey, in 1882. During his residence in Massachusetts, he was active in public health work, and for the past ten years had been director of the Division of Social Hygiene of the New York State Department of Health.

He is survived by a daughter Miss Elizabeth Pfeiffer and three brothers, William Louis and Immanuel Pfeiffer all of Bedford Massachusetts

**CLANCY**—**WILLIAM HENRY CLANCY M.D.**, of 80 Otis Street, Cambridge Massachusetts died at his home, September 21 1935. He was born in 1865 and graduated from the New York University Medical College in 1886. He had maintained an active practice in Cambridge since 1891 and had served on the staff of the Cambridge Hospital and the Holy Ghost Hospital. He was physician to the Middlesex County Jail and Cambridge schools for many years previous to his retirement in August 1935.

He was a Fellow of the Massachusetts Medical Society and the American Medical Association and held membership in the Cambridge School Board and the Boston Lodge of Elks.

Dr. Clancy is survived by his widow Mrs. Mary Dwyer Clancy a son Paul E. Clancy and a daughter Mrs. Francis M. Greene of New York.

**CARMODY**—**BELL SCOTT CARMODY M.D.**, of South Boston died September 23 1935 at the Boston City Hospital. She was born in 1888 at Taghkanic New York, and graduated from the Teachers College, Columbia University and from the College of Physicians and Surgeons in Boston in 1923.

She was prominent in civic work in South Boston having been president of the Women's Club and chairman of the emergency relief committee.

She had been active in legislative matters for several years, working for the protection of the interests of the Boston College of Physicians and Surgeons.

She is survived by a son John G. Carmody and a brother George A. Scott. Her husband died several years ago.

## NOTICES

### MEDICAL CLINIC AND STAFF ROUNDS AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 P.M. on Thursday October 10 in the amphitheater of the Peter Bent Brigham Hospital Dr. Henry A. Christian, Physician-in-Chief, Hersey Professor of the Theory and Practice of Physic in the Harvard Medical School will give a medical clinic. To it are cordially invited practitioners and medical students. These clinics will be repeated on Thursdays October to May.

On Saturdays in the wards of the Peter Bent Brigham Hospital, from 10 to 12 staff rounds will be conducted by Dr. Christian.

### INFANTS AND CHILDREN'S HOSPITALS CLINICAL CONFERENCE

A Clinical Conference by members of the staff of the Infants and Children's Hospitals will be held in the Amphitheatre of the Children's Hospital on Monday October 7 at 4 P.M.

### BOSTON UNIVERSITY SCHOOL OF MEDICINE SURGICAL CLINIC AT THE BOSTON CITY HOSPITAL

Friday October 4 121 Cheever amphitheatre  
Dr. Robert C. Cochrane, Assistant Professor of Surgery Harvard Medical School will discuss  
"Thyroid Disease"

Physicians and medical students are invited

### APPOINTMENT AS ASSISTANT SURGEON IN THE RESERVE CORPS OF THE U. S. PUBLIC HEALTH SERVICE

An examination for entrance into the Reserve Corps of the United States Public Health Service in the grade of Assistant Surgeon is hereby announced to be held November 18 1935. Applicants must not have passed their thirtieth birthday.

Persons desiring permission to take this examination should make request to the Surgeon General U. S. Public Health Service, Washington D. C., for the necessary blanks and other information.

H. S. CUMMINGS Surgeon General

### LECTURES BY DR. S. J. THANNHAUSER

Dr. S. J. Thannhauser formerly Professor of Medicine and Director of the Clinic of the University of Freiburg Germany will give a course of clinical lectures during the coming academic year on Saturday mornings at 9 A.M. at the Boston Dispensary. The subjects for October and November are as follows:

- October 5—Tuberculosis.
- October 19—Tuberculosis.
- October 26—Nephritis.
- November 2—Diabetes.
- November 9—Diabetes.
- November 16—Liver Disease.
- November 23—Peptic Ulcer.

Practitioners in any part of New England are cordially invited. This course is made possible by a grant from the Bingham Associates Fund for the Advancement of Rural Medicine.

### REMOVALS

**HENRY W. HUDSON JR., M.D.**, announces the removal of his office to 1101 Beacon Street, Brookline Mass.

**WILLIAM F. DEWIRE, M.D.**, announces the removal of his office from 6 Magnus Avenue, to 167 Elm Street Somerville Mass.

**WILLIAM M. SAKTORO, M.D.**, announces the removal of his office to 500 Park Drive (off Beacon Street) Boston, Mass.

## NOTICES OF MEETINGS

## MIDDLESEX SOUTH DISTRICT MEDICAL SOCIETY

*Dear Doctor*

About 200 out of a total membership of 850 Fellows of this District Society usually attend our meetings. Isn't it time that those of you who have become members of the Middlesex South District Medical Society during the past five years put in an appearance?

Do you know what the Medical Economic Situation is at present? Many of you do not know what laws have recently been passed which affect the physician.

If you attend the next meeting, chances are you will be much wiser in respect to our profession.

All this leads up to the following facts. This District Society will hold its next meeting at the Hotel Continental, Cambridge, on Wednesday, October 9, 1935, at noon. We meet to honor a most active member of our district, who is now the President of the Massachusetts Medical Society. Dr. Charles E. Mongan can and will tell you much of interest to yourself and the profession.

As usual all paid up members are guests of the Society at the luncheon. Internes of hospitals in this district are invited without charge. Members may obtain luncheon tickets for their friends from Dr. Edward Mellus, the Treasurer.

Many of you will attend the Postgraduate Extension Courses which begin on Tuesday, October 15.\*

If you know physicians who are not yet members of this Society, please instruct them to obtain applications from the Secretary. The next Censors' meeting takes place within a month.

We expect a record attendance.

SUMNER H. REMICK, *President*,  
ALEXANDER A. LEVI, *Secretary*

\*See page 693 for full particulars.

## THE CARNEY HOSPITAL

## CLINICAL MEETING

October 7, 1935, 8 P.M.

The Diagnosis of Common Skin Diseases. Dr. William J. Macdonald. Lantern slides.

Diagnosis and Management of Pelvic Inflammation. Dr. Louis E. Phaneuf. Lantern slides.

Physicians and medical students invited.

## THE SOUTH END MEDICAL CLUB

The ninth year of the South End Medical Club will begin on Tuesday, October 15, 1935, at 12 noon, at the Headquarters of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston. The speaker will be Austin W. Cheever, M.D., of the Syphilis Department of the Massachusetts General Hospital, and of the Skin Department of the Harvard Medical School. His subject will be "The Modern Treatment of Syphilis." All physicians are cordially invited to attend this meeting. Luncheon will be served at 1 o'clock.

## SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

## CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, OCTOBER 7, 1935

Monday, October 7—

4 P.M. Clinical Conference, Children's Hospital Amphitheatre  
\*8 P.M. The Carney Hospital Clinical Meeting

Wednesday, October 9—

112 M. Clinico-Pathological Conference. Children's Hospital

Thursday, October 10—

\*3 30 P.M. Medical Clinic at the Peter Bent Brigham Hospital  
\*5 P.M. Clinical Meeting—Faulkner Hospital

Saturday, October 12—

\*10-12 Staff rounds at the Peter Bent Brigham Hospital

\*Open to the medical profession

†Open to Fellows of the Massachusetts Medical Society

October 3—Faulkner Hospital Clinical Meeting at 5 P.M.

October 4—Boston University School of Medicine Surgical Clinic at the Boston City Hospital. See page 697.

October 5—November 23—Lectures by Dr. S. J. Thannhauser. See page 697.

October 6-20—Seventh Annual Training Course for Medical Residents at the Mayo Clinic. See page 441, issue of August 29.

October 7—Infants and Children's Hospitals Clinical Conference. See page 697.

October 7—Carney Hospital Clinical Meeting. See notice elsewhere on this page.

October 7-10—American Public Health Association will meet in Milwaukee, Wisconsin. For information address the American Public Health Association, 50 West 50th Street, New York City. See page 573, issue of September 19.

October 10—Medical Clinic at the Peter Bent Brigham Hospital. See page 697.

October 14-19—Inter-State Postgraduate Medical Association of North America. See page 549, issue of September 12.

October 15—South End Medical Club. See notice elsewhere on this page.

October 16—New England Physical Therapy Society. Detailed notice will appear in next week's issue.

October 21—November 2—1935 Graduate Fortnight of the New York Academy of Medicine. See page 598, issue of May 9.

October 28—November 1—The Twenty-Fifth Clinical Congress of the American College of Surgeons. See page 1065, issue of May 30.

## DISTRICT MEDICAL SOCIETIES

## MIDDLESEX SOUTH DISTRICT MEDICAL SOCIETY

October 9—See notice elsewhere on this page.

## WORCESTER DISTRICT MEDICAL SOCIETY

October 9—Wednesday evening. Rutland State Sanatorium, Rutland, Mass. Program 6 P.M. Dinner (complementary by State Sanatorium) 7 30 P.M. Scientific Program 1 "X-Ray Diagnosis Sclerosis vs. Tuberculosis," Dr. David Zacks, Massachusetts Department of Public Health, Discussion, Dr. W. Irving Clark, Worcester, Mass. 2 "The Value of Blood Studies in the Selection of Cases for Thoracoplasty," Dr. Gull Lindh Muller, Pathologist, Rutland State Sanatorium.

November 13—Wednesday evening. Grafton State Hospital, North Grafton, Mass. Dinner and scientific program. Subjects of program to be announced later.

December 11—Wednesday evening. St. Vincent Hospital, Worcester, Mass. Dinner and scientific program. Subjects of program to be announced later.

January 8, 1936—Wednesday evening. Worcester City Hospital, Worcester, Mass. Dinner and scientific program. Subjects of program to be announced later.

February 12, 1936—Wednesday evening. Worcester State Hospital, Worcester, Mass. Dinner and scientific program. Subjects of program to be announced later.

March 11, 1936—Wednesday evening. Memorial Hospital, Worcester, Mass. Dinner and scientific program. Subjects of program to be announced later.

April 8, 1936—Wednesday evening. Hahnemann Hospital, Worcester, Mass. Dinner and scientific program. Subjects of program to be announced later.

May 13, 1936—Wednesday afternoon and evening. Annual Meeting of Society. Time, place and details of program to be announced in an April issue of the Journal.

ERWIN C. MILLER, M.D., Secretary

# The New England Journal of Medicine

VOLUME 213

OCTOBER 10, 1935

NUMBER 15

## The Massachusetts Medical Society

### SECTION OF OBSTETRICS AND GYNECOLOGY

Georgian Room, Hotel Statler, Boston,

June 3, 1935, 2 P.M.

#### PRESIDING

Dr Thomas Almy Fall River Chairman.

Dr Charles J Kickham Brookline Secretary

**CHAIRMAN ALMY** The Section will please come to order. The first business of the meeting is the election of officers for next year. I will ask Dr Bristol Chairman of the Nominating Committee to report.

**DR. BRISTOL** Charles J Kickham as Chairman  
R. S. Titus as Secretary

**CHAIRMAN ALMY** Are there any other nominations? There being no other nominations gentlemen what is your pleasure?

**A MEMBER** I move that the Secretary cast one ballot.

**CHAIRMAN ALMY** It is moved that the Secretary cast one ballot. The Chairman will do it, as the Secretary is modest. All those in favor say Aye those opposed No. Dr Kickham is elected Chairman and Dr Raymond Titus is elected Secretary of this Section for the next year.

I would like to call attention to the notice that is on the top of the piano as we have no loud speaker. Anyone who discusses will please come forward so that all may hear him.

Dr Mongan is unavoidably delayed so Dr Davis has agreed to read the first paper on the program. The title of his paper is "Diagnosis and Treatment of Lesions of the Cervix Uteri Illustrated with Lantern Slides." We are very fortunate to have Dr Davis with us. He has come from Milwaukee to speak to us on a subject on which he has spent a good deal of time and upon which he is an authority.

### LESIONS OF THE CERVIX UTERI—DIAGNOSIS AND TREATMENT\*

BY CARI HENRY DAVIS, M.D.†

THE subject of cervical lesions is so large that little more than a summary of the more important conditions can be presented in a short paper. Unfortunately it is practically impossible to compile statistics which will give a reasonably accurate idea regarding the age incidence or frequency of various lesions. Neither can we speak dogmatically regarding the end results of treatment since this would require following every patient from the time of treatment to the time of her death, a requirement which is obviously impossible. Investigation of the few statistics which have been published indicate that they are not based on accurate investigative methods and that they should be considered as suggestive rather than proved results.

**Endocervicitis** Infection of the cervical canal was not recognized as a clinical entity until Stroganoff and Winter in 1896 demonstrated that bacteria are not normally found above the external os. Seven years earlier Winter had determined that the endometrium normally is free from bacteria. Arthur Curtis, in

1918, confirmed Winter's observations regarding the endometrium and added to the evidence showing that the cervical glands are prone to become chronically infected. Laura Moench in 1924 reported that organisms grown from chronically infected cervical glands of patients suffering from chronic arthritis were culturally identical with those commonly found in other chronic foci of infection in arthritis patients and that these organisms when injected according to the technique of Rosenow would produce joint lesions in rabbits. My own clinical experience indicates that whenever streptococci, especially the viridans type, can be grown from the cervix of a patient with arthritis, cauterization of the cervical glands will be followed by a temporary exacerbation of symptoms. Cleaning up the cervical infection usually is followed by clinical improvement and in a few cases where other foci had been removed previously the degree of relief was beyond expectation.

It may be impossible to prove a clinical connection between chronically infected cervical glands and adnexal disease yet the relief of symptoms following correction of cervical infections indicates that a definite relationship must exist. Among the symptoms relieved after adequate treatment are dysmenorrhea, dyspa-

\*Read at the Annual Meeting of the Massachusetts Medical Society, Section of Obstetrics and Gynecology, June 3, 1935.  
†Dr. C. H. Davis—Clinical Professor and Director of Department of Obstetrics and Gynecology, Marquette University School of Medicine, Milwaukee, Wis. For record and address of author see "This Week's Issue" page 129.



reuma, pelvic tenderness, pelvic pain, lumbosacral backache, menorrhagia, metrorrhagia, and sterility

*Erosions of the Cervix* There is much confusion in our literature due to the differences of opinion regarding ectropion and erosions. Contrary to the teaching in some schools, I am completely in accord with Curtis who reports that careful microscopic study of an adequate number of sections from "eroded" cervixes shows that a large percentage are devoid in some areas of an epithelial covering, the surface often being composed of granulation tissue infiltrated with polynuclear leukocytes and extensively invaded with bacteria. There may be a variety of causes but the most important is the irritating discharge from a cervical infection. Correction of the endocervicitis should be followed by epithelialization of the denuded areas. However, in some cases the granulation tissue must be cauterized before proper healing can be secured.



Small exophytic carcinoma diagnosed during a colposcopic examination by Hinselmann. A high amputation of the cervix was performed as the patient was young and desired children.

*Ectropion of the Cervix* Colposcopic examinations of the cervix uteri indicate that many women normally have gland openings at some distance from the external os. These should be distinguished from ectropion of the cervical glands associated with lacerations or resulting from an actual eversion or growing out of the glands. A patient may have an erosion superimposed upon an ectropion. Hinselmann recognizes a congenital type of ectropion in his classification of conditions diagnosed with the colposcope, and he does not consider it important so far as cancer is concerned. However, everted glands tend to become infected and the patient may have all of the symptoms associated with endocervicitis.

*Lacerations of the Cervix* Childbirth is responsible for most lacerations although some may follow various forms of instrumentation. In general, tears resulting from hasty or improper dilatation do not show externally al-

though they may cause serious bleeding. As previously stated lacerations result in an eversion of the endocervical glandular tissue which becomes infected. Many of the symptoms associated with old lacerations are those of the associated infection. Most writers assume that lacerations increase the possibility of cervical cancer, but this must be considered a sequela of the chronic irritation of the secondary infec-



Leukoplakia (Matrix) Grade IVb. Carcinoid epithelium with many pathologic mitoses and proliferation into the connective tissue.

tion. It is undoubtedly true that cervical lacerations increase the risk of abortion, but here again it is possible that the chronic cervical infection plays an important rôle.

*Stricture of the Cervix* Cervical stricture may follow various forms of trauma, especially that of infection, cauterization, coagulation, conization, chemical cauterization, operations such as amputations or curettage of the cervical glands, radium therapy and occasionally after trauma of complicated labor. While this condition is relatively common, it is preventable following the various types of therapy of endocervicitis provided the patient has adequate office treatment until healing is complete. The cervical canal must be kept open.

*Syphilis of the Cervix* Syphilitic lesions of the cervix are rarely observed even by gynecologists of large experience. However, the chancre may be located there and undoubtedly is more often than we realize. Gellhorn, who has written extensively on this subject, reports that the secondary lesions frequently may be found if the syphilitic woman is followed closely, and that the tertiary lesions tend to produce hypertrophy with subsequent necrosis. The gynecologist must realize that gummatous lesions may involve the cervix as well as other organs and be on the lookout for them in syphilitic patients. Syphilis of the cervix and cancer of the cervix may coexist.

*Tuberculosis of the Cervix* Cervical tuberculosis is a rather rare condition as evidenced by the report of Norris who found only four

cases among seventy four specimens of genital tuberculosis in his laboratory at the University of Pennsylvania. This condition usually is associated with and probably secondary to tuberculosis of the uterine cavity. It has been suggested that it might be primary as a result of a tuberculous man moistening a condom with spum. The finding of tubercle bacilli is sufficient to make the diagnosis, but if there is any doubt tissue should be secured for microscopic examination.

**Streptothrix Infection of the Cervix** It has been assumed that ray fungus (actinomyces) infections of the genital tract are quite rare but recent observations at the Kingston Avenue Hospital, New York, by Barringer and Thomson indicate that this condition may be responsible for many unexplained cases of ulcerative pathology of the genital tract. In a series of eighty nine cases diagnosed clinically as gonorrhea, forty nine patients were found by cultural methods to have the streptothrix organisms. The pathological process in the more severe infections is in inflammation characterized by a tenacious purulent discharge which is sometimes membranous in type and accompanied by necrosis with considerable loss of tissue (Barringer). These observers are preparing a new report which will be published shortly.

**Cancer of the Cervix** There are a few phases of the cancer problem regarding which clinicians are agreed. (1) Cancer does not develop in perfectly normal tissue. (2) Various forms of chronic irritation constitute predisposing factors which favor the development of cancer. (3) Every cancer in its earliest stage is a localized microscopic lesion. (4) Most cancers can be cured if diagnosed early and adequately treated.

Notwithstanding the campaigns of education carried out by various organizations during the past decade or two, it is still true that most cancers of the cervix are not seen by a physician until the patient has the symptoms of a late lesion. As a result only a small percentage of permanent cures is obtained. It is obvious that early diagnosis can be assured to any great extent only when women have periodic physical examinations. Furthermore, even though every woman did have a regular examination once or twice each year, the possibility of recognizing a very early carcinoma by palpation or the usual type of inspection is questionable unless the lesion has reached the size of a small pea. Recognition of this fact led Hinselmann to develop his colposcope by means of which a small carcinomatous ulcer, too small to be seen with the unaided eye is enlarged to a size which makes its recognition possible. The use of this instrument combined with the Schiller test, which is useful in selecting biopsy material should enable us to make an earlier diag-

nosis of cervical carcinoma than was formerly possible in the examining room. Hinselmann in a recent letter informed me that he now has "136 cases of beginning cancer detected only by the colposcope." Cancer is an easily curable disease if diagnosed and treated while the lesion still is microscopic.



Leukoplakin (Matrix) Grade II. This is from a very small involved area. The growth in this case was exophytic. Colposcopic diagnosis—leukoplakin.

**Diagnosis of Cervical Lesions** Several of the more common conditions involving the cervix uteri have been discussed briefly in the first part of this paper. Diagnosis of the actual lesion may depend on palpation, inspection through the speculum with the unaided eye and the colposcope, wet and stained smears, cultures, blood tests for syphilis, and a study of biopsy material. Only with experience may a clinician decide which procedure may be omitted during the examination of any patient. A large portion of serious mistakes result from failure of clinicians to use even the simple easily accomplished office procedures. It is distressing to find that many of our ablest internists commonly neglect inspection of the cervix when they make a "thorough" examination of a woman patient. Every gynecologist has seen a considerable number of women who have been under more or less constant supervision of a family physician or a medical specialist during the time when a cancer of the cervix was passing from a curable to a hopeless condition. It is regrettable that we still see far advanced cancer of the cervix in women who have had a subtotal hysterectomy a few months previously for fibroids or some other pelvic condition without any record to show that the cervix had ever been examined prior to the abdominal operation. (Points in diagnosis were shown in lantern slides.)

**Diagnosis with the Colposcope** Considerable experience with the colposcope is necessary before one may use it satisfactorily in the diagnosis of cervical lesions. First one must obtain an accurate knowledge of the varied but essentially normal physiologic structure of the cervix uteri. This accomplished variations from the normal may be recognized and diagnosed quite accurately. Hinselmann is convinced that with

the colposcope it should be possible to recognize an exophytic carcinomatous proliferation even if only one papilla should be involved, but such a finding would be exceedingly rare since more than one usually is involved. An endophytic carcinoma is recognized with greater difficulty since the growth is inward and the diagnosis must depend on the size of the overlying ulcer and the type of the secretion. Larger ulcers have a very characteristic appearance showing areas of necrosis, yellowish nests of cancer cells, and blood vessels running longitudinally, but it is almost impossible with the colposcope to differentiate a true erosion and a carcinomatous ulcer. It must be appreciated



Leukoplakia (Matrix) Grade I. Atypical hornified epithelium  
Colposcopic diagnosis—leukoplakia.

also that some endophytic carcinomas may still be covered with the original epithelium from which the growth originated so that they will not appear as ulcers at the time of an examination. With the usual type of inspection it may be impossible to differentiate carcinomatous epithelium and the surrounding epithelium, but with the colposcope the diseased area stands out, and should be recognized easily.

Several practical problems of considerable importance may be noted when considering the colposcopic picture of leukoplakias. (1) It is not possible to correlate the colposcopic appearance with the microscopic findings. (2) Definitely malignant leukoplakias may have the same colposcopic appearance as those which are microscopically benign. (3) Biopsy material from a cervix with many areas of leukoplakia may not permit a definite diagnosis since the excised area and the rest of the cervix may have a very different histologic structure. Hinselmann is undoubtedly correct in stating that one may rely on a microscopic negative diagnosis only when serial sections of the entire leukoplakia or the entire cervix have been studied. (4) The gynecologist should attempt to diagnose Hinselmann's matrix areas since their removal by amputation of the cervix or their destruction with the nasal type cautery or surgical diathermy

may cure an early carcinoma. (5) Early diagnosis and eradication of diseased areas is the only method available for the prophylaxis of carcinoma of the lower genital tract of women.

Unless one has studied serial sections of a large number of cervixes removed by amputation or hysterectomy it is not probable that some of the tissue changes described by Hinselmann will have been observed. He recognizes pre-matrix change of two types and four grades of matrix change before finding easily recognized cancer. His studies suggest that preleukoplakia and developing leukoplakia may be reversible so that if the underlying cause for the condition is removed the mucous membrane may heal and assume a normal appearance. However, it is apparent that a fully developed leukoplakia or matrix area cannot return to a normal state, hence removal or destruction is necessary. The accompanying photomicrographs illustrate Hinselmann's classification.

The types of treatment which may be used for various cervical lesions are described quite adequately in various works on gynecology, and no attempt need be made to review them in detail here.

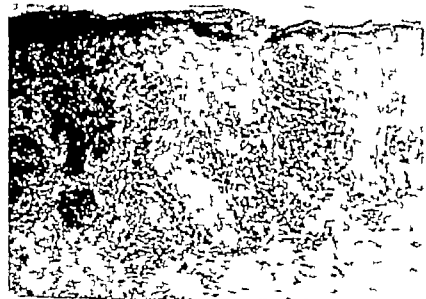


Leukoplakia (Matrix) Grade III. Carcinoid epithelium with many pathologic mitoses. Colposcopic diagnosis—leukoplakia.

American gynecologists for some years have emphasized the importance of diagnosing and correcting by appropriate therapy lacerations, ectropion, erosions, polypi, and cysts of the cervix uteri. Personal observations indicate that European gynecologists are inclined to employ a surgical procedure for many conditions which we would treat with the nasal type electric cautery, Cherry's coagulation, or Hyams' conization. At the same time they leave untreated many abnormal cervical conditions which we would correct in the office with one of the previously mentioned procedures.

There may be individual and sectional differences of opinion regarding various corrective forms of treatment but most of us will agree that all cervical lesions should be kept under observation and treated by some method until

satisfactory healing has been secured. Every statistical study, even when we make a considerable allowance for possible errors, indicates that careful prophylactic treatment of cervical lesions is a satisfactory means of preventing the later development of cervical cancer. It is highly probable that each of us who has used the nasal type electric cautery or surgical diathermy for some years has destroyed a few microscopic



Leukoplakia (Matrix) Grade II. Hornified atypical epithelium proliferating into the connective tissue. Colposcopic diagnosis—leukoplakia.

cancers, thereby curing such women from cancer just as effectively as if they had had a radical treatment with surgery or irradiation.

It has been suggested by some that the general use of the colposcope for cervical diagnosis might lead to a considerable amount of unnecessary surgery. Hinselmann has a patient who had an early cancer of the cervix treated by amputation of the cervix who has gone three years without any further evidence of trouble which shows that there is a great difference between the treatment of an early microscopic cancer and one which is well developed. Our use of the cervical type electric cautery or surgical diathermy probably would have been as effective as the amputation. During the past year I have examined with the colposcope a large number of cervixes which had been treated with the nasal type cautery or surgical diathermy during the past ten years. The results observed were very satisfactory; the colposcopic appearance of the cervix being normal in most instances. Therefore, it would appear that we are justified in continuing to treat in the office the majority of patients who have minor lacerations, erosions, and polyps with the nasal type cautery or surgical diathermy. The Hyams' conization has a definite advantage over the cautery and Cherry's bipolar coagulation since the tissue removed is available for microscopic examination. Surgical removal of the cervix and hysterectomy should be reserved for older women and those who have other indications for surgery. Early diagnosis and treatment of cervical lesions is an effective means of

preventing cervical cancer. Early diagnosis of developing cancer and adequate treatment by means of irradiation or radical surgery will greatly increase the number of permanent cures.

#### DISCUSSION

CHAIRMAN ALMY Dr Hutchins will open the discussion.

DR. HENRY T. HUTCHINS Boston, Mass. *Mr. Chairman and Members of the Section:*—

It is difficult to see how we can do otherwise than agree with Dr. Davis' sane and comprehensive résumé of the many lesions of the cervix uteri. I feel that we concur with him. This paper has forcibly brought to our attention what seems to me to be a fact that is too little recognized.

Cervix uteri is a distinct organ in itself apart from its being connected with the uterus. In discussing lesions of the cervix alone Dr. Davis has focused our attention on this fact, namely that we must consider the diseases of this organ as entities apart from the uterus itself just as much as we must consider lesions of the stomach and rectum apart from the whole intestinal tract. Although connected with the fundus uteri the cervix uteri is a distinct organ physiologically and histologically. It is the inlet and outlet of the uterine canal and functions only as such. It is sharply differentiated from the fundus at the level of the internal os. Its histological picture is entirely different from the fundus as to its glands, muscle and fibrous connective tissue. It, therefore, deserves consideration from the surgeon as a distinct organ of the body and as it is subject to diseases peculiar to itself it must be examined and treated with more thought and care than it has been in the past.

We are apt to consider the cervix as an internal organ and therefore more or less inaccessible whereas, the opposite is true. The cervix is an external organ and just as accessible as the tongue or the tonsils. It can be examined under the eye and finger and can be treated easily. Dr. Davis has told us of many procedures which can be carried out as simple office procedures, and if we will only take the trouble to regard this organ as a source of real disease—e.g. cancer for one—we can prevent a great deal of systemic disability and of course we shall even save a good many lives.

I want to make the strongest possible plea for the examination of the cervix by physicians and especially by insurance examiners and the so-called Life Extension Institutes where yearly check ups are supposed to be made. I have recently seen a case of inoperable pelvic disease where the patient had for fourteen years conscientiously gone for a complete physical examination every year and yet not once in the fourteen years was a pelvic examination made. The trouble could and should have been detected in time to have saved her life and the fault was not the patient's.

What can be done today by way of inspection with the colposcope treatment by electric cautery and diagnosis has been only too clearly demonstrated in the paper to which we have just listened.

We must remember then that the cervix as an organ is a distinct entity and subject to its own diseases which unfortunately do not always give early symptoms and therefore should be observed and treated as a routine part of every physical examination in women.

These remarks may seem to you somewhat trite but when one sees as I have in the past month a case of inoperable carcinoma of the cervix develop under the care of a physician living not in the rural districts but in a city of 100,000 inhabitants

to whom the patient went for advice for over fourteen months and no pelvic examination was made, one cannot help but feel that failure to make a pelvic examination with inspection of the cervix, comes dangerously close to medical malpractice.

Dr. Davis, in his paper and in his lantern slides, has shown us the points in the diagnosis of early carcinoma of the cervix, and these remarks of mine will serve only to emphasize a statement which he makes in his paper where he says, "It is distressing to find that many of our ablest internists commonly neglect inspection of the cervix when they make a thorough examination of a woman patient. Every gynecologist has seen a considerable number of women who have been under more or less constant supervision of a family physician or a medical specialist during the time that a cancer of the cervix was passing from a curable to a hopeless condition—without any record to show that the cervix had ever been examined—". The use of the colposcope in the hands of the specialist is new, and will undoubtedly prove of value in determining early cervical lesions, but if we can bring about the inspection of the cervix by the eye alone as a more general procedure throughout the profession, many more hopeless cases will be eliminated.

I wish Dr. Davis could present this paper before the Medical Section of this Society as well as before our Section, in order that the necessity of routine examinations of the cervix, and the ease with which cervical examinations can be made, might more clearly be brought to the attention of the internists. It is perhaps a little more bother to make a pelvic inspection than to take a look down a patient's throat, but the actual examination with a bivalve speculum is just as simple. The colposcope is not necessary for the internist. The untrained eye can detect early abnormalities and then the patient can be referred to the gynecologist for differential diagnosis and early treatment. Just because a patient has no pelvic symptoms, which is frequently the case in early carcinoma of the cervix, is no excuse for the omission of inspection of the cervix during routine physical examinations.

CHAIRMAN ALMY: Dr. George Van S. Smith of Brookline will continue the discussion.

DR. SMITH: *Mr. Chairman, and Ladies and Gentlemen—*

Doctor Davis' comprehensive survey leaves little to consider except by way of confirmation.

At the Free Hospital for Women, tuberculosis of the vaginal portion of the cervix has never been recognized. Of ninety-seven cases of pelvic tuberculosis, high endocervical involvement was found once. Syphilis of the cervix has not been seen.

The recent discovery of a chemical relationship between estrogenic substances and those producing experimental malignant disease suggests that hormonal influence be added to trauma, inflammation and chronic irritation as a possible factor in the etiology of cervical cancer, especially since over 90 per cent of patients with this disease give a history of pregnancy, which brings about tremendous changes in the estrogenic hormones.

The importance of conscientious attention to the cervix during any gynecological operation cannot be overstressed. Five of our own cases were found to have cancer of the cervix five months to four years following supravaginal hysterectomy performed eight to twenty years ago without careful examination and biopsy of the cervix.

We are constantly confronted with the problem of whether to treat diseased but symptomless cervixes. Specimens are taken for biopsy on the slightest suspicion, but, unless early cancer is actually present, the only indication for treatment is that it

may prevent later trouble. The taking of specimens for biopsy introduces more problems. First, should we be guided in removing tissue by the Schiller test and the colposcope? Despite a fairly extensive use of the iodine test during the past three years and the employment of the colposcope for one year, it so happens that our ten diagnoses of early cancer during this period have been made without these aids. Furthermore, I have been able to find only one instance in which tissue was taken from a non-malignant area when cancer was almost certainly present somewhere else in the cervix. The Schiller test and the colposcope are helpful but not necessary.

The next problem is that of pathological diagnosis. All those experienced in cervical pathology tend to agree that the so-called "precancerous" picture need not cause alarm, for there is no evidence that this is, or necessarily becomes, malignant. The real difficulty is that pathologists do not agree on what constitutes the picture of true early cancer. The criteria of Schiller and Hinselmann are not entirely accepted. I now have sections from twenty-three cervixes which I believe show early carcinoma. Of fourteen of them submitted for pathological consultation, only one was considered malignant. A second was thought to contain cancer by two out of five consultants. The patients from whom three other sections were submitted, however, had advanced cancer four to six years after biopsy. Of the other twenty patients, one was treated too late, the rest were treated and are well up to eight years with the exception of one who had endometriosis and reacted severely to irradiation.

Finally, does treatment of diseased cervixes prevent later trouble? From the point of view of inflammation and chronic irritation, we know that in general it does. That it may lower the incidence of later cancer is almost impossible to prove. Dr. S. S. Woolston traced 1014 cases of trachelorrhaphy from ten to over thirty years and found that fourteen developed later cancer of the cervix, that five more probably developed it and that four others may have died of it—an incidence at the highest of 2.3 per cent. Four of these patients had had pregnancies after trachelorrhaphy. We have traced 591 cases of cauterization of the cervix five to over twenty years, 37 per cent of them ten to over twenty years. Four hundred and seventy-two had had pregnancies before cauterization. One of these died six years later, cancer of the cervix being stated as the cause. Two others had proved cervical cancer six and six and one-half years after cauterization. The highest incidence we can make for this group is 0.65 per cent. It is impossible to obtain an accurate control figure. Dr. Woolston found statistics indicating that about 2.95 per cent of all women who reach the age of thirty-five in this country die of carcinoma of the cervix. Dr. J. W. Schereschewsky of the United States Public Health Service, who has very generously tried to supply me with a control figure, considers 2.95 per cent too high and calculates an incidence of about 1.6 per cent as being more nearly correct for the country and 2 per cent for Massachusetts. Taking these percentages for what they are worth and allowing for the fact that the percentages for the incidence of cancer after treatment cannot be correct until all cases have been followed until death, it would appear that trachelorrhaphy has little if any prophylactic value and cauterization may have very definite preventive effect. In extenuation there are two considerations to be mentioned. First, the treated cervixes undoubtedly had more marked lesions and probably would have been even more prone to malignant change without treatment. Secondly, the figures I have submitted for the treated cases are based entirely on those which had had pregnancies, whereas the control percentages were calculated for both

nulliparous and parous women. The evidence indicates that treatment of diseased cervixes is not ill-advised even when they are symptomless.

**CHAIRMAN ALMY** The paper is now open for discussion.

**DR. BENEDICT F. BOLAND** Boston, Mass. I would like to add my appreciation of the very thorough and well-written paper which Dr. Davis has delivered this afternoon. His lantern slides have clarified many details that are essential in the conduct of this work. In his paper and slides he has dealt considerably with the nasal point cautery and has made some mention of the surgical high frequency types of currents. In view of his remarks and experiences in the use of these modalities I would like to ask the doctor what percentage of good results he has obtained with the nasal tip type of cautery as compared with the high frequency surgical diathermic type of currents, and also whether he has had any experience in the use of these modalities in the treatment of chronic infections especially of the Neisserian type.

From my own experiences I appreciate that none of these various methods of approach are a panacea in every case. However in an analysis of five hundred cases which I have performed during the past five years, on the services with which I am associated at the Boston City Hospital, St. Elizabeth's Hospital, and at the Massachusetts General Hospital, and in private practice, I am convinced that excellent or satisfactory results can be obtained in 65 to 75 per cent of these types of cases. As no two cervixes are alike the selection of the case to which these modalities are to be applied and judgment in application are essential if satisfactory results are to be obtained. In the chronic type good results have been achieved in those cases that were free of pelvic tenderness or masses. These measures are contraindicated in the acute infectious or pelvic inflammatory type lest extension of the parametric infection or peritonitis be produced. Gentleness is required as the operator can encounter severe difficulty unless acquainted with the use and application of these methods.

In these local hospitals the Cherry Remington and Hyams' methods have been used clinically. Not being one hundred per cent satisfied with these methods experimental work has been performed on dogs in the Research Laboratory of the Boston City Hospital in collaboration with Dr. Stephen J. Madock. Our aim has been to determine the amount of tissue destruction that resulted in the utilization of each of these methods. Both clinically and experimentally the Hyams type has proved to be the best method. The Cherry method as the doctor has stated has limited application and has not worked satisfactorily in the multiparous type of cervix. The Remington method has produced good results in selected cases.

I would like to know, Doctor, what your end results

have been in a comparison of these methods? I thank you.

**CHAIRMAN ALMY** Do you wish to answer that now, Doctor?

**DR. DAVIS** I cannot answer from the point of view of percentages. I started the nasal type of cautery some fifteen years ago following Dr. Dickinson's first paper and my largest experience is some place between twelve and fifteen hundred patients treated with the very fine bladed cautery in contrast to the heavy blade of the usual operating room cautery or the more destructive post cautery. As you could see from the colored plate on the screen, we make our linear incisions some distance apart, and do not get the type of destruction which is obtained with a heavy instrument. My experience with the Cherry cautery has been that it is a poor instrument for the lacerated cervix. I personally am afraid to remove the speculum and let the cervix come down for fear I will do too much damage. As a result, in the few cases where I have used it I have usually destroyed the point by sparking it across and burning an area through the bakelite.

More and more, as I become experienced with it I am inclined to use the Hyams coagulation.

Now in regard to the chronic gonorrheal infection of the cervix I believe you can get a good result with either the Cherry or the Hyams method. I think probably the Hyams is somewhat the safer method in that you do not get the amount of blocking and holding back of secretions following its use that you do when you use either the cautery or the Cherry coagulation.

You will recall that in the *Journal of the American Medical Association* a surgeon in Milwaukee reported two patients whom he had seen with very severe complications following the use of surgical diathermy. The statement was not clear and I have not had the opportunity to investigate those cases. Of course everyone who has written on the use of these treatments has emphasized the fact that you must not use them except in chronic types of infection. They are dangerous with either acute or subacute cases but are relatively safe in the chronic cases. I believe that they should be used more widely over the country than they have been in the past.

**CHAIRMAN ALMY** I am sure we all feel that we are greatly indebted to Dr. Davis for coming here and giving us this splendid paper.

The next paper is by Dr. Charles E. Mongan. His paper is on "Maternal Mortality—A Demand for Fairness."

**DR. CHARLES E. MONGAN** Mr. Chairman and Gentlemen—

I have taken the liberty of changing the title of this paper without consultation with the Chairman of the Section. The title was "Maternal Mortality—A Demand for Fairness." The title now is "Changes in Maternal Mortality and their Significance."

## CHANGES IN MATERNAL MORTALITY AND THEIR SIGNIFICANCE\*

BY CHARLES E. MONGAN, M.D.†

### I. INTRODUCTION

THE best approach to the problem of maternal mortality seems to be from the side of statistics. Although they lie somewhat aside from medical problems their conclusions, taken over

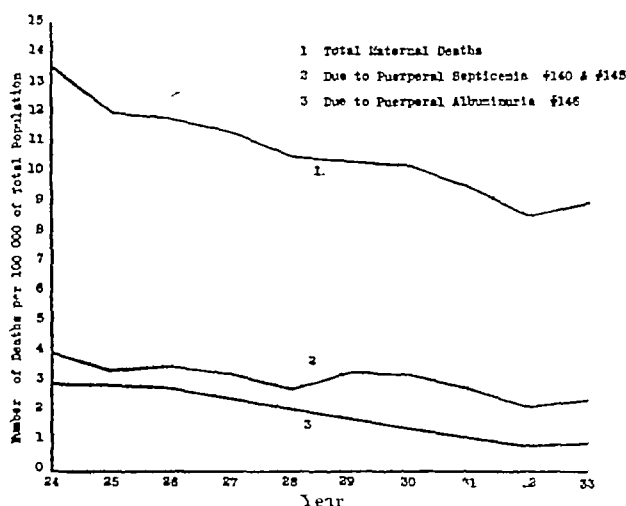
a period of years, form a measure of medical progress. In some instances they can give a direct medical clue, amounting almost to a diagnosis. A close study of the records shows that very creditable work has already been accomplished. An analysis of the structure of the death rate shows which causes of death have yielded to our efforts and which are still a challenge. The distribution of the death rate

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throughout the State indicates that many factors are at work. On the whole the results already obtained entitle us to a reasoned optimism for the future.

The following study has been based on official Massachusetts reports. Some of the data have been compiled and calculated by the Department of the Secretary of State. Other parts have been calculated by the author. The figures

MATERNAL DEATHS OVER A PERIOD OF YEARS



have been collected by the State in accordance with the law and with the international conventions. They are believed to be very reliable, which is a tribute to the conscientiousness of the reporting physician.

## OBSERVATIONS

A decrease in the total mortality is readily discernible. It is therefore interesting to see its amount, to study its causes, and to estimate its future. According to the data the rate has declined from 12.5 to 9.0 per 100,000 in 1933 (See table 1). This is a decline of about twenty-five per cent in the death rate. However, to gain a better insight into the processes at work, it is desirable to analyze the total rate.

Consider that part of the death rate due to septic abortions and puerperal septicemia (See table 2). These are causes No 140 and No 145 respectively of the International List. A calculation of the figures for 1931, 1932 and 1933 indicates that cause No 140 (septic abortions) seems practically constant at twenty per cent of the sum of No 140 and No 145. Over a ten-year period the death rate due to No 140 and No 145 has fluctuated considerably. It is now slightly lower than it was.

Now let us consider the part of the rate due to puerperal albuminuria (see table 3). This rate has shown a constant and persistent decrease until it is now a small contributing factor. Then the tables refer to the changes of the death rate over a period of years. To gain more information regarding the forces at work, it is well to study the structure of the death rate for a given year, say 1933 (See table 4).

We can arrange the causes of death in the order of the number of deaths they have caused.

TABLE 1

TOTAL MATERNAL DEATHS IN MASSACHUSETTS OVER A PERIOD OF YEARS

Year	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933
Number	498	544	501	501	486	456	453	438	408	369	389
Rate	12.5	13.6	12.1	11.9	11.4	10.5	10.4	10.3	9.5	8.6	9.0

Number refers to the sum of all deaths from causes No 140 to No 150 of the International List calculated on the basis of 100,000 of the population.

TABLE 2

DEATHS FROM PUERPERAL SEPTICEMIA

Year	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933
Number	128	161	140	150	141	123	147	141	119	96	103
Rate	3.2	4.0	3.4	3.6	3.3	2.8	3.4	3.3	2.8	2.2	2.4

Deaths due to the sum of causes No 140 and No 145 of the International List calculated per 100,000 of the population. Cause No 140 is septic abortion. Cause No 145 is puerperal septicemia. Deaths due to cause No 140 run twenty per cent of those due to the sum of No 140 and No 145.

TABLE 3

DEATHS FROM PUERPERAL ALBUMINURIA, BEING CAUSE NO 146 OF THE INTERNATIONAL LIST

Year	1923	1926	1931	1932	1933	1934	1935 ( $\frac{1}{4}$ )
Number	130	120	52	35	41	29	5
Rate	3.0	2.8	1.2	.80	.95	.67	.46

The rate is calculated for 100,000 of the total population.

TABLE 4

DISTRIBUTION OF MATERNAL DEATHS AMONG THE  
VARIOUS CAUSES FOR 1933

Int List Num ber	To- tal Deaths	Rate per 100 000	Per Cent	Cause
140	19	0.43	4.9	Septic Abortions
141	18	0.37	4.1	Abortions Without Men- tion of Condition
142	20	0.46	5.1	Ectopic Gestation
143	1	0.02	0.26	Accidents of Childbirth
144	56	1.30	14.3	Puerperal Hemorrhages
145	84	1.94	21.6	Puerperal Septicemia
146	41	0.95	10.5	Puerperal Albuminuria
147	26	0.60	6.7	Other Toxemias of Preg- nancy
148	55	1.27	14.1*	Puerperal Phlegmasia etc. (53 were Embol- ism and Thrombosis)
149	67	1.55	17.2	Other Accidents (70 were Cesareans)
150	4	0.09	1.0	Unclassified
	389	9.00	100%	

\*Cause No 148 of the International list includes Puerperal Phlegmasia Alba Dolens, Embolus Thrombosis Sudden Death not specified as septic

TABLE 5

DISTRIBUTION OF MATERNAL DEATHS THROUGHOUT  
THE STATE

City	Popula- tion	P Sept	Oth ers	Rate P S	Oth ers
Attleboro	21 769	0	1	0	4.6
Cambridge	113 643	4	16	3.4	14.0
Dedham	15 186	0	0	0	0
Everett	43 424	0	4	0	8.2
Fitchburg	40 692	0	3	0	7.4
Framingham	22 210	0	1	0	4.5
Gloucester	24 204	1	2	4.1	8.2
Lynn	104 320	4	7	4	7
Malden	58 036	2	8	3.4	14.0
Medford	59 714	1	3	1.7	5
Newburyport	15 084	0	0	0	0
North Adams	21 621	0	3	0	1.4
North Attleboro	10 197	0	0	0	0
Northampton	24 381	0	4	0	16
Salem	43 353	3	2	6.9	4.6
Somerville	103 908	2	5	1.9	4.8
Waltham	39,247	1	0	2.6	0
Woburn	19 434	0	0	0	0

(1) Puerperal Septicemia, No 145 with twenty-two per cent, (2) Other accidents, No 149 with seventeen per cent, (3) Puerperal Hemorrhages No 144 with fourteen per cent (4) Puerperal Phlegmasia, No 148 with fourteen per cent, and (5) Puerperal Albuminuria with eleven per cent. One third of all deaths in class No 149, or nearly five per cent of all maternal deaths, were associated with cesarean operations. On the other hand practically all deaths charged to No 148 are due to embolism.

In table 5 the distribution of deaths throughout the State is shown. Some cities have an exceptionally favorable rate. Others are highly unfavorable.

Now let us consider the significance of these figures and observations.

## DISCUSSION

The decrease in the total death rate is due almost entirely to the decrease in the rate for puerperal albuminuria. This is a reflection of the work of the Massachusetts Medical Society, in pre-natal care. The results are so favorable that it must be strongly urged to continue the good work. In general the puerperal albuminuria situation is better than formerly for this year a rate is about twenty per 100 000 of the total population.

The same cannot be said of puerperal septicemia which has had its ups and downs. This is a difficult problem. However, the advice of this Section of the Massachusetts Medical Society to practice antiseptics diligently, is well grounded by the figures. A careful physical examination is also helpful.

Due to the decrease in puerperal albuminuria and puerperal septicemia other causes of death are becoming relatively more important. These are as follows: (1) embolism, No 148, (2) hemorrhages, No 144, (3) accidents, No 149. If the deaths ascribed to embolism were correctly diagnosed, then we face another difficult situation. For we cannot at the moment do much to prevent embolism.

The number of deaths from the International List cause No 144 (puerperal hemorrhages), is great enough to warrant an attack by the best skill and judgment of all practicing in this field.

The item No 149, accidents, is somewhat vague. It is, however, remarkable that one-third of all accidents, which is five per cent of all maternal deaths, can be attributed to those conditions where cesarean section was employed as a surgical measure. This indicates the gravity of the decision to use the cesarean operation.

Now a few words regarding the distribution over the State are in order. Some cities have a very favorable death rate. Others are very differently situated. As the standard of medical skill varies but little from place to place in Massachusetts, we are forced to seek other causes to explain this erratic distribution. It appears from a consideration of the characteristics of the various regions that social and economic factors are playing the dominant part.

In conclusion we may remark that the general trend of the death rate is favorable. These results justify the efforts which this Section has already made. They provide the basis for a genuine optimism. On the other hand the analysis of the causes indicates the points where fur-



ther efforts would bring great results. It therefore behooves the Section to continue its vigorous efforts, for the prize is great.

### DISCUSSION

CHAIRMAN ALMY The discussion will be opened by Dr Kellogg.

DR FOSTER S KELLOGG, Boston Mass. Dr Mongan's paper marks a summary of the educational work of this Section to date. The results he reports are a tribute to the efforts of the Section, to the men who have worked hardest for it, and to him, in particular, because I think he conceived the idea. The figures that he presents appear to show the value of persistent work throughout the year. This has been the underlying idea of the Section from the beginning. And since it was his idea primarily and he has always given unselfishly and completely of his time and himself to it, I think his position as an educator in obstetrics in this State is equal to that of any of our men of professorial rank in the schools.

I will discuss one or two points in the paper very briefly. In the first place, the one apparently outstanding improvement that has been made is in the group of hypertension albuminuria cases. This is due, as Dr Mongan has said, to greater attention to prenatal care, but also to the advice which the Section has carried through the State, that patients with pre-eclampsia and albuminuria and hypertension should be hospitalized early and if they fail to improve on medical treatment in hospital, delivered by the gentlest possible means.

In the last fifteen or twenty years at the Boston Lying In Hospital, since accouchement forcé was abandoned, we have saved no patients by altering our treatment of eclampsia but have saved a good many by earlier treatment and delivery in pre-eclampsia. So this seems, in the light of the present lack of knowledge, a good system to pursue.

In the second place, it is discouraging to note our failure to improve results in the bleeding cases in the State. Those of us who have done the educational part of the program are perhaps somewhat to blame for this. We have gone about preaching that every patient who bleeds antepartum must be considered a placenta praevia unless proved otherwise. Some of us also have agitated quite strongly the delivery of most placenta praevias by Caesarean section. It is possible that some patients who have had antepartum bleeding have been subjected to Caesarean section without the diagnosis of placenta praevia having been established.

This brings us directly to my third consideration. Dr Mongan reports a high mortality in Caesarean section cases throughout the State. It seems probable that, as for many years in the past, too many Caesarean sections are done and they are not done under careful enough indications. Though individuals seem capable of doing long series of abdominal deliveries with no mortality at all these happy results seem never to get into state-wide statistics, and the moral that we must all draw from this is that in each individual instance, we should think twice before we subject a patient to Caesarean section.

Last, the mortality from sepsis. This rate will diminish if we adhere to the rule that, whenever possible, a patient shall be allowed to deliver herself normally, without instrumentation, and that especially we will never operate through the undilated, partially dilated, or so-called dilatable cervix. In hospital we will avoid the periodic exogenous throat infection epidemics if we insist on all contacts with the patient's perineum being masked throughout labor and throughout puerperium.

I thank you for your kind attention.

CHAIRMAN ALMY Dr DeNormandie will continue the discussion.

DR. ROBERT L. DENORMANDIE When Dr Mongan handed me his paper to read he said he hoped that if I differed from him I would frankly say so, for by that means he hoped discussion would be stimulated. I am going to take him literally and differ from him, thereby hoping that others will carry on.

At the present time most statistical studies on maternal mortality are based on rates determined in relation to 1,000 live births. Dr Mongan has, however, used rates calculated upon the basis of 100,000 of the population. The rates as he has given them are not, therefore, comparable to many reports that have already been published. To be sure, such rates are published from time to time, but usually only when the more accurate method, that in relation to the number of live births, is not available. In Massachusetts this latter method is available, and I regret that Dr Mongan did not use it. The Fifteen States Study, the New York and the Philadelphia Studies are all based on the rates per 1,000 births.

In table 2 Dr Mongan has given us the results of adding together rubrics 140—Septic Abortion, and 145—Puerperal Septicemia, of the International Classification. This seems wholly justifiable, but in table 3 he shows the rate for puerperal albuminuria to be 3 per cent in 1923, dropping to 67 per cent in 1934, that is, 130 cases in 1923 and twenty-nine in 1934. The reason for this decided improvement he does not state, but it was due chiefly to the changes in the 1929 revision of the Manual of the International List of Causes of Death. In this revision, rubric 146 became "Puerperal Albuminuria and Eclampsia," and 147 became "Other Toxemias of Pregnancy." To show the correct picture, these two rubrics should be added and the percentages calculated from these figures. On this basis the maternal death rate in eclampsia and toxemia becomes in

	1931	227			
	1932	189			
	1933	172			
	1934	186			
146 Puerperal albuminuria and eclampsia	52	35	41	29	
147 Other toxemias of pregnancy	41	35	26	30	
	93	70	67	59	

The last three years are better than 1931, but 18 per cent of the total deaths cannot be considered "a small contributing factor" of maternal mortality. The situation undoubtedly has improved, but there is still great room for effort and improvement.

Dr Mongan states that rubric 149—Other Accidents of Childbirth—is somewhat vague. But is it? It is divided into two parts.

- (a) Caesarean operation Porro's operation
- (b) Others under this title

Caesarean section is not vague. The second subdivision takes in the various obstetric operations—breech, rupture or inversion of the uterus, rupture of the bladder, malpresentation. It seems perfectly clear what the intent of this division is—death from difficult delivery.

I do not believe the whole story of Caesareans is explained by saying that 5 per cent of all the maternal deaths can be attributed to Caesarean section. I am confident that there were more. If each death were studied, Caesareans would be found under at least three other rubrics—namely, 144—Hemorrhage, 145—Sepsis, and 146—Puerperal Eclampsia. I do

not believe "Caesarean operation *per se* should ever be accepted as a cause of death. Caesarean section does not kill. It is the condition for which it is done hemorrhage or eclampsia, or the complication of sepsis which follows, which kills and therefore the death should be put in the proper rubric and not under Caesarean operation.

I take it that most of the deaths in this section were due to poor operative obstetrics either in the choice of operation or lack of skill in performing it. It would have been most interesting if Dr. Mongan could have told us how many times operative procedures preceded death in this group.

Dr. Mongan: I think, questions the correct diagnosis of so many cases of embolism. I too question the diagnosis. Some undoubtedly were rightly ascribed to embolism but embolism sounds much better than rupture of the uterus following a hard forceps or version. The diagnosis of embolism is accepted by the registrar usually without question.

I agree that there has been a slight improvement in the general trend of the death rate but I can not subscribe to the statement that it provides a basis for genuine optimism. The effort of this Section must be to reduce the number of these deaths. It is not alone a medical problem. The social and economic condition of the patients plays a part. The Section can do no greater good than to popularize throughout the State the meaning of good adequate conservative maternity care. Then each one of us must live up to this standard.

In order to accomplish this purpose I believe that in each of the District Societies a committee on maternal welfare should be appointed. It would be incumbent upon these committees to hold meetings for the purpose of showing what adequate maternity care is. These committees should follow up carefully each maternal death in their district. The deaths should be studied on the same schedules so that they would be comparable, and each year a short report should be made in regard to progress. The formation of such committees would be in line with what the American Committee on Maternal Welfare is doing throughout the country and what it wishes. By this means the entire State would be covered, no undue amount of work would be put onto any one committee and the whole could be carefully compiled each year into a most valuable report. By this means the Section could be a real power in the State for demanding good sane obstetrics.

CHAIRMAN ALMY: The paper is now open for discussion from the Section.

Dr. SAMUEL GWYNNE, Worcester, Mass.: I would like to ask Dr. Mongan if he has any figures as to whether those Caesareans were done by general surgeons or whether they were done by obstetricians.

CHAIRMAN ALMY: Dr. Mongan, do you care to close the discussion?

Dr. MONGAN: In answer to Dr. Gwynne there is no way of knowing when a surgeon is an obstetrician and when an obstetrician is a surgeon. Dr. DeNormandie says it is a live issue. He and I apparently agree. I think this chart was presented by the State Department of Public Health. Dr. DeNormandie?

Dr. DeNORMANDIE: Yes.

Dr. MONGAN: And the State Board of Health is not the official source from which maternal death rates or any death rate is collected in Massachusetts. Keep that in mind. That is the first thing I do not criticize Caesarean operations. I said that a certain number of deaths occurred where the ob-

stetrical procedure of a Caesarean operation was employed. Dr. DeNormandie says that if we look farther we might find more deaths in which the surgical operation of Caesarean section was employed. Yes. I didn't report them all. Some are under hemorrhages which happened after the Caesarean operation was performed. Since 1929 Caesarean operations have a separate classification. I think that is a misleading classification. I would rather have the reasons why the obstetrician felt it necessary to perform Caesarean operations.

The classification of "the toxemias of pregnancy" has been changed. Let me tell you the history. The international classification of diseases was the outcome of an agitation brought about by Bertillon the French scientist who invented finger printing. It was he who called together representatives of all the civilized countries of the world to determine and agree upon a system of classifying deaths. This list has been revised every ten years. The last revision was in 1929 partly through the agitation of this Section which sent a message through the American Medical Association to the Chief of the Census Bureau in Washington when this Section met in Swampscott in 1924 requesting this change in classification. Were all the toxemias of pregnancy under the old classification put under albuminuric pregnancy? No they were not. They are not today. There are now two classifications. One—146—"Puerperal Albuminuria and Eclampsia" and 147 "Other Toxemias of Pregnancy."

We do think that there has been a decided change in the albuminuria of pregnancy. We also think that the reporting of the other toxemias of pregnancy should be more specific. I should hope that no one listening to my paper could think for a moment that we were going to give up our work of striving to eliminate albuminuric pregnancy. If I created that impression it is one that I did not wish to express. Every month there is submitted to me from the Department of the Secretary of the State a list of all the diagnoses of deaths occurring in the puerperal state in Massachusetts. I suppose in the last fifteen or eighteen years I have studied and reviewed over 5,000 death certificates some of them written by men here. On the whole these certificates are a credit to your professional ability. There are very few of these certificates that in any way indicate that the reporting physician was trying to camouflage or evade any condition which it was his duty to report. There are some however which are open to question.

When you write a death certificate in a puerperal case, be specific, be short. Know what you are going to say and say it honestly. If the patient did die of puerperal septicemia say so. There isn't any man practicing obstetrics over a period of years but must have had that sad duty to perform. If it was eclampsia, say so. No matter what the actual condition was say it succinctly and precisely. Then these lists of causes of deaths will amount to something.

Remember toxemias were not classed in the old days under albuminuria. Puerperal septicemia the British call it a riddle and I call it a riddle too. It sometimes varies with the seasons. When there is a large amount of puerperal septicemia prevalent it occurs here and all over the world. It seems sometimes as if we had reached a point where we can make no impression on it. We are not the only country that has septicemia to deal with nor are we the only country that is studying the problem. In studying the subject let us use statistics gathered by Massachusetts physicians and not those statistics collected in a manner we do not know about. I thank you.

CHAIRMAN ALMY: The paper on "Presacral Neurectomy" will be read by Dr. Frank A. Pemberton, Professor of Gynecology at Harvard College.

## RESECTION OF THE PRESACRAL NERVE IN GYNAECOLOGY\*

BY FRANK A PEMBERTON, M D †

**T**HE presacral nerve, or superior hypogastric plexus, is a network of nerve fibres, or rarely a single nerve, extending downward from just above the bifurcation of the aorta for a distance of about five cm. It lies in the areolar tissue between the peritoneum in front and the aorta, left common iliac vein, and sacrum behind. It is part of the autonomic nervous system and is composed mostly of fibres from the sympathetic division of that system.

The fibres come from the inferior mesenteric plexus and adjacent lumbar ganglia of the sympathetic system which, as they enter the pelvis, spread out forming a triangle at the lower corners of which are the inferior hypogastric plexuses. From these, fibres run down to the pelvic ganglia on each side of the pelvis of which they are the sympathetic roots. They are joined here by fibres from the sacral part of the spinal cord which constitute the parasympathetic roots of the pelvic ganglia. From these ganglia nerves run to the various pelvic organs. This description was obtained from Livingston<sup>1</sup> and Davis<sup>2</sup>.

The presacral nerve itself is not often a single nerve. Davis reports that in eighty-five per cent of his cases it was a plexus of fibres and in fifteen per cent one nerve. All of our cases have shown a poorly defined bundle of many small fibres with one or more easily seen nerves among them in a few cases. We have demonstrated nerve fibers in the tissue removed from all our cases by means of the microscope.

According to Livingston who sums up the opinion of many authorities, the autonomic nervous system sends out impulses to the visceral organs. It is thought from its anatomical arrangement and experimental data that the sympathetic division is used for a wide diffusion of impulses while the parasympathetic division carries impulses to single organs to produce specific and local effects. Further there is a theory that these two divisions work antagonistically to each other and maintain a balance when they function normally. There is experimental evidence both for and against it, so the problem is not solved but it makes a good working plan for clinical application at present. It is believed that the sympathetic division maintains tonicity of the blood vessels because it causes constriction of them when it is stimulated while the parasympathetic has the opposite effect. The sympathetic nerves produce their effects by elaborating a substance called sympathin at the nerve endings, a substance which seems to be identical with adren-

alin. The other division similarly elaborates a substance called acetyl-choline.

The autonomic nervous system does not complete all its reflexes through the spinal cord, for centers in the brain which control it have been found but their limits have not been defined.

Finally there is an afferent system of visceral nerves which carries impulses from the viscera to the central nervous system. These impulses are largely subconscious but when the integrity of an organ is threatened by disease these impulses reach consciousness as pain of varying intensity.

We are concerned primarily with the presacral nerve and its function. It is said by both Livingston and Davis that its sympathetic fibres cause relaxation of the intestinal musculature and an increase in the tone of the sphincter muscle because cutting it in chronic dilatation of the colon, Hirschsprung's disease, is followed by contraction of the intestine. The theory is that the operation gives the parasympathetic nervous system a better chance to excite contractions of the muscle. It is supposed that there may be a similar control of the uterine and bladder musculature.

The presacral nerve probably controls the tone of the blood vessels in the genital organs. It is not uncommon after presacral neurectomy for the patient to flow from the uterus for a few days even though menstruation has ended just before operation. Cutting the sympathetic supply may allow the parasympathetic to cause dilatation of the vessels which could account for the bleeding. Many cases of essential dysmenorrhea have sclerocystic disease of the ovaries which theoretically may be due to some effect on the blood supply from an imbalance in the autonomic nervous system.

The presacral nerve, according to Livingston, probably contains fibres of the afferent visceral nervous system as well as its sympathetic part, because cutting it relieves pain in dysmenorrhea, diseases of the bladder and cancer of the pelvic organs. It usually relieves the pain immediately but since it does not do so always Davis suggests that the effect may be obtained by stopping an imbalance in the vasomotor apparatus. This is a subject of discussion with no satisfactory explanation. If the autonomic nerve control of the uterus is analogous to that of the large intestine one would suppose that removing the sympathetic division would allow the parasympathetic to excite stronger contractions of the uterine muscle and increase dysmenorrhea rather than relieve it. Either dysmenorrhea is not due to muscle contractions, the pain is caused by blood vessel spasm from the

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action of the sympathetic system or the pain has nothing to do with the autonomic nervous system and relief is obtained by cutting the afferent visceral nerve fibres in the presacral nerve which carry pain sensations.

Clinical reports offer no good explanation of why presacral resection should be as effective as it is. It is used as a gynecological procedure to relieve pain in dysmenorrhea, malignant diseases in the pelvis, and idiopathic pain. Some writers mention beneficial effects in pruritus vulvae.

In essential dysmenorrhea it should be used as a rule, only after all other methods of treatment have failed. One should remember that hygiene, regulation of habits of body and mind and medicine should be given a thorough try first. If these fail then operation may be considered. Whether to do a dilatation of the cervix alone and reserve presacral neurectomy for cases in which dilatation fails or to do both right off is a matter of individual selection depending on the severity of the symptoms and the patient's mental attitude. We believe that if the patient has reached full growth that is the age of twenty one, it is useless to temporize and both procedures had better be carried out. Further we believe that if the uterus is retroverted or anteverted and retrocessed that a suspension of the uterus aids in relief so we do that also and as a result have only one case to report who has had simply a dilatation of the cervix and presacral neurectomy.

In dysmenorrhea due to pathological conditions in the pelvis this operation is combined with the removal of diseased organs or correction of versions to make success more certain.

We have debated the use of this procedure in conservative operations for diffuse endometriosis for fear that we might implant the disease retroperitoneally but are inclined to the opinion that if the neurectomy is done as a first step in the operation as a whole the danger is slight enough to be disregarded.

We have discarded it for the time being in patients suffering from pain due to advanced cancer of the cervix because the injection of alcohol into the spinal canal has been so satisfactory. Resecting the nerve means an abdominal operation with its attendant hospital stay and period of convalescence for a patient who is in poor condition with not very long to live anyway.

There seem to be no permanent deleterious effects caused by the operation. There are reports that postoperative catheterization is necessary more often and that a residual urine occurs but it is for two or three days only. It has no effect on childbirth. Fontaine and Herrmann<sup>1</sup>, Wetherell<sup>2</sup>, De Courcy<sup>3</sup> and others report normal pregnancies and labors following the operation. Wetherell<sup>4</sup> reports the relief of obsti-

nate constipation in one case as well as the beneficial effect on her dysmenorrhea.

Section of the nerve does not alter the normal menstrual cycle except for the bleeding which follows the operation in some cases. Menstruation which has been scanty or profuse usually returns to normal.

De Courcy<sup>3</sup> reports twenty-one operations done for dysmenorrhea with excellent results. Greenhill<sup>5</sup> has done it in both essential and other dysmenorrheas and recommends it. Counseller and Craig<sup>7</sup> have had a similar experience in fourteen cases. There are many satisfactory reports from Europe where the operation was first performed in France thirty years ago but discarded until about ten years ago.

There are very few reports of its use to relieve pain in advanced cancer of the cervix. Behney<sup>8</sup> cites twenty-two cases. Sixteen were relieved of the pain but seven lived less than four weeks after the operation.

The technique of the operation is not so simple as the various reports say in our opinion. The peritoneum over the bifurcation of the aorta is opened by a longitudinal incision which is enlarged to about ten cm in order to obtain sufficient exposure over the lower end of the aorta and well down on the sacrum. One sees areolar tissue with nothing distinctive about it until a close inspection shows small nerve fibres running through it and sometimes a well defined nerve or two. We lift the peritoneum and clear its under surface carefully out to the ureter on the right and the inferior mesenteric artery on the left, which may have to be pushed aside in some cases in order to reach all the fibres. Then a triangular space from just above the bifurcation of the aorta downward for about five cm is cleared of all areolar tissue and nerve fibres. At the apex we have often cut small vessels which needed ligation and similar ones at the lower corners of the triangle. The middle sacral artery can be avoided usually but we feel sure that it has been cut twice in our series without damage. One must be careful to avoid injuring the right ureter, inferior mesenteric artery and left common iliac vein which lies on the left in the posterior wall of the triangle. The incision in the peritoneum is closed with fine catgut.

We have a series of forty-one cases who have had a presacral neurectomy, twenty-five done by various members of the staff of the Free Hospital for Women and sixteen by the author in his private practice.

Fifteen patients had no other pathology than some form of underdevelopment of the pelvic organs and had never been pregnant. That is they had essential dysmenorrhea. Their ages varied from sixteen to thirty-seven with an average of twenty-six. They were all twenty-one or over except one girl of sixteen who was operated on

primarily for appendicitis, and presacral neurectomy was done because she had severe dysmenorrhea. We think it is evident from these age statistics that we have been very conservative in the application of this new operation. They are patients who had had medical methods tried first in most cases without relief. The operation in fourteen consisted of a dilatation of the cervix, a suspension of the uterus by Ols-hausen's method, and an incidental appendectomy as well as the neurectomy. We do a suspension of the uterus because experience has shown that it helps in the cure of dysmenorrhea, and feel that everything should be done. Therefore we have only one case which had a dilatation and presacral neurectomy alone done for essential dysmenorrhea.

The time since operation varies from two to thirty-six months with an average of fifteen.

Twelve (80 per cent) of these fifteen patients were relieved, one (7 per cent) had partial relief, and two (13 per cent) had no relief. The one with partial relief has pain with every third period on the average so she is much better. We cannot explain why this should be. The two with no relief are recent cases each having had only two periods since operation which were just as painful as before. There is nothing distinctive to show why they were not relieved and it seems as if the whole nerve should not have been removed.

Dilatation of the cervix alone gives relief in about fifty per cent of cases while dilatation and suspension relieves about sixty-five per cent, so the addition of the neurectomy is of distinct benefit. Therefore it may be sensible to change our rule of waiting until the patient has reached her full growth and do it on those who have had thorough medical treatment followed by a simple dilatation of the cervix without relief.

Presacral neurectomy may be used as an adjunct in treating dysmenorrhea due to pathological changes in the pelvis. We have so used it on eighteen patients who had conservative operations of various kinds. The main diseases were as follows: pelvic inflammation in seven, prolapse in seven, fibromyoma of the uterus in two, and endometriosis in two. They had various types of conservative operations all of which included a suspension of the uterus and a presacral neurectomy. We have lost track of one. Eleven were relieved of the dysmenorrhea, four had partial relief and two no relief. One is pregnant and one has had a normal labor since operation. Some of them have minor pelvic pain of an aching character which is not bad. It is our impression from studying these cases that cramp-like pain is relieved by the neurectomy because of the common statement by the patient that her cramps are gone but she has some aching at times, apparently depending on how bad the original pathological

condition was and the condition in which the pelvis was left. The type of operation done on these patients differed so much that no exact conclusions can be drawn. Neurectomy adds little to the risk and should be done in an attempt to use every effort to obtain relief.

Two patients had hysterectomies and bilateral salpingo-oophorectomies for pelvic adhesions due to a previous inflammation as well as a neurectomy and are entirely relieved. How much the neurectomy had to do with the cure is uncertain but it may be of value as shown by the next case.

This woman of thirty-four had a conservative operation for pelvic inflammation in 1929. She came to the author in 1931 complaining chiefly of a dull ache with sharp pain at times in the left lower quadrant. He found the pelvis full of adhesions, and the uterus, tubes and ovaries so damaged that it was necessary to remove them. She made a normal convalescence but continued to have the same pain. The urinary and gastrointestinal tracts were negative to x-ray examination. Medical and orthopedic consultations were negative. In 1933 the patient demanded that something be done and following a presacral neurectomy she has been well.

A spinster of sixty-eight had had a hysterectomy and bilateral salpingo-oophorectomy seventeen years before. She complained of sharp pain in the lower abdomen of three months' duration and frequent burning micturition of ten days' duration. On November 9, 1932, a pyelogram was done with negative findings. A gastrointestinal x-ray was negative. She was treated by means of bladder dilatation and irrigation without improvement. On March 31, 1933, operation by the author revealed a loop of sigmoid adherent to the bladder over an area of about four square inches. This was separated and the presacral nerve removed. The interesting point in this case is that the patient said three days after operation that the sharp pain had gone and all she noticed was some irritation which seemed to be in the urethra. This irritation subsided and she felt well in a month. There is no proof that the neurectomy helped in the cure but it seems very possible.

Therefore in cases similar to the last four we are inclined toward doing a presacral neurectomy with the hope that it may aid in the cure although it will be a difficult proposition to prove.

We have used the operation in four cases of cancer of the cervix to relieve pain without success. They had widespread growths in the broad ligaments and retroperitoneal areas. In this disease the operation is done on patients who have not much longer to live anyway. More important however is the fact that the injection of alcohol into the spinal canal to destroy the sensory roots has been successful at the

**Free Hospital for Women** It is simple to do, effective, and so far has not been followed by complications. This will be made the subject of a report by Youngs at a later date.

#### SUMMARY

Presacral neurectomy relieves dysmenorrhea of the essential type and may help in that due to pathological conditions.

It is apparently of value in stopping idiopathic pelvic pain and pain due to malignant growths.

It has no deleterious effect on pregnancy and labor and may restore irregularities of menstruation to normal. The mechanism of its action is not definitely known.

#### REFERENCES

1. Livingston. Clinical Aspects of Visceral Neurology.
2. Davis, A. A. Presacral nerve. Its anatomy, physiology, pathology and surgery. Brit. M. J. 8: 1 (July) 1924.
3. Fontaine, R., and Herrmann, L. O. Clinical and experimental basis for surgery of the pelvic sympathetic nerves in gynecology. Surg. Gynec. Obst. 54: 123 1922.
4. Wetherell, F. S.: Intractable dysmenorrhea: relief by sympathectomy. Am. J. Obst. & Gynec. 29: 1 (March) 1924.
5. De Courcy, J. L. Resection of the presacral nerve for dysmenorrhea based on favorable results in a series of twenty-one cases. Am. J. Surg. 23: 408 1924.
6. Greenhill, J. P. The treatment of severe dysmenorrhea by pelvic sympathectomy. Am. Med. 40: 230 (Aug.) 1924.
7. Counseller, V. S., and Craig, W. M.: Treatment of dysmenorrhea by resection of presacral sympathetic nerves: evaluation of end results. Am. J. Obst. & Gynec. 23: 161 (Aug.) 1924.
8. Bower, C. A. Discussion—Treatment of Dysmenorrhea by Counseller. Am. J. Obst. & Gynec. 23: 170 1924.

#### DISCUSSION

**CHAIRMAN ALMY** Dr James C White will open the discussion.

**DR. JAMES C. WHITE** Dr Pemberton has given you an excellent exposition on the value of resection of the superior hypogastric plexus in gynecology. His is the largest series on record in this country and it seems almost presumptuous to add our small number of seven cases from the Massachusetts General Hospital. These have been operated on by Dr J. V. Meigs and me. The only thing that is significant about our series among the large number of favorable case reports which have appeared in the literature is that in six of our cases we have carried out no other procedure besides presacral neurectomy and routine appendectomy. For purposes of control retroverted uterus were left retroverted, and the pain was wholly relieved in all but one instance (and she is none the less definitely better). These cases have been followed from six months to four and one-half years. Now that the effectiveness of cutting the viscerosensory nerves from the uterus has been so well established, we agree that routine suspensions and any necessary procedure on the tubes or ovaries should be carried out at the same time. In corroboration of Dr Pemberton's statistics none of these patients have complained of any postoperative difficulty with urination or any other disturbance. In this connection the recent anatomical observation of Stoford and Telford should be emphasized—that the pelvic parasympathetic supply which stimulates the lower colon to normal defecation travels upwards in the hypogastric nerves. If the presacral nerve dissection is carried too far down into the pelvis these fibres may be cut as they branch off to join the superior hemorrhoidal artery. On the other hand the operator who fails to dissect downwards far enough will fail to destroy

the ramus from the fourth lumbar ganglion which runs under the common iliac vessels. I believe that this is a cause of occasional failure, and that the surgeon should not be satisfied until he has thoroughly dissected the triangle below the aortic bifurcation down to the origin of the internal iliac vessels.

I believe that the relief of pain which follows this operation is directly due to the cutting of visceral pain pathways. From a strictly anatomical view point the presacral nerve like the splanchnics and the cardiac nerves contains a majority of small unmyelinated sympathetic motor fibres. It also carries a certain number of large myelinated neurones which Heinbecker has shown are identical histologically and in their electrical conduction properties with ordinary sensory nerves to the skin like the saphenous. Furthermore these fibres come from the posterior spinal sensory roots and are therefore identical with ordinary sensory nerves to other parts of the body.

**CHAIRMAN ALMY** Dr Louis E Phaneuf will continue the discussion.

**DR. LOUIS E. PHANEUF** Boston, Mass. *Mr Chair* man and Members of the Section—

Dr Pemberton has brought to our attention an important method in the treatment of intractable primary spasmodic dysmenorrhea.

Three groups of nerves are concerned in the innervation of the female genital apparatus—(1) the pelvic sympathetic superior hypogastric plexus of Hovelacque presacral nerve of Latarget (2) the utero-ovarian nerves and (3) the pudendal nerve from which the perineal nerve arises. The first two innervate the internal genital apparatus and the vagina, while the third supplies the external genital organs and the perineum.

Resection of the presacral nerve for dysmenorrhea was popularized by Gaston Cotte of Lyon, France in 1924. Cotte has written an excellent book entitled *Chirurgie du sympathique pelvien* Masson & Cie, Paris 1932. In this book the indications and technic are well described. Since 1924 several papers and case reports have appeared in the literature. Among the American contributions may be mentioned those of Adson and Masson, Elant, Fontaine and Herrmann, Greenhill, and Wetherell.

A symposium on 'pain in gynecology' was presented before the second Congress of the French Gynecological Society in 1933. Cotte presented one of the reports at this Congress. In his paper he reported more than thirty pregnancies following presacral neurectomy in his series. In all of these cases the deliveries were normal and without complications. He stated that he had not encountered any trophic disturbances or atrophy of the vulva and vagina following this intervention.

From the standpoint of technic he advises against trying to isolate the sympathetic fibers but advocates the removal of about 3 cm. of the cellulofibrous membrane which is found under the peritoneum and which contains the fibers. The tissue removed should be examined histologically to demonstrate these nerve structures.

At the same Congress L. Aubert of Geneva, in discussing Cotte's report gave the details of his sixty presacral resections. In this group he reported but two failures. Pregnancy had ensued in a few of his patients who had had normal labors.

I am in complete agreement with Dr Pemberton that this operation valuable as it may be should be used cautiously since dysmenorrhea, in many instances, may be relieved by medical endocrine and other surgical means. It should be reserved for

those patients who have not been helped by the ordinary methods of treatment. Since, in the past, some of these women have been treated by hysterectomy, radiation and oplates, it seems logical that in the future these procedures should be supplanted by a resection of the superior hypogastric plexus, bearing in mind, however, that the intervention carries the risk of a laparotomy

Personally I have done but three presacral resections. The operation is not difficult if one has the anatomy of the parts clearly in mind. For my part, I examined the superior hypogastric plexus in several anatomical subjects to familiarize myself with the landmarks before performing my first operation. All three of my patients were relieved of pain in their subsequent menstruations. The first patient so operated realized that she was menstruating when blood appeared on her clothing the period being absolutely painless, although before the intervention she was so crippled from dysmenorrhea that she had to remain in bed and resort to oplates. I have had no experience with presacral neurectomy for carcinoma of the cervix or for pruritus vulvae, although there are reports in the literature to the effect that relief may be obtained in these two lesions by resecting the presacral nerve.

Dr Pemberton has shown us a useful procedure, which, when employed in properly selected cases, is attended with uniformly good results.

CHAIRMAN AINSY. The paper is open for general discussion.

DR JOHN FALLON, Worcester. After you have heard the story of so rich an experience as this, I would not dare to get up and talk about my own, which is limited to seven cases, if I disagreed with Dr Pemberton. But I don't. I agree with every thing he has said, and would only add two minor ideas.

First. The operation promises well, is still, at least on this side of the water, a shade experimental. Not difficult, it requires a little special knowledge and technique (helped, by the way, by Cushing clips). Therefore it is not something to recommend for every dysmenorrheic maiden who happens to see us. Dr Pemberton said as much. I would add the corollary. When the abdomen of a dysmenorrheic is already open, for whatever reason, it seems not only justifiable but desirable to add this step to whatever is being done, if it is technically feasible.

Secondly. The patient with enough recurrent pelvic carcinoma to give intractable pain and, unfortunately, enough strength to last some time, seems to be the ideal subject for study. Three of my cases were in this group, and the three did well—probably from luck possibly because a wider sympathectomy was done. The resection included the presacral plexus, lower two lumbar ganglia on each side, inferior mesenteric and iliac nerves. Surgically more radical, this seems less radical physiologically than intra arachnoid alcohol.

CHAIRMAN AINSY. Unless there is some more business to come before this Section, the meeting stands adjourned.

## OBSERVATIONS ON THE SYMPTOMATOLOGY OF CHOLELITHIASIS\*

### With Special Reference To Vomiting

BY ROBERT ZOLLINGER, M.D.,† AND EDMUND YOUNG, M.D.†

WE became interested in the symptomatology of cholelithiasis after studying several patients whose pain varied from the typical syndrome of biliary colic. Since the pain is often the result of overdistention of the gallbladder or major bile ducts by a calculus, we attempted to simulate this by mechanical means in conscious patients. By such a method we hoped to study the symptoms produced by distention of the gallbladder as compared with distention of the major extrahepatic ducts. In this report a clinical study, based on our experimental findings, has been undertaken in an effort to evaluate the symptoms of cholelithiasis in relation to the location of the offending calculus.

Our observations consisted of the mechanical distention of the gallbladder or common duct in six patients<sup>1</sup>. Under a short gas-oxygen anesthesia or local infiltration of novocain the stones were removed from the gallbladder or common duct and a sterile balloon was inserted which could be distended and the pressure recorded. When the patient had recovered sufficiently from the anesthesia to answer all questions intelligently the gallbladder or common duct was

distended. Distention of the gallbladder produced a feeling of indigestion or deep epigastric discomfort without the usual referred pain to the back or discomfort in the right hypochondrium. Nausea and vomiting did not occur regardless of the degree of distention. Distention of the common duct produced a more severe epigastric distress but again pain was not referred to the back. Inspiratory distress was characteristic of distention of either viscus. The chief difference between distention of the gallbladder and of the common duct was the occurrence of nausea and vomiting with the latter.

The significance of these observations was then determined from a study of the clinical histories of three hundred cases previously operated upon in the Peter Bent Brigham Hospital for cholelithiasis. Particular reference was made to the location of their initial pain and the occurrence of involuntary vomiting. These cases were divided into three groups of one hundred cases each. The first group included only patients with cholecystitis and cholelithiasis who had never been jaundiced and in whom no evidence of cystic or common duct calculus could be found at operation. As far as could be determined in this control group the ducts had not been distended by a calculus, and the symp-

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toms resulted from stones within the gallbladder. All of the second group had acute cholecystitis. The cystic duct was occluded by a stone in forty of these patients, and probably in many more not mentioned in the pathologist's or surgeon's note. The third group of one hundred cases had calculi removed from the common duct at operation.

Table 1 compares the relative frequency of

TABLE 1

	Cholecystitis and Chole- lithiasis	Common Duct Stones
	*Chronic %	*Acute %
1. Involuntary vomiting	29	85
2. Colic	60	80
3. Right upper quadrant pain	58	65
4. Epigastric pain	37	35
5. Left upper quadrant pain	5	0
6. Chills and fever	0	12
7. Jaundice	0	11
8. Average age	47.2	47.1
9. Postoperative days in hospital	16.7	21.7
10. Mortality	0	5

One hundred cases

One hundred cases

some of the more common symptoms in cholelithiasis as it occurred in the three hundred cases. Involuntary vomiting interested us especially since it occurred experimentally only when the ducts were dilated. We believed it might prove of value in the differential diagnosis between stones in the gallbladder as compared with the symptoms of stones in the cystic or common duct. By involuntary vomiting we mean spontaneous vomiting and not induced vomiting following nausea. Unless there was a specific statement to the contrary, we considered the vomiting described in the clinical history to be spontaneous. It occurred in twenty nine of the one hundred cases of chronic cholecystitis with out evidence of calculi in the cystic or common duct. Vomiting was found in eighty five of the one hundred cases of acute cholecystitis. Obstruction in the cystic duct no doubt accounts for the high incidence in this group. As we expected, the highest incidence of vomiting (eighty nine per cent) occurred in the one hundred cases of proved common duct stone. We believe that the clinical and experimental observations coincided rather closely, in that distention of the ducts does produce vomiting in contrast to its absence in distention of the gallbladder. Obviously it cannot be determined how many cases of vomiting in the group of chronic cholecystitis may have been due to a stone temporarily blocking the cystic duct. These findings suggest that pronounced involuntary vomiting in

cases of cholelithiasis often indicates that a stone is impacted in the ampulla of the gallbladder or located in the major extrahepatic ducts. The surgical significance of this observation is apparent and we believe that involuntary vomiting should be added to the commonly accepted list of indications for exploration of the common duct.

Attacks of colicky pain occurred in sixty per cent of the cases of chronic cholecystitis and cholelithiasis. The percentage was increased to eighty in acute cholecystitis and ninety in cases of common duct stone. It must be remembered that common duct stones can occur without pain. There is no mention made in these histories of the association of inspiratory distress with colic, but in a study of our recent cases we find it to be associated with gallstone colic in over twenty five per cent. We are convinced of its diagnostic significance in cases of biliary colic.

Right upper quadrant pain occurred in almost two-thirds of the three hundred cases. Left upper quadrant pain or bizarre and atypical localization in about five per cent. On the other hand, epigastric pain appeared as the initial symptom in more than one third of the cases. Since the epigastric pain was the only type produced by our mechanical distention of the gallbladder or common duct, we believe that this symptom indicates a similar process resulting from a calculus blocking or trying to pass through one of the major ducts. Closer questioning of the patients would undoubtedly elicit the fact that often the onset of pain was localized in the epigastrium. Thus, we believe to be a visceral type of pain. The high incidence of pain in the right upper quadrant may be accounted for by an associated inflammation of the gallbladder stimulating the adjacent cerebral spinal nerves. We cannot offer a satisfactory explanation for the referred pain to the back so often found in biliary colic.

Jaundice occurred in eleven of the one hundred cases of acute cholecystitis and in ninety of the one hundred cases of common duct stone. We have found involuntary vomiting to occur as often as jaundice in the presence of a common duct stone, and we have occasionally accepted it as the chief diagnostic symptom. A recent or past history of jaundice is an indication for exploration of the common duct. However it must be remembered that ten per cent of the common duct stones occurred in the absence of jaundice.

Although both chills and fever are usually considered to be inseparably associated with jaundice in the presence of a stone in the common duct, we found to our surprise that they were mentioned in only fifteen of our one hundred proved cases. Close questioning of our recent patients showed that they certainly are not present in over one-third of the cases.

The average age of the one hundred cases of



those patients who have not been helped by the ordinary methods of treatment. Since, in the past, some of these women have been treated by hysterectomy, radiation and opiates, it seems logical that in the future these procedures should be supplanted by a resection of the superior hypogastric plexus, bearing in mind, however, that the intervention carries the risk of a laparotomy

Personally I have done but three presacral resections. The operation is not difficult if one has the anatomy of the parts clearly in mind. For my part, I examined the superior hypogastric plexus in several anatomical subjects to familiarize myself with the landmarks before performing my first operation. All three of my patients were relieved of pain in their subsequent menstruations. The first patient so operated realized that she was menstruating when blood appeared on her clothing, the period being absolutely painless, although before the intervention she was so crippled from dysmenorrhea that she had to remain in bed and resort to opiates. I have had no experience with presacral neurectomy for carcinoma of the cervix or for pruritus vulvae, although there are reports in the literature to the effect that relief may be obtained in these two lesions by resecting the presacral nerve.

Dr Pemberton has shown us a useful procedure, which when employed in properly selected cases, is attended with uniformly good results.

CHAIRMAN ALMY: The paper is open for general discussion.

DR JOHN FALLON, Worcester: After you have heard the story of so rich an experience as this, I would not dare to get up and talk about my own which is limited to seven cases, if I disagreed with Dr Pemberton. But I don't. I agree with every thing he has said, and would only add two minor ideas.

First: The operation promises well, is still, at least on this side of the water, a shade experimental. Not difficult, it requires a little special knowledge and technique (helped, by the way, by Cushing clips). Therefore it is not something to recommend for every dysmenorrheic maiden who happens to see us. Dr Pemberton said as much. I would add the corollary: When the abdomen of a dysmenorrheic is already open, for whatever reason, it seems not only justifiable but desirable to add this step to whatever is being done, if it is technically feasible.

Secondly: The patient with enough recurrent pelvic carcinoma to give intractable pain and, unfortunately, enough strength to last some time, seems to be the ideal subject for study. Three of my cases were in this group, and the three did well—probably from luck possibly because a wider sympathectomy was done. The resection included the presacral plexus, lower two lumbar ganglia on each side, inferior mesenteric and iliac nerves. Surgically more radical, this seems less radical physiologically than intra-aortic alcohol.

CHAIRMAN ALMY: Unless there is some more business to come before this Section, the meeting stands adjourned.

## OBSERVATIONS ON THE SYMPTOMATOLOGY OF CHOLELITHIASIS\*

### With Special Reference To Vomiting

BY ROBERT ZOLLINGER, M.D.,† AND EDMUND YOUNG, M.D.‡

WE became interested in the symptomatology of cholelithiasis after studying several patients whose pain varied from the typical syndrome of biliary colic. Since the pain is often the result of overdistention of the gallbladder or major bile ducts by a calculus, we attempted to simulate this by mechanical means in conscious patients. By such a method we hoped to study the symptoms produced by distention of the gallbladder as compared with distention of the major extrahepatic ducts. In this report a clinical study, based on our experimental findings, has been undertaken in an effort to evaluate the symptoms of cholelithiasis in relation to the location of the offending calculus.

Our observations consisted of the mechanical distention of the gallbladder or common duct in six patients.<sup>1</sup> Under a short gas oxygen anesthesia or local infiltration of novocain the stones were removed from the gallbladder or common duct and a sterile balloon was inserted which could be distended and the pressure recorded. When the patient had recovered sufficiently from the anesthesia to answer all questions intelligently the gallbladder or common duct was

distended. Distention of the gallbladder produced a feeling of indigestion or deep epigastric discomfort without the usual referred pain to the back or discomfort in the right hypochondrium. Nausea and vomiting did not occur regardless of the degree of distention. Distention of the common duct produced a more severe epigastric distress but again pain was not referred to the back. Inspiratory distress was characteristic of distention of either viscus. The chief difference between distention of the gallbladder and of the common duct was the occurrence of nausea and vomiting with the latter.

The significance of these observations was then determined from a study of the clinical histories of three hundred cases previously operated upon in the Peter Bent Brigham Hospital for cholelithiasis. Particular reference was made to the location of their initial pain and the occurrence of involuntary vomiting. These cases were divided into three groups of one hundred cases each. The first group included only patients with cholecystitis and cholelithiasis who had never been jaundiced and in whom no evidence of cystic or common duct calculus could be found at operation. As far as could be determined in this control group the ducts had not been distended by a calculus and the symp-

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disc is maintained by a marginal rim on the end surface of the vertebra.

The construction of the nucleus pulposus gives to the spinal column its resilient quality. Acting like a spring which is, at the same time, equally under pressure and compression, this elastic semi fluid mass takes from the bony surfaces the force of blows and distributes the shock of sudden jars, lessening their effect upon the nervous system. Any pathology, therefore, which interferes with the proper function of the disc as a shock absorber may give symptomatology in this region. Schmorl, commenting on the frequency with which changes in the intervertebral discs occur, says that "with increasing age they become so frequent that after the middle of the sixth decade it is almost impossible to find a spine in which all the intervertebral discs are normal." That such alterations may not always be found in those doing hard physical labor but may appear in severe form in brain workers suggests that disturbances in metabolism and endocrine disorders may, at times, enter the picture. Schmorl has differentiated three forms which changes in the discs may assume: (1) a drying of the tissue of the disc, (2) an increased moisture in the tissue, inducing gross fissure formation and ultimately destruction of the disc, and (3) the occurrence, primarily, of fissures in the discs. In the drying process the volume of the disc is decreased and the tissue becomes brittle and crumbly.

Pathology in the disc may also assume the form of a displacement of the intervertebral tissue, which may protrude in nodular excrescences through fissures in the cartilaginous plates. Through the tension of the nuclear tissue these small villi are pressed into defects in the cartilaginous plates and thence into the spongiosa of the vertebral bodies. If they occur on the posterior surface of the intervertebral disc, they may extrude into the spinal canal possibly irritating the spinal cord and even at times inducing paralysis. Such nuclear hernias or prolapses may cause proliferation of cartilaginous tissue, which may calcify and finally become ossified. Prolapses of the nuclear tissue in young people may lead to kyphosis. In adults they are not conducive to curvature, first because the cartilaginous nodules develop, for the most part, only in a single disc, secondly, because much less tissue prolapses on account of the decreased expansion in the region of the nucleus, and thirdly, because the growth of the vertebral bodies has ceased and therefore the kyphosis seen in youth through ossification disturbances can no longer take place. The most significant changes are secondary to nodule formation and consequent upon the resulting destruction of the nucleus and the obliteration of the joint space. The two cartilaginous plates are then brought into juxtaposition.

Keyes and Compere<sup>4</sup> remark that "if only a small portion of the nucleus pulposus is extruded the function of the disc may not be seriously affected, but the extrusion of even small amounts may lead to an earlier than usual dehydration of the disc and therefore diminished function at an earlier age. Such small ruptures may thus be a predisposing etiological factor in the development of arthritis of the spine later. If so much fluid escapes that the nucleus pulposus is destroyed, the axis of motion is shifted posteriorly to the articular facets and the weight of the body is transferred to the lateral or anterior portion of the vertebral bodies."

Weaver<sup>5</sup> believes that rupture of the nucleus pulposus would require considerable force and that, consequently, rupture due to sudden



FIG 1. Dissection of lumbo-sacral area.

trauma is probably rare. Of more frequent occurrence, on the other hand, is narrowing of the disc due to mild continuous trauma, such as faulty posture, which throws a continuous strain on the lumbosacral junction.

Calvé and Galland note, among the changes which may take place in the intervertebral discs, calcification of the nucleus. In this condition the cells of the nucleus are necrosed and the fibrous tissue destroyed by calcareous deposit. A satisfactory explanation for this calcification, they say has never been given. These authors, like Schmorl, have observed herniation of the nucleus pulposus into fissures in the cartilaginous plates, with resultant rarefaction and destruction of the bone.

On the other hand, destruction of the intervertebral discs may be secondary to pathological conditions in the vertebral bodies as in os

chronic cholelithiasis and chronic cholecystitis without a history of jaundice was 47.2 years. This average was almost identical with the one hundred cases of acute cholecystitis which was 47.1 years. The patients with common duct stone averaged about six years older, which suggests that the longer the patient carries the stones the greater the chance of a calculus escaping into the common duct. This is an argument in favor of an earlier operation in cases of cholelithiasis. The period of hospitalization was considerably longer in the group of acute cholecystitis (21.7 days) and common duct stone (22.8 days) than in the uncomplicated cases (16.7 days).

The mortality figures demonstrate the seriousness of the complications in cholelithiasis. It so happened that no deaths occurred in the uncomplicated cases, although a few pulmonary complications and wound infections did occur. The mortality rate of the one hundred cases of acute cholecystitis was five per cent. A cholecystostomy was done in eight of the one hundred cases. Sepsis was the etiological cause of death in a greater number than pulmonary complications in this group. The mortality rate of the one hundred cases of proved common duct stone was twelve per cent. We feel, however, that careful exploration of the common duct in itself adds little to the mortality rate. The method described by Cheever<sup>2</sup> was usually employed. Pulmonary complications accounted for seven of the twelve deaths in the latter group.

## SUMMARY

Observations are recorded following the distention of the gallbladder or common duct in six patients operated upon for cholelithiasis. The cardinal findings of clinical importance were as follows: (1) Failure by this method to reproduce the usual referred pain to the back, (2) the consistent complaint of inspiratory distress, (3) the absence of vomiting when the gallbladder was distended and the prominence of this symptom when the ducts were distended.

The importance of these findings was tested by a study of the records of three hundred cases of cholelithiasis consisting of one hundred cases of cholelithiasis and chronic cholecystitis with a negative history for jaundice, one hundred cases of acute cholecystitis and one hundred cases of proved common duct stone.

Our observations, which showed that vomiting followed distention of the common duct, were in accord with the clinical findings that distention of the biliary ducts, as by a calculus, produced a high percentage of involuntary vomiting as compared with calculi within the gallbladder. We are suspicious of a calculus in the cystic or common duct in cases having pronounced involuntary vomiting and we believe it should be considered in the group of indications for exploration of the common duct.

## REFERENCES

- 1 Zollinger R. Observations following distension of the gallbladder and common duct in man. *Proc. Soc. Exper. Biol. & Med.* 30: 1260 1932 33
- 2 Cheever D. Instrumental dilatation of the papilla of Vater and the dislodgment of calculi by retrograde irrigation. *Arch. Surg.* 18: 1069 1929

## FURTHER CASE STUDIES OF LUMBO-SACRAL PATHOLOGY WITH CONSIDERATION OF THE INVOLVEMENT OF THE INTERVERTEBRAL DISCS AND THE ARTICULAR FACETS

BY CHARLES E. AYRES, M.D.\*

INTEREST in the conditions conducive to painful symptoms in the lower back has by no means abated since our last contribution to the subject in 1929<sup>1</sup>. On the contrary, it has increased in considerable degree and so much has the literature been enlarged that one is made increasingly aware of the multitude of possibilities for pathology in this region. Our conclusions in 1929, from the study of thirty-six cases, were that the anatomical structures most concerned in low-back pain were the intervertebral discs, the articular facets, and the 5th lumbar nerve. In the intervening five-year period every angle of the etiology has been investigated. Particularly painstaking researches into the minutest details of the anatomy, normal and pathological, and the physiology of the intervertebral spaces, have been carried on by the German school headed by Schmorl<sup>2</sup>. As so aptly phrased by Calvé and Galland<sup>3</sup>, "a new chapter in vertebral pathology has been disclosed the

pathology of the intervertebral disc." Intimately connected with this are destructive processes in the intervertebral articulations and the implication of the 5th lumbar nerve root.

## THE INTERVERTEBRAL DISCS

The intervertebral disc consists of the nucleus pulposus, a central flattened lens of loose fibrous tissue, made up of cartilaginous cells and containing synovia-like fluid under pressure. This central gelatinous mass is held in place by a strong, elastic fibrocartilaginous envelope, the annulus lamellosus, the fibres of which are in continuity with the fibres forming the periphery of the vertebral surfaces. The end surfaces of the vertebrae are covered by a thin layer of cortical bone, quite compact in the center over the nucleus pulposus and more porous peripherally. Over this cortical bone lies the cartilaginous plate, composed of hyaline cartilage, which ends abruptly anteriorly and laterally by abutting the bony epiphyseal ring. A firm connection between the body of the vertebra and the intervertebral

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tilage may be found in the articular cartilage of these facets. This degeneration may go on to complete loss of the cartilaginous surface and irregular hypertrophy of the margins similar to that encountered in the advanced stages of degeneration or hypertrophic arthritis of other joints. With narrowing of the intervertebral discs there is overriding of the surfaces of the facets and with this abnormal contact traumatic arthritis is set up. Ghormley believes the sciatic pain in these cases to be more likely caused by pressure on the nerve or nerve sheath excited by the facet than by the intervertebral disc



FIG. 3. Cross section of spine at lumbosacral joint showing intimate relation which fifth lumbar nerve root bears to facets and lumbosacral cartilage.

The degree to which the facet may be involved in any inflammatory process in the intervertebral spaces and the character of the changes are strikingly brought out by the pathological report on a specimen of tissue from the lumbosacral facets in one of our cases (No. 78), which was as follows: "Sections of the soft tissue show a dense stroma with some round cell infiltration and much fibrosis change. Some areas show calcification and bone formation. Sections of the decalcified bone show moderate round cell infiltration and many fat cells, evidence of chronic inflammatory changes. Diagnosis: Chronic inflammatory tissue, beginning calcification and ossification." (Dr. P. Beregoff)

Willis<sup>12</sup> points out the frequency with which anomalies of the vertebrae occur and says the last presacral vertebra shows a tendency to variability in its transverse processes and articula-

tions with the sacrum. Junghans<sup>13</sup> calls attention to the fact that the 5th lumbar is not always the last presacral vertebra as there may be an anomalous number of vertebrae with displacement of the various segments of the column. All such anomalies predispose the lumbosacral region to pathology.

Baastrup<sup>14</sup> emphasizes the importance of the spinous processes in painful conditions of the back. "The lumbar vertebrae form," he says, "a mutual system of leverage with the axis posterior to the middle of the vertebrae. Therefore, the spinous process is the short lever arm in the system. Under special conditions they may be pressed against each other with great force, the soft parts between them sharing in this process. If this compression is continued, the spinous processes themselves become the site of osteoarthrotic pathological changes. As a result may be seen obliquely placed spinous processes, faceted contact surfaces, osteosclerosis of the bony tissue surrounding the contact surfaces, anomalous contact surfaces, osteophytes at the ends of the articulations, 'mouse' formation and ankylosis. In attempting to compensate for this there is constant strain on the musculature." The number of cases in our own series in which the spinous processes were involved was too small for us to speak with much authority on this point.

#### CLINICAL FINDINGS

Since our report in 1929, a series of sixty-three new cases have been operated upon. A study into the symptomatology of these patients (nearly twice the number reported upon previously) substantiates the statements then made in regard to the clinical findings in these cases of lumbosacral pathology. These are as follows: usually a list to one or the other side, marked tenderness at the lumbosacral junction, although palpation may be difficult and the tenderness masked in muscular patients with severe contraction of the erector spinae; in most cases, distinct tenderness over the gluteus medius just below the crest of the ilium, in some instances, tenderness in back of the trochanter, in the region of the gluteal fold, burning pain along the outside of the thigh corresponding to the tensor fasciae femoris and in severe cases, burning pain involving the outside of the calf and extending beneath the external malleolus and down to the dorsum of the foot. Whether there is atrophy depends upon the severity of the involvement as well as its duration. In our complete series of ninety-nine cases we found considerable variation in the duration of the symptoms. One patient (reported in our first series) complained she had had her symptomatology "all her life." The longest stated period was thirty-five years, the shortest, four weeks, and the average a fraction over two years.

teomalacia, generalized osteitis fibrosis or senile osteoporosis. Schmorl says that while primary metastatic affections of the healthy intervertebral discs of adults cannot occur because the discs have no blood supply and therefore cannot be infected through the blood stream nevertheless suppurations in the region of the disc may attack and destroy it.

Bohmig<sup>6</sup>, through his study of the blood supply to the intervertebral discs in the embryo and in youth, is convinced that the growing disc is much more intimately concerned in the circulation of the blood and in metabolism than has previously been recognized. They may share, therefore, up to the beginning of the twentieth year, in all general diseases of the body, in disturbances of metabolism and infectious blood diseases (bacteremia, sepsis typhus, etc). So it is realized that theoretically all metastatic processes may be present in the intervertebral discs although practically Schmorl has not yet been able to produce such findings in all of his considerable material. There is, Bohmig believes, a possibility of postinfection diseases of the intervertebral discs in the young after grippe and staphylococcic and streptococcic infections. Bohmig also found that the formation of cartilaginous nodules, as described by Schmorl, most often took place at the site of the present or former blood-vessel canals. This author also accounts for anomalies in the form of the nucleus pulposus by the fact that the intervertebral chordal segment is the matrix of the nucleus pulposus and gross and microscopic anomalies of form of the chorda have an extraordinary significance in the development of the nucleus pulposus. Every displacement of the parts of the notochord, every segmentation of its cell complex leads to a diminution of the material for the formation of the gelatinous mass and therefore anomalies in the form of the nucleus pulposus follow. This is most important as regards the statics and dynamics of the vertebrae.

#### THE ARTICULAR FACETS

So closely related are the anatomical structures in the intervertebral spaces that one part, or all, may share in the destructive process. Secondary to thinning of the intervertebral discs there may be changes in the articular processes of the vertebrae. Keves and Compere were able to produce experimentally in animals complete disappearance of the disc and sclerosis with spur formation andipping of the adjacent bone surfaces by injury to the nuclear material. In every instance where nucleus pulposus material had been permitted to escape, there was definite narrowing of the intervertebral disc and when most of the nucleus was curetted out, the adjacent vertebrae showed

early changes of typical hypertrophic or osteoarthritis of the spine and fibrosis of the material remaining in the space previously occupied by the nucleus pulposus. Williams<sup>7</sup> says that with herniation of the nucleus pulposus and loss of the intervertebral space, owing to settling of the vertebrae, there is, in turn, partial subluxation of the articular facets and diminution in the diameter of the intervertebral foramina. The axial force and pivoting which formerly came on the resilient nucleus pulposus must now fall on the inelastic superior surface of the first sacral segment. As motion



FIG. 2 Lumbo-sacral area showing relation of fifth root to lumbo-sacral facet

continues, a pressure atrophy results and the body surfaces may be scarred and narrowed.

In a paper by Williams and Yglesias<sup>8</sup> they divide their cases into two classes: (1) those in which there is a complete loss of the disc and (2) a group showing only narrowing of the disc posteriorly. In the second class, they find the mechanical alteration in the region of the articular facets and foramina with consequent irritation of the 5th lumbar nerve root, is as great, if not greater, than in the first group. With loss of the intervertebral disc and subluxation, the inferior facets of the 5th lumbar vertebra move down and backward, thereby closing off the foramina and causing pressure on the 5th lumbar nerves.

Ghormley<sup>9, 10, 11</sup> mentions the fact that the articular facets are the only true joints in the spinal column, a point brought out by the writer in 1929. Hyaline cartilage covers their surfaces and synovial membrane lines their articular capsules. The degenerative changes, therefore, which are characteristically seen in hyaline car-

tilage may be found in the articular cartilage of these facets. This degeneration may go on to complete loss of the cartilaginous surface and irregular hypertrophy of the margins similar to that encountered in the advanced stages of degeneration or hypertrophic arthritis of other joints. With narrowing of the intervertebral discs there is overriding of the surfaces of the facets and with this abnormal contact traumatic arthritis is set up. Ghormley believes the sciatic pain in these cases to be more likely caused by pressure on the nerve or nerve sheath excited by the facet than by the intervertebral disc.



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## FIFTH NERVE ROOT INVOLVEMENT

The clinical findings, as stated in our previous paper, are adequately accounted for by the anatomical position of the 5th lumbar nerve root and the distribution of its branches. Lying, as it does, between the lumbosacral intervertebral disc and the lumbosacral articular facets, it is liable to involvement in any inflammatory process which attacks either the disc or the facets. Pain then occurs along the course of its branches, the 5th root fibres to the gluteus medius and gluteus minimus giving pain just below the crest of the ilium and in the region of the trochanter and outer aspect of the buttock the fibres to the tensor fasciae latae causing pain along the outside of the thigh, the fibres to the semitendinosus, semimembranosus and biceps giving the symptomatology down the back of the thigh, and the fibres to the crural groups of muscles involving the calf and dorsum of the foot. Continued study of the subject impresses upon us even more forcibly the frequency with which pain radiated down one leg or both. In our entire group of ninety-nine cases, eighty-one patients had pain in the legs, fifty-eight of these in one leg or the other and twenty-three in both legs. Putti<sup>15</sup> has called this type of sciatica which is secondary to some abnormal condition in the spinal column "vertebral sciatica" and says that in 345 cases of lumbar arthritis examined during ten years at the Institute Rizzoli, sciatica was present in 231. Williams notes that the quadratus lumborum and multifidus spinae receive part of their innervation from the 5th lumbar nerve through the posterior perforating branches. This may be an important factor, he says, in muscle spasm of the lower part of the back and, associated with reflex spasm of the psoas muscle, probably explain the spinal rotation and list seen in arthritic irritation. The earliest symptoms of nerve root irritation are likely to be gluteal pains and tenderness, usually interpreted as sacroiliac pathology, but which, he believes, are due to irritation of the superior gluteal nerve through the 5th lumbar segment. The fibers of the superior gluteal nerve are peripherally placed within the 5th lumbar nerve root and are therefore the first to register irritation.

## TREATMENT

We have continued to use the Hibbs fusion operation, the technique of which is outlined in our previous article. The results have been almost uniformly excellent (as will be seen in the analysis of our cases), and this operation has the advantage of keeping the patient hospitalized for only ten days or two weeks, at the end of which time, a plaster jacket is applied in extension with a pelvic belt having two straps so as to rotate the pelvis posteriorly and bring the sacrum into proper alignment with the spi-

nal column, that is, to make the superior or bearing surface of the sacrum as horizontal as possible. The patient is then allowed to go home and wears the plaster jacket for six weeks, when it is removed and a spring back brace which extends up to include the shoulders is fitted to him.

In none of our cases has facetectomy been deemed necessary. To attempt this step at the time of the fusion operation is to encounter the danger of involving the 5th nerve root in a mass of callus formation, thus nullifying the results of the fusion. On the other hand, if facetectomy is performed as a secondary operation, it becomes a difficult procedure to reach the facet after the fusion has formed.

Williams and Yglesias have performed the fusion operation in thirteen cases within eighteen months with complete relief of symptoms in all the cases but one. In this case pain persisted along the course of the left sciatic nerve, which, it was felt, was due to constriction of the foramen between the 5th lumbar and 1st sacral vertebrae, with irritation of the 5th nerve segment. Therefore, at a second operation the left inferior articular facet of the 5th lumbar vertebra was removed and also the sacral facet, and the nerve freed from surrounding tissue from the point at which it emerged from the neural canal. The patient made a perfect recovery.

## ANALYSIS OF CHARTED CASES

Ninety-nine cases have been studied, which may be divided as follows:

Cases with thinning of the disc (shown by x-ray)	59
Cases with lumbosacral involvement without discernible thinning of the disc	31
Spondylolisthesis	6
Sacralization	1
Impingement of spinous process	2
	99

Of the fifty-nine cases with thinned discs, fifty-two had pain referred to the legs and seven had no pain in the legs. Of the lumbosacral cases without thinning of the disc, thirty-one in all, twenty-three patients complained of pain in the legs and eight did not. The patient with sacralization did not have leg pain and the two patients with impingement of the spinous process complained of no pain in the legs.

We have been able to follow ninety-three of our patients and have the subjoined data:

1 patient is well at the end of a 10 year period	
4 patients are " " " " " " " " " " " "	9
14 " " " " " " " " " " " "	8
17 " " " " " " " " " " " "	7
3 " " " " " " " " " " " "	6
15 " " " " " " " " " " " "	5
19 " " " " " " " " " " " "	4
1 patient is " " " " " " " " " " " "	3
6 patients are " " " " " " " " " " " "	2

80 patients

Eighty of our patients, therefore, have been heard from and are well from two to ten years after operation.

Of the remaining nineteen patients, one has died, one was well for eight years and then developed Paget's disease, one was well for a year and a half and after that could not be traced, six have been lost track of entirely, and ten still complain of pain.

Of the ten patients still complaining of pain, four are patients who showed thinning of the disc by x ray (Nos 28, 30, 55 and 96 on the chart), four are lumbosacral cases with no thinning of the disc discernible by x ray (Nos 37, 42, 46 and 51 on the chart), and two are cases of spondylolisthesis (Nos 47 and 83 on the chart).

Two of these ten patients reported for study, one a lumbosacral case without thinning of the disc (No 37) and one (No 55) with intervertebral disc thinning. Case No 37 was found to have solid fusion but had a large ventral hernia recurring in the scar of a previous abdominal operation. From the examination it appeared that her back symptoms were related to this condition. Case No 55 was operated upon in 1928 and remained well for four years when the symptoms recurred following heavy lifting. He did not have a return of the sciatic symptoms and x ray showed a probable pseudarthrosis.

### CONCLUSIONS

A group of ninety nine patients with lumbosacral symptomatology has been analytically investigated. The end results are known in ninety three cases and in eighty the results of operation have been excellent. The earliest of these cases was operated on in 1924 and thirty six of them previous to 1929, so that we have the results of at least a five year period in all this earlier group and in some cases the postoperative period is as long as ten years. In addition, we have the results in a larger group of sixty three cases, some of them operated upon four years ago. We feel, therefore, that we have convincing evidence of the soundness of our theory of the etiology of lumbosacral backache and the

efficacy of the Hibbs fusion operation as the preferred mode of treatment. Our further study of the subject, over a period of five years since 1929, has served to corroborate the conclusions drawn at that time, namely, that

- (1) A destructive process of the lumbosacral cartilage is a common finding in cases of low back pain.
- (2) An arthritic involvement of the lumbosacral facets may alone cause symptoms of back pain and sciatica.
- (3) Ankylosis is indicated.
- (4) The results of fusion by the Hibbs method are satisfactory in cases that do not respond to conservative treatment.

### REFERENCES

- 1 Ayres, Charles E. Lumbosacral backache. *Boston M. and S. J.* 1901, 9 (Jan. 9) 197. *New Eng. J. Med.* 1901, 253 (March 21) 197.
- 2 Schmorl, C. G.: Über die pathologische Anatomie der Wirbelbandscheiben. *Beitr. z. klin. Chir.* 1913; 260 1930 31. Idem: Ueber die gesunde und kranke Wirbelsäule mit besonderer Berücksichtigung der Bandscheiben. *Gesamk. bl. u. m. n. in lab. v. d. prakt. M.* 1912, 1912.
- 3 Caird, J. and Gailard, M.: Le nucleus pulposus intervertebral anatomic et physiologie, sa pathologie. *Presse med.* 1931; 420 (April 16) 1930.
- 4 Keyes, Donald C., and Compere, Edward L.: The normal and pathological physiology of the nucleus pulposus of the intervertebral disc: an anatomical, clinical and experimental study. *J. Bone and Joint Surg.* 14: 897 1932.
- 5 Weaver, James B.: Some remarks on the narrowed lumbosacral disc as an etiological factor in sciatica. *J. Kansas M. Soc.* 1931; 35: 91 (March) 1931.
- 6 Böhmig, Richard: Die Blutgefäßversorgung der Wirbelbandscheiben, das Verhalten des intervertebralen Chorda-segments und die Bedeutung beider für die Bandscheibendegeneration. *Arch. f. klin. Chir.* 1931; 158: 374 1930.
- 7 Williams, Paul C.: Reduced lumbosacral joint space. *J. A. M. A.* 89: 1617 (Nov. 13) 1925.
- 8 Williams, Paul C., and Tsigalas, Louis: Lumbosacral facetectomy for post fusion persistent sciatica. *J. Bone and Joint Surg.* 14: 879 1932.
- 9 Grunley, R. K.: Operative treatment of painful conditions of the lower part of the back. *Proc. Staff Meet. Mayo Clin.* 6: 112 (Feb. 25) 1931.
- 10 Idem: Backache from the orthopedic viewpoint. *Minnesota Med.* 14: 349 1931.
- 11 Idem: Low back pain: with special reference to the articular facets with presentation of an operative procedure. *J. A. M. A.* 101: 1773 (Dec. 2) 1933.
- 12 Willis, Theodore A.: Backache: an anatomical consideration. *J. Bone and Joint Surg.* 14: 87 1932.
- 13 Jungblut, H. C.: Die anatomischen Besonderheiten des fünfsten Lendenwirbels und der letzten Lendenbandscheibe. *Arch. f. orthop. u. Unfall-Chir.* 83: 260 1932.
- 14 Baasstrup, C. I.: Proc. spin. vert. lumb. und einige zwischen diesen liegende Gelenksverbindungen mit pathologischen Prozessen in dieser Region. *Fortschr. a. d. Geb. d. Röntgenstrahlen.* 48: 420 (Oct.) 1933.
- 15 Pott, V.: Sciatische vertebrale, Riforma med. 48: 867 1929.
- 16 Ryerson, Edwin W.: Surgical treatment of low back disabilities. *J. Bone and Joint Surg.* 14: 164, 1932.

### TRICHOBEZOAR\*

BY ALFRED HURWITZ, M.D.†

WE have recently had the opportunity of studying and operating on a case of hair ball of the stomach. Because of the rarity of this condition, this case is reported in full.

G. P. eleven year old female was admitted to the Beth Israel Hospital October 6 1934. During the preceding two years the patient had had dull epigastric pain with an acute exacerbation three days before admission, accompanied by nausea and vomiting of unchanged food particles. Intermittent sharp epigastric pain persisted up to the time of admission. The past history revealed that the patient had always been underweight and had had several intercurrent infections, namely bronchopneumonia at two and one-half years of age, pharyngitis at seven years which confined her to bed for seven months.

Physical examination revealed a temperature of 100° F rectally pulse 84 respirations 20 and weight

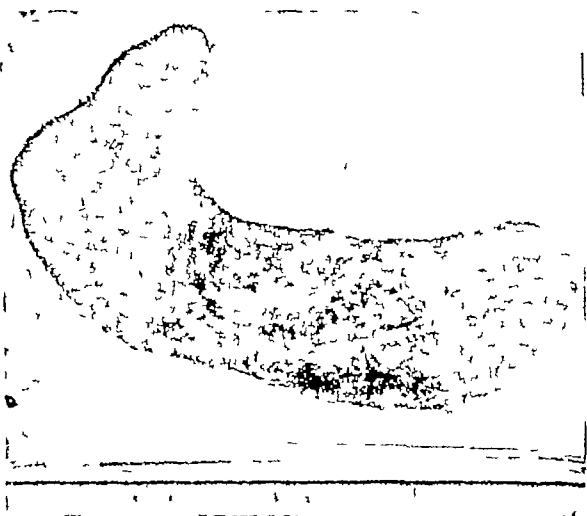
gastric pain with an acute exacerbation three days before admission, accompanied by nausea and vomiting of unchanged food particles. Intermittent sharp epigastric pain persisted up to the time of admission. The past history revealed that the patient had always been underweight and had had several intercurrent infections, namely bronchopneumonia at two and one-half years of age, pharyngitis at seven years which confined her to bed for seven months.

Physical examination revealed a temperature of 100° F rectally pulse 84 respirations 20 and weight

From the Surgical Service of the Beth Israel Hospital.  
Hurwitz, Alfred—Intern, Boston Lying In Hospital. For record and address of author see "This Week's Issue," page 728.



55 pounds. The patient was a frail, slightly undernourished girl with obvious pallor. She had an apparently normal mental development. Her breath was quite foul. The scalp showed some scaly crusts and a sparsity of hair. Abdominal examination revealed a mass in the left upper quadrant which was about 8 cm long and 4 cm wide in the shape of a J. The mass was nontender, freely movable and moved with respiration. Clinical pathology revealed a red blood count of 4,250,000, Hb 8 per cent and a white count of 10,600. Hair was observed in the stools twice preoperatively. A G I series on October 9, 1934 revealed a large atonic stomach with marked pylorospasm and a mottled appearance with some residue after six and twenty-four hours. A flat x-ray film of the abdomen revealed displacement of the transverse colon downward.



On October 17 the patient was operated on by Dr C G Mixer and on exposing the interior of the stomach through a two inch vertical gastrotomy incision a hair ball was observed forming a com-

plete cast of the stomach. This was removed and the incision closed. The patient made an uneventful convalescence and was discharged November 2, 1934.

#### COMMENT

The last complete review of trichobezoar was written by Maes<sup>1</sup> in the *Annals of Surgery*, October, 1928, at which time he reported 119 cases. Other complete studies were published by Butterworth<sup>2</sup> and Matas<sup>3</sup>.

This condition occurs usually in young girls who display a normal mentality but a perverted appetite. The following are aids in diagnosis: (1) age and sex of the patient, (2) personal habits, for example, hair chewing, (3) careful search of the stools for hair and (4) x-ray studies which reveal a mobile mass conforming to the shape of the stomach and showing a mottled appearance on the six-hour plate. The physical findings and history in this case are quite typical of the disease. It should be emphasized that at the time of operation a careful search for multiple hair balls should be made inasmuch as one or more may be lodged in the small intestine. The largest trichobezoar, which was reported by Davies, is reputed to have weighed six and one-half pounds.

Phytobezoars or food balls are usually composed of coconut, vegetable or salsify fibres, but most commonly, of persimmon seeds. The symptoms are more severe with phytobezoar than with trichobezoar and are characterized by a severe gastroenteritis with abdominal pain, fever, and occasionally occult blood in the stools and in the vomitus. Moreover, the patient harboring the food ball is predominantly of the male sex and most commonly of the age group between forty and sixty years. Ulceration with subsequent perforation and peritonitis is more frequently observed with the phytobezoar. The operative mortality of bezoars in general has been estimated to be about four per cent by Maes and the causes of death are attributable to intestinal obstruction, or perforation followed by peritonitis and inanition.

#### SUMMARY AND CONCLUSIONS

A complete history of another case of trichobezoar has been reported. The differentiating features of trichobezoar and phytobezoar have also been presented.

#### REFERENCES

- 1 Maes Urban. Bezoars. *Ann Surg* 88: 685 (Oct) 1928.
- 2 Butterworth W W. Hair ball or hair cast of the stomach and its occurrence in children. *J A M A* 53: 617 (Aug 21) 1909.
- 3 Matas Rudolph. Hair balls or hair casts of the stomach and gastro intestinal tract. *Surg Gynec Obst* 21: 594 (Nov) 1915.

# CASE RECORDS

of the

## MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C. CABOT M.D.

TRACY B. MALLORY, M.D., Editor

### CASE 21411

#### PRESENTATION OF CASE

A fifty-two year old single Canadian book-keeper entered complaining of shortness of breath upon exertion and change in her bowel habits.

One year before entry she had a severe attack of loose, watery, mucus-containing stools several times a day which cleared up in about ten days. Since then she had been slightly constipated and her stools had been small in caliber. Three and a half months before entry she had a similar but less severe attack. At this time she had a few night sweats but had had none since. Ten days later she noticed the onset of shortness of breath upon slight exertion. There was no cough or sputum. At that time she entered a hospital where her chest was tapped. She returned two weeks later to that hospital for another chest tap. During the six weeks before entry she had three more paracenteses. Approximately two months before entry she noticed abdominal swelling and a sense of pressure in the epigastrium which was more marked when sitting. This abdominal swelling had decreased with salyrgan treatment. Her appetite had decreased during this illness but had improved somewhat during the past month. At the time of admission she felt quite comfortable. Her chest had been tapped three days before entry and salyrgan had decreased her abdominal swelling.

Her family history is non-contributory.

Nine years before entry she was "run-down," due to hard work and long hours. At this time she noticed blood in her mouth on several occasions and on her pillow in the morning. A physician told her that she had a spot on her lung and she remained at home for two and a half months. Re-examination at that time was said to have been normal. The remainder of her past history is non-contributory. Her menopause had occurred about five years before entry.

Physical examination showed a well-developed and fairly well-nourished woman lying flat in bed. The right chest expanded very little and

was flat to percussion both anteriorly and posteriorly. The breath sounds were very distant. There was no fremitus. The upper half of the left chest was hyperresonant and the breath sounds were prominent. The heart was displaced to the left. The sounds were of good quality. The abdomen was soft and distended and showed a fluid wave and shifting dullness.

The temperature was 98°, the pulse 100. The respirations were 20.

Examination of the urine was negative except for a slight trace of albumin. The blood showed a red cell count of 4,230,000 with a hemoglobin of 65 per cent. The white cell count was 13,600, 78 per cent polymorphonuclears. The sputum was thin, mucoid and contained rare Gram positive cocci. Four sputum examinations were negative for tubercle bacilli. The stools were soft, light brown in color and showed consistently negative guaiac tests. The nonprotein nitrogen of the blood was 39 milligrams per 100 cubic centimeters, the chlorides 95 cubic centimeters of N/10 Cl. The serum protein was 7.1 per cent. A Hinton test was negative.

X-ray examination of the chest showed that the entire right lung field was obliterated by dense homogeneous dullness which extended up to the first interspace. The shadow of the heart showed only a slight amount of displacement. There was no evidence of metastatic disease in the bones or ribs. A gastrointestinal series was negative.

On the third day 2,300 cubic centimeters of clear yellow fluid was withdrawn from the right pleural cavity and replaced by 1,500 cubic centimeters of air. The fluid had a specific gravity of 1.019. The cell count could not be determined because the fluid was clotted when received. A smear showed many red blood cells and lymphocytes. A culture gave Gram negative and positive bacilli. A guinea pig inoculated with this fluid was negative for tuberculosis.

An x-ray of the chest following paracentesis and the introduction of air showed no lung tissue in the upper two-thirds of the right lung field. There was a straight fluid level extending about two inches above the diaphragm. The findings were those of hydro-pneumothorax with complete collapse of the right lung.

On the twelfth day about 5 liters of yellowish clear fluid was removed from the abdomen. A cell count gave 725 red blood cells, 20 white blood cells and 155 epithelial cells. A culture showed no growth. Following this paracentesis an irregular mass, presumably the liver, was easily felt in the right upper quadrant. On pelvic examination a large, hard, tender, retroverted and recessed uterus was found. On the fourteenth day an exploratory laparotomy was performed.

Following operation the patient's condition remained the same except that there was no ap

parent accumulation of either abdominal or chest fluid. She was discharged three weeks after operation at which time practically all her chest and abdominal fluid had disappeared.

#### DIFFERENTIAL DIAGNOSIS

DR RICHARD H MILLER I have read this over and the logical diagnosis, it seems to me, is so obvious and simple that I cannot help suspecting Dr Mallory of having dug a pit for me to fall into. We shall see.

Shortness of breath occurred, for which she had to have her right chest tapped, and that was done several times before she came to this hospital. Also, shortly before her entry, she noticed her abdomen getting larger. Therefore, we have to find one cause for fluid in the right chest and fluid in the abdomen.

Nine years before entry she was thought to have tuberculosis which may have been moderately active but it presumably became quiet, if not entirely healed. However, one has to consider tuberculosis in making the final diagnosis.

When she came in here it was perfectly obvious that the right side of the chest was filled with fluid, pushing the heart over to the left, and there was also fluid in the abdomen but no fever.

The various laboratory data are not particularly helpful until we get down to the examination of the fluid. The x-ray shows fluid but nothing else.

From the right chest there was withdrawn this fluid which clotted very quickly and contained red blood cells and lymphocytes. A guinea pig was inoculated and the result was negative. Then later on the abdomen was tapped and five liters of fluid containing blood cells and epithelial cells was withdrawn. The fluid showed no growth on culture.

The next matter of importance is the pelvic examination which you see demonstrates a large, hard, tender, retroverted and recessed uterus.

The outstanding features in this case are fluid in the chest containing blood cells and fluid in the abdomen containing blood cells. To me blood cells in an aspirated fluid mean cancer. I do not think there is any logical reason to question that statement. I do not think that red cells would be found in a tuberculous exudate and I am sure they would not be found in a transudate resulting from disease of the heart or kidneys. Therefore, we will say that the underlying disease is cancer and, although it first appeared in the chest, it is logical to assume that it originated in the abdomen, that is, although her symptoms first occurred as a result of fluid in the chest, this cancer arose in the abdomen. What kinds of cancer in a female cause fluid, ascites, and may metastasize to the chest? First, carcinoma of the ovary. Nineteen times out of twenty it would be carcinoma of the ovary that would cause the picture

which we are studying here. Once in a great while cancer originating in some other organ will result in a general carcinomatosis and ascites and in the past few years I have seen a substantial number of such cases in which even with a large incision in the abdomen, where one could both see and feel, it has been entirely impossible to determine where the growth had its origin. The last case of that nature which I saw a short while ago was in a young man. Unfortunately we could not get a postmortem but he had a picture just like this. Had it been a woman I certainly would have said carcinoma of the ovary. In this case the pelvic examination notes that the uterus is slightly enlarged, hard and retroverted, but I am inclined to disregard that because I believe she had a carcinoma of the ovary and for one reason or another it might not have been clearly felt at that examination. Therefore, I shall say, and I hope I am not falling into a pit, that she had primary papillary adenocarcinoma of the ovary with general carcinomatosis, metastases in the liver, which I neglected to mention, and metastases in the right pleural cavity.

#### X-RAY INTERPRETATION

DR GEORGE W HOLMES The films in this case present the characteristic picture of a large amount of fluid in the right pleural space. The heart is displaced and the lung markings have disappeared. After tapping we see the pleural space filled with air. If this patient had extensive metastases to the lung sufficient to produce a bloody pleurisy it is rather strange that the whole lung should have collapsed down to a mass no larger than is seen here and that there are no nodules visible in the parietal pleura. In other words, this looks now like an ordinary pneumothorax with fluid. I think that it is not impossible that this patient has metastases to the lungs but I certainly wonder if the fluid did not come from below the diaphragm rather than from some process in the chest.

DR MILLER What do you mean by that?

DR HOLMES That something ruptured through from the liver into the chest and in that way collapsed the lung. The heart shadow is not enlarged. We have no reason to suspect trouble with the vascular system. The gastrointestinal examination was said to be negative and I shall not attempt from this plate to dispute it. There is rather more than normal density in the pelvis. There may be, as Dr Miller has said, tumor in the pelvis, but we have no positive proof.

#### CLINICAL DISCUSSION

DR JOHN W CASS We were very much puzzled by this syndrome and felt that we had ruled out most of the common things that might give this picture. We thought we had ruled out tuberculosis. On questioning the patient it seemed

that there was little good evidence that she had really had it nine years before. She had a good deal of diarrhea at the time, had been overworking, lost a little weight and had a little blood in the mouth but no real hemoptysis. We ruled out any heart condition or kidney condition or Pick's syndrome which might have given this picture and because of the definite finding of tumor in the pelvis we felt that, since the patient was sent to this hospital for definite diagnosis and since she was in good condition and understood the whole situation and was willing to go through operation to determine the diagnosis, it was logical to put her through it. The diagnosis was malignancy of the ovary with metastases probably throughout the peritoneum and to the chest, although we thought that it was unusual to get complete absence of cancer cells in the fluid and to get this x ray picture.

DR. LELAND S. MCKITTRICK. As Dr. Cass said, our preoperative impression was pretty much as Dr. Miller had made it. We had not yet been able to make a positive diagnosis and as has been pointed out, the findings were not entirely characteristic of malignancy. Pelvic examination was not altogether satisfactory. She had a hard fixed uterus, a firm mass in the pelvis, the outlines of which I could not make out. Exploration was done, hoping to make a positive diagnosis, but without the slightest expectation that we were going to do her any good. The abdomen was opened and it was filled with straw-colored fluid then as in the taps. In the pelvis was a perfectly typical benign fibroma of the ovary. It was wedged in the pelvis but could be brought out easily. There were two or three small grayish areas on the peritoneum which looked almost like areas of pressure necrosis although they did not extend very deeply. The tumor was taken out but even then I had not the slightest idea that it was going to do any good. It is not too uncommon to find ascites with a benign tumor of the ovary but I cannot associate it with the fluid in the chest. Dr. Cass was deserving of no little credit in insisting upon removing the tumor, and it seemed satisfactory to take it out.

DR. TRACY B. MALLORY. Dr. Cass, will you tell us the outcome?

DR. CASS. This patient made an uneventful recovery and left the hospital about three weeks after the operation. She had been tapped previous to the operation, both her abdomen and chest, and there had been at the time of discharge no evidence of any reaccumulation of fluid. Without any specific therapy she had gained ten pounds in weight and had returned to her normal health. She has been followed since and a letter just recently received from her states that she is in the best of health, has gained twenty five pounds and has been working for six months at her occupation as a secretary.

There is only one other thing that Dr. Mc

Kittrick did not mention. The liver was very large, though otherwise perfectly normal as far as palpation could determine it, and the liver has decreased in size under the observation of the local doctor but can still be palpated. Dr. Meigs will probably say that this syndrome is not uncommon. There have been cases reported similar to this, three by Dr. Meigs in his book and one case that I found in the review of the literature in the last fifteen years of a case identical with this with complete recovery, so that in some way this tumor did cause this picture.

DR. MALLORY. As Dr. Miller suggested, I did lay a trap for him. I did not believe anyone would possibly come to any diagnosis in this case other than that of generalized malignancy and yet it would have been very easy to think that there was no use whatever in exploring such an evident and hopeless case. But the woman has completely recovered. Histologic examination of the tumor gave us no additional information. It was a perfectly typical benign fibroma of the ovary. This is by no means the first case of this type that we have found in this hospital.

DR. JOE V. MEIGS. I remember when I was with Dr. Graves at the Free Hospital that he said that a tumor in the pelvis with fluid in the abdomen was not necessarily a hopeless proposition. There are cases of fibroma of the ovary that are accompanied by a great deal of fluid that recover completely after removal of the tumor. I have seen quite a number and about thirty per cent have ascites. In going over the histories and pathological specimens of fibromas of the ovary three years ago I discovered three patients who had been studied on the medical wards and suspected of tuberculosis. They had pleurisy with effusion and were tapped two to six times each. Eventually a fibroma of the ovary was discovered and on removal of the tumor the ascites which they had and the pleural effusion cleared up. These three cases made me suspect that there ought to be a syndrome with ascites, pleural effusion and fibroma of the ovary. Dr. Cass's case is very similar to the other three, and two of our cases followed for five years and are free of any difficulty since their operations.

DR. AUBREY O. HAMPTON. Dr. Daniel Jones had a presumably benign tumor of the pancreas, a cyst, which was accompanied by pleurisy, and the fluid disappeared after exploration.

#### PREOPERATIVE DIAGNOSES

Tumor of the ovary, ? malignant.  
Ascites, undetermined origin.  
Gall stones

#### DR. RICHARD H. MILLER'S DIAGNOSIS

Papillary adenocarcinoma of the ovary with peritoneal metastases

#### PATHOLOGIC DIAGNOSIS

Fibroma of the ovary

parent accumulation of either abdominal or chest fluid. She was discharged three weeks after operation at which time practically all her chest and abdominal fluid had disappeared.

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ing in the history which could not be explained by tumor. In the mediastinum neoplasm could grow readily without making itself manifest until sufficiently large to interfere with circulation or respiration, the rapid increase of dyspnea and cyanosis could be due to sudden enlargement by hemorrhage or edema or to shift in location with change of the patient's position.

Physical examination, showing edema, dilated veins on the chest, and interference with flow of air in and out of the lungs, presents definite confirmatory evidence. The supracardiac dullness was wide and percussion would have doubtless shown it even wider had the lungs not been overinflated.

The x ray findings are also confirmatory.

In a case of mediastinal tumor at this age one naturally thinks first of thymoma, teratoma and Hodgkin's disease as the most likely possibilities. Later in life, substernal goiter, aneurysm or some other type of malignant tumor would be suspected but they are hardly to be considered here. Between the two first mentioned I do not believe it possible to differentiate without pathological investigation. Hodgkin's disease should show glands elsewhere or at least have had them in the past. Furthermore Hodgkin's is a more chronic disease and should show generalized constitutional symptoms. Acute leukemia with mediastinal glands would have an abnormal blood picture.

A PHYSICIAN: Could it be a tuberculous gland?

DR. ADAMS: It would have to be a tremendously large gland to give this picture.

A PHYSICIAN: If a case of thymoma is exposed to x ray does it not have a tendency to diminish the mass?

DR. ADAMS: Yes. But he did not receive treatment, only a diagnostic plate, and probably a portable one. Whether x ray treatment was not started immediately for fear of increasing the obstruction by reaction incident to therapeutic exposure I do not know, but that is a possible explanation.

A PHYSICIAN: I have seen one case of thymoma which acted almost exactly like this. Decrease in the size of the tumor was brought about by the x ray exposure in taking the diagnostic plate. The patient then received therapeutic doses and within a few days the mass had apparently completely disappeared. In a month's time, however, he began to have hemorrhages, and despite several transfusions died within two months.

#### CLINICAL DIAGNOSIS

Mediastinal tumor

DR. F. DENNETTE ADAMS: DIAGNOSES

Mediastinal tumor—teratoma or thymoma  
Bronchopneumonia terminal

#### ANATOMIC DIAGNOSES

Lymphoblastoma of the thymus (thymoma)  
with pulmonary infiltration  
Operative wound Tracheotomy  
Hyperplasia of the spleen and mesenteric lymph nodes  
Endocarditis, acute rheumatic, mitral  
Pleuritis, chronic fibrous, bilateral  
Chloasma

#### PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY: What we found was a very large tumor in the anterior mediastinum which occupied the position of and completely replaced the thymus. It was obviously malignant in character and was infiltrating in all directions laterally into the lungs, and anteriorly and posteriorly through the mediastinal tissues. It has not penetrated the pericardium as these tumors sometimes do.

The diagnosis of course narrows down to what types of tumors occur in this region. In an old person you have to think of various other things that do not come under consideration here—a substernal goiter, cancer of the thyroid or metastases from a distant spot and so on. These are all practically ruled out by the age factor alone. Generalized lymphoma must of course be ruled out. A dermoid cyst or a teratoma of the anterior mediastinum are perfectly good possibilities in a child and there is no way to differentiate them from thymoma. It comes down to the question of one or another of these three tumors and of them thymoma is distinctly the commonest. What these so-called thymomas are, we do not really know. The thymus, as you will remember, microscopically is made up of a small amount of epithelium, ordinary squamous epithelium and of a large amount of what looks like lymphoid tissue. In older people, from fifty up, a tumor of the thymus stands a very good chance of being a squamous cell carcinoma. But in children it practically never is cancer and will usually look like a more or less typical lymphosarcoma, as in the case here. These tumors are very sensitive to radiation and Dr. Holmes felt in this particular case if they had gone a little farther with the tracheotomy—if they had put a tube down into the bronchi to establish an airway—and then had given him a small dose of x ray, it was perfectly possible that the patient could have been pulled through coming in even moribund as he did.

DR. ADAMS: Was there no cyst, hemorrhage or edema to account for the sudden increase in symptoms?

DR. MALLORY: These tumors of course lie just beneath the upper thoracic outlet which is a fairly small and very inelastic space. It is bounded by the first rib and clavicles on the side and front and by the vertebral column be-

hind. A very slight shift of the tumor upward would wedge it into this outlet and make a tremendous difference in the amount of obstruction. Variations in position might easily account for such a shift. I suspect that when he was lying down he was much more obstructed than when he was upright.

The majority of these tumors look like and probably are lymphomas. Our diagnosis on this case was lymphosarcoma of the thymus. However, it must be admitted that a case of lymphoma which fails to become more or less generalized is open to suspicion as to the correctness of the diagnosis. Many of the cases starting in the thymus do not look or behave quite like lymphoma and there always has been a question whether all the round cells in the normal thymus are lymphocytes or not. They look so much like them that so far the histologist has not been able to differentiate them with any certainty.

A PHYSICIAN. In this particular case if he had got exposure to x-ray you think he would have pulled through this attack?

DR MALLORY. One can only guess at it. If you could have got in one small dose of radiation without his suffocating he would have pulled through. The whole question would have been whether you could have kept the airways

open long enough. There is real danger of significant swelling of the tumor for a few hours after the x-ray treatment which might prove suddenly fatal.

A PHYSICIAN. What factor did the vagus have here? Was it entirely mechanical obstruction or was there some interference with the vagus?

DR MALLORY. My impression was that it was entirely mechanical. The phrenic lay closer to the tumor than the vagus but it obviously was not involved, since the diaphragm moved satisfactorily. The vagus was far enough back so that it could hardly have been affected.

A PHYSICIAN. The question could be raised, inasmuch as you have this large mass here, whether the obstruction would develop so suddenly since it was mechanical.

DR MALLORY. I think it is again the question of a tumor mass filling the neck, and the difference of an eighth of an inch in diameter of the tumor would make the difference as to whether the neck was completely plugged or partially plugged.

A PHYSICIAN. Did he have the general appearance of a status lymphaticus individual?

DR MALLORY. No, and the lymph nodes elsewhere were not enlarged.

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## GRADUATE TEACHING

THE problem of graduate teaching is becoming more and more acute. For many years several medical schools have attempted to meet the needs of those who have desired to improve their medical education. There are about twenty-eight medical schools in this country offering courses to graduates. The question is, "Are these schools to continue their programs indefinitely or will they endeavor to assume the real functions of medical education in its broadest sense, beginning at the point when the student receives his diploma?"

In the main the support of the so-called Post Graduate School is derived from the tuition of its students, which makes the institution a commercial one. The result of this is that the burden on the individual student seems large to him and the remuneration seems small to the teacher.

Graduate teaching today is carried on under the same conditions that prevailed in the undergraduate medical departments thirty-five years ago. No sane person wishes a return of those days. It would seem then, as a result of this unhealthy situation, that some sincere effort ought to be made to remove the graduate school from the arena of commercial medicine and put it in a more dignified place. Unfortunately, the public which needs the practitioner is unwilling to help the situation by endorsing graduate schools. Funds for research are given much more freely than for improvement of the product of the medical schools. The busy practitioner is unwilling to leave his practice for several reasons: the fear of losing his practice while absent, the expense of maintaining his family and himself, the tuition, the leaving of his community without a physician and too frequently the fear of mixing with his city colleagues. He is afraid to ask questions and express his opinions and often there is lack of interest in self improvement. All these facts are evident to those who have had contact with the problems of graduate teaching since less than four per cent of the practicing physicians of this country attend courses for graduates.

During the past few years Boards of Certification have been formed by several of the special societies which have laid down minimum requirements in order that a physician may be recognized as qualified to specialize. There is no regular organized scheme at present which will meet the needs of this situation.

A specialist, in addition to his clinical experience should have a fundamental knowledge of general pathology followed by training in pathology applying to his special field. The graduate school is the legitimate medium for organizing and managing this work. These schools therefore should abandon the insignificant place which they now occupy and strike out on a large, well formulated basis to care for the practitioner, the research fellow, the intern and the embryo specialist.

Such departments as are needed may be had from expansion of the undergraduate departments. This is probably advisable as the contact may stimulate the undergraduate to continue his studies as long as he is active. In order for graduate departments of medicine to assume the functions which properly belong to its life and welfare it is necessary to have the whole matter of graduate teaching thoroughly studied and investigated by some well-qualified person or persons who will report their findings and make recommendations. The time is ripe for such a procedure. The school, the physician and above all the patient will reap the benefit.



## THE COMMONWEALTH

*The Commonwealth*, the quarterly journal of the Massachusetts Department of Public Health, lives up, in its current issue, to a high standard originally set and consistently maintained. For Number 2 of Volume 22 the editor has selected the general subject of personal hygiene, and as usual has presented an array of authorities who have written on many phases of this interesting and important subject.

Hygiene is today as much concerned with mental comfort, happiness and efficiency as it is with physical well-being, and it is fitting that the leading article, by Dr Ives Hendricks, should be on Clinical Psychology and Medicine, containing a brief résumé of the advances that have been made in our understanding and handling of the neuroses. Other contributions have to do with conservation of sight and proper lighting, the prevention of deafness, the care of the teeth, feet and skin, ventilation, air conditioning and heating, the preservation of foods, the preparation of meals, scientific facts about sleep, and recreation hobbies and dress.

A good work is being done in the preparation of these bulletins, and the layman who follows through with them will receive a sound education in those fundamentals of medicine, hygiene and public health which should be the property of all intelligent citizens. One wonders how many are aware of its existence and that it will be sent free to any citizen of the state who applies for it.

The list of contributors is necessarily great and it is not to be expected that all will write with an equal degree of interest and clarity. The facts presented, however, are all sound and should be valuable.

## THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

DAVIS, CARL H. B.A., B.Sc., M.D. Rush Medical College 1909 F.A.C.S. Clinical Professor and Director of Department, Obstetrics and Gynecology, Marquette University School of Medicine. Obstetrician and Gynecologist, Columbia and Milwaukee County Hospitals. His subject is "Lesions of the Cervix Uteri—Diagnosis and Treatment." Page 699. Address 425 E Wisconsin Avenue, Milwaukee Wisconsin.

MORGAN, CHARLES E. A.B. M.A., M.D. Harvard University Medical School 1892 F.A.C.S. Visiting Surgeon, Holy Ghost Hospital for Incurables and Somerville Hospital, Senior Staff. His subject is "Changes in Maternal Mortality and Their Significance." Page 705. Address 24 Central Street, Somerville.

PEMBERTON, FRANK A. S.B., M.D. Harvard University Medical School 1909 F.A.C.S. Surgeon-in-Chief, Free Hospital for Women, Brookline. Clinical Professor of Gynecology, Harvard University Medical School. His subject is "Resection of the Presacral Nerve in Gynaecology." Page 710. Address 198 Commonwealth Avenue, Boston.

ZOLLINGER, ROBERT B.S., M.D. Ohio State University College of Medicine 1927 F.A.C.S. Instructor in Surgery, Harvard University Medical School. Junior Associate in Surgery, Peter Bent Brigham Hospital. Address Peter Bent Brigham Hospital, Boston. Associated with him is

YOUNG, EDMUND A.B., M.D. Harvard University Medical School 1934. Intern, Surgery, Lakeside Hospital, Cleveland, Ohio. Address Lakeside Hospital, Cleveland, Ohio. Their subject is "Observations on the Symptomatology of Cholelithiasis With Special Reference to Vomiting." Page 714.

AYERS, CHARLES E. M.D. Tufts College Medical School 1912 F.A.C.S. Orthopedic Surgeon, Memorial Hospital, Worcester. His subject is "Further Case Studies of Lumbosacral Pathology with Consideration of the Involvement of the Intervertebral Discs and the Articular Facets." Page 716. Address 36 Pleasant Street, Worcester.

HURWITZ, ALFRED M.D. Johns Hopkins Medical School 1933. Intern, Boston Lying-In Hospital. His subject is "Trichobezoar." Page 721. Address Boston Lying-In Hospital, 221 Longwood Avenue, Boston, Massachusetts.

## The Massachusetts Medical Society

SECTION OF OBSTETRICS  
AND GYNECOLOGY\*

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## DIAGNOSIS AND TREATMENT OF BENIGN ENDOMETRIOMATA OF THE OVARY

(Chocolate Cysts, Endometrial Cysts of the Ovary)

Perforating hemorrhagic or chocolate cysts of the ovaries are usually found in women between thirty and fifty years of age, are frequently bilateral with accompanying secondary implants to uterus, tubes, round ligaments, large and small intestine, bladder, and pelvic peritoneum, but unlike malignant ovarian tumors, rarely, if ever, found in the omentum.

\*A series of short selected articles by members of the Section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the Section.

The preoperative diagnosis is difficult. In large endometrial cysts of the ovary there is often a history of sterility and severe acquired dysmenorrhea with acute attacks of pelvic pain occasionally rectal and vesical tenesmus. The condition is often associated with fibroids and other pelvic disorders making the diagnosis uncertain. With such a history and a pelvic examination that reveals a conglomerate tumor, a fixed uterus with inflammatory like masses in the region of the adnexa and a nodular infiltration or scar like formation in the culdesac the indications point strongly to hemorrhagic ovarian cysts.

At operation one or both ovaries will be found to be enlarged and cysts containing a typical dark, syrupy material, with dense adhesions involving adjacent structures making removal extremely difficult.

Treatment. The differential diagnosis presenting a difficult problem especially excluding pelvic inflammation and knowing there are adhesions and fixation of the organs, relief is best effected by mechanical procedures. Surgical intervention is indicated when the patient is considered a reasonably good surgical risk rather than treating with x ray or radium. It is recognized that the growth of the implants are dependent on the functional activities of the ovaries therefore all ovarian tissue should be removed. Secondary implants should be removed when easily possible. When implants are extensive and difficult to remove, such as those found on the intestine and bladder an attempt at removal should not be undertaken as these lesions in a majority of cases will atrophy and be followed by relief of resulting symptoms when the ovarian tissue has been completely removed. If there is activity after operation or the patient is an extremely poor surgical risk, irradiation may be employed in an attempt to inactivate the ovarian function.

#### THE 1936 ANNUAL MEETING

At the Council Meeting October 2 the Committee of Arrangements reported that the next Annual Meeting of the Massachusetts Medical Society will be held on June 8, 9 and 10 1936 at the Hotel Kimball, Springfield.

#### PUBLIC RELATIONS COMMITTEE

##### COMPULSORY SICKNESS INSURANCE NOT THE ANSWER

Compulsory sickness insurance is a system of insurance, administered either by the Government or by some type of commercial insurance organization to which certain designated groups in a community are compelled by law or as a condition of employment to subscribe. These designated groups are determined on the basis of certain income levels. These income levels have been placed by various pro-

ponents at different amounts. The general idea however being that it shall not exceed an amount necessary to supply the essential comforts of life.

In the feudal state the overlord was charged with the care of his dependents. In the trades, the guilds assumed the responsibility but with the great and unrestricted and rapid growth of industrialism with its machines and impersonalities, with its alternating surplus and shortage with its failure oftentimes to share profits equitably with the worker all this was changed and there developed a type in our population which was not able to care for even its basic needs and for which nobody seemed responsible.

This failure on the part of our industrial system to provide sufficient wealth for every willing worker to care comfortably and completely for himself and his family in their essential needs brought into being the social concept, which is in effect, that because the public tolerated an abuse it was bound to do what it could to relieve the abused.

While some attempts have been made to correct the abuses of industrialism we had rather come to think of them as inevitable as something inherent in the system as something that could not be changed without wrecking the whole. We rather think this problem has grown to such vast proportions before we even recognized we had a problem that its magnitude appeared too formidable for us and we turned to the easier way of making it up to industry's abuses by means of charitable and social agencies in the presence of a malignant disease that might have been cured by early operation we threw away the scalpel and administered a shot of dope.

Doctors know of these charitable and social agencies as no other group does. They have been caring for industry's oppressed in their charitable clinics within and without hospitals for many years. They have seen these clinics grow to enormous magnitude, representing services which if paid for would amount to more than \$100,000,000 each year. Social service was the doctor's handmaiden. The greatest impetus to its growth comes from doctors.

Is it any wonder then that doctors think that they are entitled to have something to say about the trends which these agencies are assuming? Nobody in the profession questions that grave abuses have been allowed to creep into free clinics. A friend of the writer giving his services to a large metropolitan hospital can find no place to park his car because the outpatients have preempted all the parking space. Nobody who watches the trends of the last few years has any doubt but that the professional sociologist seeks the domination of medical practice.

The original concept of compulsory sickness insurance was designed to so spread the cost of sickness for those of small means over such large numbers as to make it unburdensome for each. Nobody questions the wisdom of this as a statement of an ideal. It would be most difficult to find any doctor who was not in entire sympathy with such a proposal. Thinking men however are wont to distinguish between a stated ideal and the application of that ideal to everyday life.

Compulsory sickness insurance has been offered as the instrument by which that ideal is to be realized. Let us see how well this system has maintained that ideal in the several countries in which it is already in operation. In every country in which has been inaugurated a system of compulsory sickness insurance the original concept of providing first class medical care for those economically unable to provide it for themselves has been lost sight of and there has taken place either an extension of or a tendency to extend the benefits to increasing num-

bers of the population irrespective of their abilities to provide for themselves. The figures to support this statement are available to anyone who cares to investigate. We find that this system of sickness insurance has so grown in the numbers covered that today it covers 63 per cent of the German, 76 per cent of the Austrian, 75 per cent of the Belgian, 65 per cent of the Danish, 31 per cent of the English, 61 per cent of the Swedish and 75 per cent of the Czechoslovakian populations. During the present year, 1935, there has been much agitation to very materially increase England's figures.

It is rather interesting to inquire as to why this ideal has not worked according to its original conception. We think the answer is to be found in the character of the institution that first offered it and has since controlled it, an institution that appears to be the same the world over, the institution of politics. Every one knows that there are very few ideals which politics touches that it does not ultimately blast.

The voice of the people has never been in demand for compulsory sickness insurance. Because labor has never been very much interested in the social concept, because it has never been interested in trading a steady job at a living wage for a bowl of soup, because it has never been interested in substituting social responsibility for personal responsibility, it has never been interested in compulsory sickness insurance. Furthermore, labor should never be deceived by the promises which such a system offers. Labor should know that as the ultimate consumer it pays, not part of the bill, but the whole bill. Labor should know that the employees share is not a gift but something either taken out of wages or tacked on to the cost of the article produced which in turn labor must buy. Labor should know that it pays for the host of administrators, for the ornate and costly administrative buildings and equipment. It pays a bill far in excess of that which it paid when it received its medical care from private sources. (See "Handbook of Sickness Insurance and State Medicine and the Cost of Medical Care" Page 20.)

In 1881 Bismarck was in the process of realizing his crowning political effort—the unification of a strong German Empire. There was however a body of German citizens who, feeling oppressed by the industrialism of the time, were more interested in bettering their economic position than in Bismarck's dream. These Social Democrats, as they were called, had grown to such numerical strength by 1883 that they seriously threatened the policies of the crown. To attract votes from this group, to show the benevolence of the crown Bismarck had passed the first formal compulsory sickness insurance act. Gottlieb Pick, a German writing in the "Sozialversicherung und Aerzte" 1931, page 56, has in this connection the following to say: "Bismarck's original plan arose out of a combination of the capitalistic with the feudal and fraternal mental attitude. Governmental care was to make clear to the eyes of the worker how much the state cared for them and thereby make them contented and loyal."

This German system has now been in operation more than fifty years. It has been and is changing with great rapidity due to the constant dissatisfaction with the details of the law. This constant alteration has brought about a most complex situation, so that today there are 3,000 sections of the German laws on compulsory sickness insurance. What a paradise for the bureaucrats!

The demoralizing effect which this system has had on the German citizen has been well put by a German physician, M. Kirschner, who writing in "Zur Praxis der Begulachtung" has the following to say: "The insured also believe since they have

long contributed to the cost of insurance, that after a certain time they have the right to receive some money from it. It is easy to implant the idea in the consciousness of a simple man: 'Now that I have paid so long, I will at last get something out of my insurance.' In this way the ominous will to be sick is artificially created and social institutions are many times practically compelled to put a premium on sickness, laziness, exaggeration and deceit, so that the individual who is in a manner the innocent victim of these compulsory institutions, cannot make any special individual objection. Since legal compulsion has today brought the majority of the population within the scope of social insurance, a constantly increasing proportion of the workers is being brought into a condition of subjection to these institutions."

Present day Germany has been compared to a great lazaret or home for crippled where each individual is trying to get as much as possible out of the gigantic pension cup, which is kept filled by ever increasing contributions. Every seventh German is today a "social pensioner." In this same connection let us listen to what Gustav Hartz, a German labor leader and economist, also has to say, writing in the *New York State Journal of Medicine*, March, 1935: "The sickness insurance provides the workman with medical attendance free of charge, with medicine and other necessities and with an allowance. Any one will at first sight consider this a great blessing for the workman as well as for national health. The reality, however, is very different. Dread of illness obsesses most people and this has been pressed into a system 'illness made easy' by which the will to be well has been strangled. The doctor is consulted a dozen times where once would be sufficient—the insurance pays. The prescribing of medicine, bandages, etc., is desired. When they are obtained they lie about until they are no longer fit to be used and must be thrown away—the insurance pays. Besides it is nice to get something in return for the premiums paid year in and year out. Excessive over doctoring is the result. Pretenders and hypochondriacs are bred and the use of medicine becomes excessive. A few years ago it was estimated that four times as much money was used for doctors' fees and medicines for 35,000,000 of people in insurance as for 30,000,000 of uninsured. At first sight it seems improbable and paradoxical that a desire to obtain sick money that scarcely amounts to half the sum of wages should arise. It appears impossible that some one should, unless compelled by illness, forfeit his wages to get an allowance of half the amount. In millions of cases, for example, when wages are being decreased, when work is scarce and work hours shortened in consequence, when there are fewer shifts, many holidays, work restrictions in certain seasons, outdoor work in frosty weather, 50 per cent of the wages are welcome. One objects to the work he is given, another does not feel like working, a third's time is taken up by some family matter for which he would have to take leave of absence and forfeit his pay. In such cases sickness insurance comes in handy. Doctors are induced to prescribe medicine and instead of medicine toilet soap and scent are handed out by the pharmacies." How is this possible, you ask? Hartz answers that by saying that "under compulsory sickness insurance medical science has become a cheap article and doctors have given up conscientious treatment." This is not a very beautiful picture which Hartz paints. It strips human nature pretty bare. But it is in accord with a fairly generally accepted view.

Gottlieb Pick writing in *Sozialversicherung und Aerzte* 1932, page 40, tells us of the enormous administrative bureaucracy which has been built up in Germany by its compulsory sickness insurance sys-

tem. It tells us that the numbers of the Krankan hassen, the administrative side of the system has grown to be practically the same as the number of physicians engaged in giving medical service.

None of these systems are self-supporting. They all depend on governmental subsidy with the inevitable increase in taxation. No reserves are built up by such systems of insurance. Birth, old age and death permit of fairly accurate determinations, but there are so many moral elements which enter into this business of compulsory sickness insurance as to preclude the possibility of sound actuarial guidance. It is a hand-to-mouth existence which such systems must lead. In times of unemployment their costs must increase and the awards must decrease. They cannot pay out what they do not take in. This breeds trouble with the worker who believes because he has for years paid into such insurance he is entitled to a definite fixed award in his time of need. The only other alternative is to dip deeper and deeper into the public treasury. It is held by many insurance experts that it is not insurance at all because it does not take into consideration the more or less fixed elements on which insurance is founded.

In 1911 David Lloyd George was having some trouble in England in maintaining his control of the British Government. There was an election in the offing. He was being pressed on the one hand by the Conservative and on the other by the Labor Party and it looked as if the pressure exerted by these two forces might squeeze him and his Liberal Party out of the political picture. He felt that this would be a catastrophe for England and must not be allowed to happen and so his waking hours were entirely taken up in formulating plans and furthering schemes for saving England and David Lloyd George. Then one night he sat up late reading German history as a relaxation from the arduous labors of the day. He learned of a German statesman who several years before finding himself in much the same position hit upon the expedient of compulsory sickness insurance as a means of demonstrating his interest in and sympathy for the laboring man. He closed the book and went to bed. The German history had solved his problem and thus was born England's compulsory sickness insurance idea.

This English plan demands our closest scrutiny. Because it, more than any other, is being talked of as the model for the proposed American system.

It might be well at this point and for the moment to address ourselves to those few doctors who while not necessarily favoring do assume a fatalistic attitude toward this matter of compulsory sickness insurance. It is coming anyway. No matter what we do about it. So why bother to try to do any thing. The Massachusetts Medical Society decries this attitude and the Public Relations Committee wishes to call to the attention of those this fact, that whatever merit there may be in the English system was had only because of the vigorous stand which the British Medical Association assumed in opposition to the iniquitous plan as originally proposed by David Lloyd George.

Under the English system all workers with a few exceptions who earn 250 pounds or less each year are compelled to subscribe. The worker has removed from his wages 9 pence each week. The employer adds 9 pence more and in addition the Government contributes an amount which when taken with that obtained from the other two sources will keep the system going. This latter amount during the last year was 18 per cent of the total cost. The worker alone is insured. His dependents are not. For his or her contribution the worker receives medical services, treatment and all those medicines and other

therapeutic aids which the doctor deems necessary. When his or her illness is of such character as to unfit either for work and he or she is so certified by the doctor he or she receives certain cash benefits. When a worker's wife has a baby he receives a pound and when the wife herself is also a worker two pounds are added to the family budget.

The act provides for the services of the general practitioner only. It does not provide for hospitalization or the services of specialists. Any doctor licensed to practice medicine in England is eligible to do this kind of work. It is only necessary for him to indicate his desire to the Ministry of Health and his name will be placed on the panel which hangs in the local post office. The worker makes his selection from this panel. Once the worker has selected his doctor and has consulted him he must remain the patient of that doctor for one year unless the doctor is willing to give him up. In the case of dispute on this and other matters there is provided a tribunal which will hear the grievances and render a decision. In addition to treating the patient, in certain rural communities, where there are no pharmacies the doctor must dispense medicines and for this latter he receives special remuneration. He must record his calls on special cards supplied by the insurance committee.

When the insured's incapacity to work is doubted the doctor must supply the regional officer with appropriate information in the form of a written report. He must at all times be ready to answer charges of negligence brought against him by insured patients.

The doctor's remuneration is about \$2.25 per insured person per year. The average ratio of insured to insurance doctors at this time is 1000 to 1. If this work were evenly divided among these doctors, each doctor's top each year would be \$2,250.00. Forty nine per cent of the English doctors are engaged in this type of work. These doctors may also engage in private practice.

It is estimated that the expense of a panel practice is \$1,100.00 per year. The figures released by the British Ministry of Health a few months ago give an average gross annual income to the panel doctor of \$1,960.00—or a net annual income from this source of \$860.00. It being axiomatic that one receives according as one pays at least it suggests itself that such service might possibly leave much to be desired. The fact is it is cheap service and at best second-class service. This is true not only in England and Germany but in all countries harboring systems of compulsory sickness insurance and nobody seriously questions this fact.

The proponents of the English system point to what they are pleased to call its low administrative costs and they point with pride to the English Civil Service system as one of the main reasons for these low costs. Nobody questions the excellence of the English Civil Service. It is one of the finest in the world. The Royal Commission on National Health Insurance is however not particularly impressed that these costs are low but think quite the contrary. Let us put it in their own words: "We should have expected that very large societies having at their disposal for purposes of administration of National Health Insurance, they call it Health Insurance in England all the machinery of a huge business undertaking, would have been able to carry on their administration at an appreciably lower cost per head of membership. We are surprised to find that this is not the case. For the actual administrative costs however let us have a look at the figures supplied by the British Ministry of Health for the year 1934. During that year the cost was \$23,820,000. For every dollar spent on the insured fifteen cents was spent

on administration Quite a tidy sum to come out of the workers for the administration alone of a second rate article Imagine if you can what these costs would be in this country where we have to muddle along without the excellence of the English Civil Service and where we enjoy an administration which tosses billions around as if they were toy balloons

The administration of the English system is quite complicated At its top is the Ministry of Health Certain approved Societies and Commercial Insurance Companies complete in a general way the administrative set up Theoretically the commercial companies do their work without profit, actually, costs are so manipulated that a very tidy profit is realized Those of us who have had any contractual contacts are familiar with cost plus plans We know how these costs may be and are juggled, and we furthermore know that from these same costs come plenty of gravy

Does the English worker like the system? I think in a general way he does To quote Sir Frederick Treves "The English working class has a craving for bottles of medicine which is second to the craving for strong drink" This system permits him to indulge this fancy to his heart's content without reckoning on its purchase price He enjoys running to the doctor with his trivial complaints distracting the doctor's time and attention from those who really need them What a paradise for the neurotic! Nor, we are told, is this controllable Refusal to supply these bottles of medicine means lost patients, and patients' families and friends and lost patients mean lost income, and here we have at the very beginning an invitation to moral let down of which we will have more to say later

Is the English worker's health better since the establishment of the insurance system? There is no evidence that it is and if we are to accept the figures of the British Ministry of Health for a six year period, 1921 to 1927, we are forced to one of two conclusions, either his health is very much worse or he has developed malingering to a fine art These figures tell us that the morbidity rates as indicated by benefit claims had increased during that period 41 per cent for men, 60 per cent for unmarried women and 106 per cent for married women

Has the system lessened the time lost to industry by reason of the worker's illness? There is no evidence that it has On the contrary there is evidence that it has not Previous to the existence of compulsory health insurance in England the English and American workman lost about the same number of days each year because of illness Today the English workman loses ten days each year and the American 65 days for this reason

How has compulsory health insurance affected mortality rates in England? There is no evidence that it has affected them favorably and in this connection it at least is interesting to note that during a period of twenty years ending 1933 the English mortality rates dropped less than 10 per cent, while during this same period these rates dropped 21 per cent in the United States

In England under this system the interest has been focused on the care of those actually ill and the emphasis has been largely away from preventive medicine as we know it in this country

What about the amounts expended for poor relief? Has it been lessened in England under compulsory health insurance? It was expected that it would There is no evidence that it has and while the insurance is for the worker and the care of the indigent does not come within the scope of the insurance act, it was expected that the poor law agencies would be relieved of the care of that great

horde of workers whose wages were so low that they could not pay for their own medical care It has, however, not worked out that way Dr R G Leland writing in the *Bulletin of the American Medical Association*, October, 1934, says that "the expenditures for this purpose have increased continuously ever since insurance went into force, and with in the last two years the most extensive measures in this direction ever proposed in England have been put into operation Some of these are much the same as those proposed by the Royal Poor Law Commission in 1909 and then rejected in favor of insurance" The vast unemployment of the times may have something to do with this and undoubtedly has This condition however does not constitute by any means the whole explanation We know that during the first two years of insurance, Governmental and privately supported clinics were very materially decreased in attendance but since that time there has been a steady and rapid trek back to these charitable clinics so that today more people are being treated by these agencies than ever before and their rolls by no means are made up entirely of the indigent and unemployed but contain the names of vast numbers of workers who are already covered by insurance

Webster defines morals as the science or doctrine of right conduct While conduct may be related to point of view, among all peoples there are certain fundamentals upon which all are in accord Honesty in thought and act is one of these The invitation to dishonest practices upon the part of the doctor and worker is everywhere recognized as one of the great evils of compulsory sickness insurance not only in England but in every country in which such a system is in operation When the insured resents the doctor's lack of coöperation in making it possible for him to draw an extra week's benefit, when work is slack or when he thinks he needs a vacation, he is apt on the first possible occasion to change his doctor Pretty soon the word is passed around that Doctor So and So is very strict and pretty soon Doctor So and So finds he has no patients Compulsory sickness insurance places the doctor on the spot.

It has been said that the English doctor likes compulsory sickness insurance This may be true It is easy to understand why it may be true Before the advent of insurance in England a large amount of medical service was dispensed through the medium of clubs So terrible was the competition that many doctors employed solicitors or runners who sought to sign up patients for them at two pennies a week These were intolerable conditions from any standpoint. Any system which changed this must be an improvement, as anything worse is not conceivable So when we are urged to accept compulsory sickness insurance because our English brother may like it let us remember these facts and the speciousness of such an argument will be apparent

Doctors who have opposed compulsory sickness insurance for this country have been accused in the lay press of being reactionary and devoid of sympathy and understanding of the needs of many of their fellow citizens This criticism, we believe, is not vicious, but is due to a failure on the part of editors to understand the doctor's point of view For this the doctor himself is very largely to blame We have built a high wall around our motives and aspirations We know their purity We know that the well-being of humanity as it touches the doctor, occupies first place in his heart and mind Who else knows it? When an editor looking at an abstract ideal and finding it good criticizes the doctor who opposes the application of the ideal, too much fault should not be found with him, because the doctor is either

too inarticulate or too proud to explain the reason for his opposition

In this campaign of public education let us tell the editor and the public at large that we even more than they are eager that *first class medical care* shall be the heritage of every resident of our country and that they may know that this is not high sounding clap-trap let us point to the billions in service which the doctors of this country pass on yearly to their underprivileged fellow citizens. Let us tell those swivel chair well fed and well paid sociological romancers who have never treated a patient, who busy themselves with their graphs, diagrams and mathematics that we even more than they are concerned with the health of our fellow man. Let us remind our people that mass production methods will yield poor dividends in health. Let us remind our people of the necessarily intimate personal relationship of patient and doctor with the direct responsibility which one shares with the other. Let us ask him if he desires the politician messing around in that relationship. If compulsory sickness insurance has so completely failed to realize its objective in providing *first class medical care* in countries like Germany and England with their homogeneous populations what can be expected of it in a country like ours with its extremely heterogeneous make-up? How could our Federal Government formulate a compulsory sickness insurance law that would be workable in each of our forty-eight states? The problems of no two are alike. What might be good medicine in the Carolinas might very well be poison for Massachusetts. The citizens of the United States have not been cast in a common mold. Their private lives are built around the traditions of their origin and it may be a hundred years before and maybe never will our citizenry think as a unit in matters that touch closely their homes and families.

Maybe we do need some change in Massachusetts in the way in which medical care is made available. Who knows? Certainly not the fellow who takes a hop skip and a run view of the whole country. Certainly not the Committee on the Costs of Medical Care from whose majority report comes a great deal of the urge for compulsory sickness insurance. This committee in its survey did not touch Massachusetts at all. The fact is nobody knows. The Massachusetts Medical Society intends to know and is in the process of knowing through the activities of the committee on the adequacy of medical care, a sub-committee of the public relations committee.

The Massachusetts Medical Society is committed to an honest and intelligent attempt to find the truth and furthermore pledged to sponsor remedies where needed. Can any editor or citizen question the logic of such a procedure? Tell them of our plans. We of the committee are sure that they will listen eagerly and respectfully and much good will have been done.

### THIRD ANNUAL POSTGRADUATE MEDICAL EXTENSION COURSE

The following sessions have been arranged by the Committee for the week beginning October 13

#### Barnstable

Sunday October 13 at 4 00 P.M., at the Cape Cod Hospital Hyannis Subject Cancer of Breast and Uterus Sarcomas of Bone Lymphoma and Leukemia. Their Early Diagnosis Discussion of Life History of Cancer and Grades of Malignancy Instructors C O Simmons, A O Hampton and C L Parsons J I B. Vall M.D., Chairman

#### Bristol South (Fall River Section)

Monday October 14 at 4 00 P.M., at the Stevens Clinic of the Union Hospital Prospect Street, Fall River Subject Dermatology Ten Common Skin Diseases — Diagnosis and Treatment. (1) Impetigo Contagiosa (2) Scabies (3) Acne Vulgaris (4) Psoriasis and Seborrheic Dermatitis (5) Epidermophytosis (6) Herpes Simplex and Zoster (7) Eczema (8) Erythema Multiforme (9) Verruca Vulgaris (10) Dermatitis Medica mentosa and Dermatitis Venenata In structor C G Lane Eugene A. McCarthy M.D., Sub-Chairman.

#### Essex North

Friday October 18 at 4 00 P.M. at the Hotel Bartlett, 95 Main Street, Haverhill. Subject Cancer of Breast and Uterus Sarcomas of Bone Lymphoma and Leukemia Their Early Diagnosis Discussion of Life History of Cancer and Grades of Malignancy Instructors G A. Leland and Shields Warren Francis W. Anthony M.D., Chairman

#### Essex South

Tuesday October 15 at 4 00 P.M., in the Nurses Home of the Salem Hospital Salem. Subject Arthritis (a) Medical Care of Patient in the Home (b) Orthopedic Treatment in Hospital and Aids in Home Treatment. Instructors J S Barr and H A Nissen Walter G Phippen M.D., Chairman

#### Hampden

Thursday October 17 at 4 00 P.M., at the Academy of Medicine Professional Building 20 Maple Street Springfield and at 8 00 P.M. at the Holyoke City Hospital Holyoke Subject Diseases of the Liver Surgical Problems in Diagnosis of Acute Disease of Gall Bladder and Liver Instructors E. S. Emery and H M Clute George L. Schadt M.D., and George D. Henderson, M.D., Chairmen.

#### Hampshire

Wednesday October 16 at 4 15 P.M., in the Nurses Home of the Cooley Dickinson Hospital Northampton Subject Arthritis. (a) Medical Care of Patient in the Home (b) Orthopedic Treatment in Hospital and Aids in Home Treatment. Instructors A H. Brewster and A. A. Horner Robert B. Brigham M.D. Chairman

#### Middlesex East

Wednesday October 16 at 4 00 P.M., at the Melrose Hospital Melrose Subject Arthritis (a) Medical Care of Patient in the Home (b) Orthopedic Treatment in Hospital and Aids in Home Treatment Instructors R. B. Osgood and F C. Hall Joseph H. Fay M.D., Chairman.

**Middlesex South**

Tuesday, October 15, at 4 15 P M, at the Middlesex County Sanatorium, Waltham Subject Lung Diseases (a) Differential Diagnosis and Treatment of Lobar Pneumonia (b) The Surgical Problems of Empyema. Instructors H F Newton and D S King Edmund H Robbins, M D, Chairman

**Norfolk South**

Monday, October 14, at 8 30 P M, at the Quincy City Hospital, Quincy Subject Immunology Latest Developments in Immunization Smallpox, Typhoid, Measles, Scarlet Fever, Diphtheria, Whooping Cough and Infantile Paralysis Instructor G W Anderson David L Belding, M D, Chairman

**Plymouth**

Tuesday, October 15, at 4 00 P M, at the Brockton Hospital, Brockton. Subject Dermatology Ten Common Skin Diseases—Diagnosis and Treatment. (1) Impetigo Contagiosa, (2) Scabies, (3) Acne Vulgaris, (4) Psoriasis and Seborrheic Dermatitis, (5) Epidermophytosis, (6) Herpes Simplex and Zoster, (7) Eczema, (8) Erythema Multiforme, (9) Verruca Vulgaris, (10) Dermatitis Medicamentosa and Dermatitis Venenata. Instructor J H Swartz Walter H Pulsifer, M D, Chairman.

**Worcester North**

Friday, October 18, at 4 30 P M, at the Burbank Hospital, Fitchburg Subject Immunology Latest Developments in Immunization. Smallpox, Typhoid, Measles, Scarlet Fever, Diphtheria, Whooping Cough and Infantile Paralysis Instructor E S A Robinson Edward A. Adams, M D, Chairman

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**MISCELLANY**


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**HARVARD UNIVERSITY NEWS ITEMS**

Four physicians from the Harvard Medical School and two physicians from the staff of the Massachusetts General Hospital have joined the Harvard Department of Hygiene as assistants to Dr Arlie V Bock, Henry K Oliver Professor of Hygiene and director of the Medical Service at Harvard University The appointments run for one year from September 1, 1935

Of the new appointees, five will carry the title of Assistant Medical Adviser They are Dr Clark Wright Heath, Instructor in Medicine, Harvard Medical School, Dr Greene Fitzhugh, formerly Assistant in Medicine, Harvard Medical School, Dr Jackson Mash Thomas, Assistant in Psychiatry, Harvard Medical School, Dr Kenneth James Tillotson, Instructor in Psychiatry, Harvard Medical School, Dr Vernon Phillips Williams, Assistant Psychiatrist, Massachusetts General Hospital, S B

Harvard '24, M D Harvard '28, and Dr John William Cass, Jr, Assistant in Medicine, Massachusetts General Hospital, Ph D Boston College '25, M D Yale '29

Dr Seth Marshall Fitchet, Assistant in Orthopedic Surgery, Harvard Medical School, will be Assistant Surgical Adviser

These appointments are in addition to those of five Assistant Medical Advisers and five Assistant Surgical Advisers in the Hygiene Department announced last spring

Awards of forty-one scholarships totaling \$10,095 to the following students in the Harvard Medical School this year were recently announced.

William McD Hammon, 4M, of Pittsburgh, Pa., Lewis Dexter, 4M, Beirut, Syria, James F Whitten, 4M, of Amesbury, Mass, Ferdinand F McAllister, 2M, Brooklyn, N Y, Charles A Robinson, 2M, Bronxville, N Y, William H Sweet, 4M, Centralia, Wash, Lewis Thomas, 3M, Flushing, N Y, James B Blodgett, 4M, Detroit, Mich, Arthur L Abrams, 2M, Roxbury, Mass, Walter H Pritchard, 4M, Binghamton, N Y

Newell R. Kelley, 3M, of Hartford, Conn, Lewis G Shepler, 3M, Mystic, Conn, Orvar Swenson, 3M, Independence, Mo, Seth H Read, 3M, Belfast, Me, Robert D Woolsey, 3M, Maquon, Ill, Henry H Work, Jr, 3M, Buffalo, N Y, Marshall deG Ruffin, 4M, Roanoke, Va, Henry B Garrigues, 3M, Conshohocken, Pa, Murray S Howland, Jr, 3M, Binghamton, N Y, Richard B Pippitt, 3M, Port Jervis N Y, Vincent P Gruzdis, 2M, Worcester, Mass

Frank J Lepreau, Jr, 2M, of Hastings-on Hudson, N Y, Frederic D Lake, 2M, Perth Amboy, N J, Joseph Foster Ross, 4M, Covina, Calif, Robert B Lawson, 4M, Foxborough, Mass, Calvin T Klopp, 2M, Reading, Pa, George T Howard, Jr, 3M, Lexington, Ky, Ralph E Durkee, Jr, 4M, West Hartford, Conn, Espey F Cannon, 4M, Salt Lake City, Utah, William H Mathews, 4M, Whitesboro, N Y, David McL Greeley, 3M, Madison, Wis

Charles W Hayden, 2M, Kansas City, Mo, Elliott S Hurwitt, 3M, Brookline, Mass, Palmer Congdon, 4M, Waban, Mass, Samuel T Clarke, 4M, Honolulu, T H, Francis McC Ingersoll, 2M, Tecumseh, Neb, Donald E Nitchman, 3M, Schenectady, N Y, Robert P Tucker, 2M, Charleston, S C, John Maier, 2M, Royersford, Pa, Robert S Thomson, 2M, Milton, Mass, and Charles E MacMahon, 4M, Seattle, Washington

**ANTERIOR POLIOMYELITIS CASES FOR 1935****WEEKLY LIST, SEPTEMBER 30 - OCTOBER 5****City or Town**

Fall River	4
New Bedford	1
North Attleboro	2
Somerset	2
Ashland	1
Braintree	1
Brockton	1

Medfield	1
Natick	1
Quincy	3
Walpole	1
Arlington	2
Belmont	2
Boston	31
Cambridge	6
Malden	1
Medford	1
Newton	3
Revere	3
Somerville	4
Waltham	3
Watertown	1
Wellesley	1
Chelmsford	2
Lowell	4
Lynn	3
Methuen	1
Newbury	1
North Andover	1
North Reading	1
Wakefield	1
Leominster	1
Northbridge	1
Littleton	1
Holyoke	1
Longmeadow	1
Pelham	1
Southbridge	1
Greenfield	1
Total	99

## RECENT DEATHS

**FRIEDMAN—NATHAN M. FRIEDMAN M.D.**, of 1067 Blue Hill Avenue Dorchester Massachusetts, died at his home October 3 1935

He was born in 1884 and after graduating from a German Medical College subsequently graduated from the Tufts College Medical School in 1909

He was a fellow of the Massachusetts Medical Society and the American Medical Association.

During the World War he served as an examiner for the Medical Board. He was secretary of the Jewish Hospital for Chronic Diseases Roxbury and a Mason. Dr. Friedman is survived by his widow Mrs. Isabel (Frank) Friedman and two sons Elliot Friedman and Theodore Friedman

**KLEIN—ALVIN WALTER KLEIN M.D.**, of Stockbridge, Massachusetts, died September 27 1935

He was born in Owenton Kentucky February 2, 1868, educated in the public schools of Cincinnati and received his medical degree from the Cincinnati College of Medicine and Surgery in 1889. He practiced for a time in Cincinnati. After serving in the New York State Hospital Service and the U. S. Army

Medical Corps he became associated with the Austen Fox Riggs Foundation serving both as physician and trustee. He was a fellow of the Massachusetts Medical Society and the American Medical Association. The only surviving relatives are nieces and nephews living in Sherbrooke, Canada and New Rochelle, New York.

**HICKSON—WILLIAM JAMES HICKSON M.D.**, of Pittsburgh Pennsylvania, died at his summer home in Gloucester Massachusetts October 4 1935

He was a well known psychologist with especial interest in criminology

He had had a varied experience in criminal courts in Chicago and elsewhere

Dr. Hickson was a graduate of Duquesne University and Pittsburgh University and received his medical degree from the University of Pennsylvania Medical School in 1900

He was a member of the Illinois Medical Society the American Medical Association the Philadelphia Psychiatric and other scientific orders.

He is survived by his widow Mrs. Marie Katherine Kittner Hickson.

**WHEELER—LEONARD WHEELER M.D.**, of 12 Chestnut Street Worcester Mass., died at his home October 2 1935

Dr. Wheeler was born in Lincoln, Massachusetts August 31, 1845 the son of Abel and Charlotte (Bemis) Wheeler. His early education was acquired in the public schools of Lincoln. In 1862 he graduated from Phillips Exeter and in 1866 from Harvard College. He received his M.D. degree from Harvard in 1870 after serving an internship at the Massachusetts General Hospital. He pursued post graduate studies in Vienna and Breslau before settling in Worcester where he became prominent in hospital and consultation practice and was honored by the District and State Societies.

Dr. Wheeler is survived by his widow Mrs. Elizabeth B. O. Wheeler three sons Dr. Bancroft O. Wheeler Mr. Leonard Wheeler Nathaniel Wheeler and a daughter Miss Eunice Wheeler

## NOTICES

### MEDICAL CLINIC AND STAFF ROUNDS AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 P.M. on Thursday October 17 in the amphitheater of the Peter Bent Brigham Hospital Dr. Henry A. Christian, Physician-in-Chief, Hersey Professor of the Theory and Practice of Physic in the Harvard Medical School will give a medical clinic. To it are cordially invited practitioners and medical students. These clinics will be repeated on Thursdays October to May.

On Saturdays in the wards of the Peter Bent Brigham Hospital from 10 to 12 staff rounds will be conducted by Dr. Christian



## REMOVALS

S SEYMOUR HORLICK, M D, announces the removal of his office from 1687 Commonwealth Avenue to 1860 Commonwealth Avenue, Brighton. Telephone Longwood 5460

WILLIAM T HOPKINS, M D, announces his removal from 7 Atlantic Street, Lynn, to 832 Humphrey Street, Swampscott, Massachusetts Telephone Jackson 0334

## BOSTON DISPENSARY

Assembly Hall, 25 Bennet Street

## MEDICAL CONFERENCE PROGRAMS

October, 1935, 9 10 A M

Friday, October 11 — Ward Cases Dr S J Thannhauser

Monday, October 14 — Endocrine Clinic Case Presentations Dr Charles Lawrence

Tuesday, October 15—X Ray Demonstration Dr Alice Ettinger

Wednesday, October 16—Ward Cases Dr S J Thannhauser

Thursday, October 17—"Vital Statistics and Medical Statistics" Dr E B Wilson

Friday, October 18 — Ward Cases Dr S J Thannhauser

Saturday, October 19 — Tuberculosis Clinic Dr S J Thannhauser

Monday, October 21—Anaphylaxis Clinic Case Presentation Dr Joseph Kaplan

Tuesday, October 22 — "The So Called Splenic Anemias" Dr William Dameshek

Wednesday, October 23—Ward Cases Dr S J Thannhauser

Thursday, October 24—"Physiological Significance of Macrocytosis in Anemia" Dr W B Castle

Friday, October 25 — Ward Cases Dr S J Thannhauser

Saturday, October 26—Nephritis Clinic Dr S J Thannhauser

Monday, October 28—G I Clinic Case Presentation Dr K S Andrews

Tuesday, October 29 — "Flat Feet." Dr John D Adams

Wednesday, October 30— Ward Cases Dr S J Thannhauser

Thursday, October 31 — "Revision of Interpretation of Laboratory Tests for Syphilis" Dr Hinton

## NEW YORK ACADEMY OF MEDICINE LECTURES

The New York Academy of Medicine has arranged for a series of lectures addressed to the lay public.

The opening lecture October 4, by Dr Walter B Cannon of the Harvard Medical School was under the title of the "Wisdom of the Body" Seven lectures by outstanding authorities are to follow

The subjects will deal with the "art and romance of medicine," the "methods of medicine", how "medicine achieved its goals", and "how it is striving for those unattained"

Disease and disease prevention will not be discussed

BOSTON UNIVERSITY SCHOOL OF MEDICINE  
SURGICAL CLINIC AT THE BOSTON CITY HOSPITAL

Friday, October 11, 12—1, Cheever Amphitheatre Dr William R Morrison, Associate Professor of Surgery, will present

- 1 Posterior gastro-enterostomy for obstructing duodenal ulcer
- 2 Two-stage Lahey operation for cancer of rectum
- 3 Indirect inguinal hernia.

Physicians and medical students are invited

## MASSACHUSETTS MEMORIAL HOSPITALS

The Surgical Section will resume its monthly meetings on October 11, 1935 The meeting will be held in the Ladies Aid Room (former nurses dining room), Falbot Memorial, 82 East Concord Street, Boston, at 12 noon on the above date

Dr Frank E Barton will speak of his "Observations in Hospitals in Europe" and papers will be presented by Dr Samuel L Marnoy, Dr Leo J Lynch and Dr Phillips L Boyd

MILO C GREEN, *Secretary*

DR. WILLIAM D McFEE ELECTED SECRETARY  
OF THE NEW ENGLAND PHYSICAL THERAPY SOCIETY

At a Council Meeting of the New England Physical Therapy Society held at the Hotel Victoria on September 25, Dr William D McFee of Boston and Haverhill was elected Secretary of the organization to succeed the late Dr Arthur H Ring of Arlington who had been the Secretary since 1930

REPORT AND NOTICES  
OF MEETINGSTHE ANNUAL MEETING OF THE NEW  
ENGLAND SURGICAL SOCIETY

For the second time in its history the New England Surgical Society was invited to hold its annual meeting in Manchester, New Hampshire, this year September 27 and 28 were selected and the Local Committee, Dr David W Parker, Dr George C Wilkins and Dr Ezra A. Jones, arranged and conducted a most admirable program On Friday morning the local men operated at the Elliott Hospital and at ten o'clock the following dry clinic was conducted

Dr John P Bowler, Compound Fractures  
Dr Emery M Fitch, Carcinoma of Penis  
Dr George C Wilkins, Cancer of Mouth  
Dr Thomas W Luce, Pick's Disease  
Dr Ezra A. Jones, Leg Lengthening (Infantile),  
Fracture Neck of Femur, Sedimentation Test (Résumé)

Dr David W Parker, Prolapse of Rectum, Obstruction at Ligament of Treitz (Torsion), Meckel's

Diverticulum Evisceration of the Bowels at the Umbilicus Ten Hours After Birth.

Dr James W Jameson Meckel's Diverticulum Dermoid Cysts.

Dr James B Woodman Fractured Patella.

A delicious buffet lunch was served at the hospital and considerable time was given the men to sit around and talk to their companions a very valuable part of the annual meeting of this Society

At two o'clock in the Ballroom of the Carpenter Hotel the following papers were read

Malignancy of the Breast, Dr H Gildersleeve Jarvis

Results in Mammary Carcinoma at the Elliott Hospital Dr George C Wilkins Dr George F Dwinell—by invitation

Secondary Carcinomata of the Large Bowel Dr Edward L Young Jr

One Hundred Untreated Cancers of the Rectum Dr Ernest M. Daland

Stones in the Common and Hepatic Bile Duct Dr Frank H. Lahey

Obliterative Cholangitis Involving the Extrahepatic Bile Ducts Dr Horace K. Sowles

Surgical Complications of the Salmonella Sulphaster Dr Irving Walker

Congenital Diaphragmatic Hernia in Children Dr Philemon E. Truesdale

At five o'clock the members and their wives were entertained by Dr and Mrs David W Parker at tea.

The eighteenth annual dinner was held at the Manchester Country Club. Eighty-three men sat at the table. After dinner the President Dr Peer P Johnson read an address and later introduced Mr Henry Wise Wood who spoke interestingly and at some length concerning canoeing sailing (the Cruising Club of America) and into the clouds by aeroplane and otherwise.

At nine o'clock on Saturday morning the members assembled at the Carpenter again and at the annual business session elected the following of ficers

President Daniel C Patterson M.D. Bridgeport, Conn.

Vice-President David W Parker M.D. Manchester N H

Secretary John M. Birnie, M.D. Springfield Mass

Treasurer James R. Miller M.D., Hartford Conn.

Recorder Walter G. Shippen M.D., Salem Mass.

Executive Committee Officers of the Society  
Lucius Kingman M.D. Philemon E. Truesdale  
M.D. William H. Bradford M.D. Thomas W. Luce  
M.D. Lyman Allen, M.D.

It was announced that the next meeting would be held in Bridgeport, Connecticut.

Thereafter the following papers were read

A Form of Sclerosing Osteomyelitis following Fractures of the Long Bones Dr Paul P. Swett

Statics of the Foot in Relation to Surgery Dr Frederic J. Cotton.

DeQuervain's Disease and Carpal Ganglia, Dr Daniel C. Patterson.

Certain Aspects of Hand Surgery Dr Torr W. Harmer

Congenital Absence of the Pericardium Dr William E. Ladd

Urologic Aspects of Vesicovaginal Fistula Dr William C. Quinby

Acute Arterial Obstruction from Arteritis Dr Howard M. Clute

Personal Experiences with Cancer of the Bladder Dr J. Dellinger Barney

Reconstruction of the Vagina from a Portion of the Sigmoid Report of a Case Dr Herman C. Pitts.

Everyone agreed that again a most interesting and instructive meeting had been enjoyed and that many thanks were due to the Manchester men for their thoughtful preparation. Over ninety men were present at the meeting

#### HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held in the Peter Bent Brigham Hospital Amphitheatre (Shattuck Street Entrance) Tuesday evening October 22 at 8 15 P.M.

##### PROGRAM

Presentation of Cases.

Some Experiences During a World Tour By Walter B. Cannon M.D.

MARSHALL N. FULTON M.D. Secretary

#### ESSEX NORTH DISTRICT MEDICAL SOCIETY

The Quarterly Meeting of the Essex North District Medical Society will be held Wednesday October 23 1935 at 1 00 P.M., at Peabody House Andover Academy

Business meeting will precede the luncheon which follows at Phillips Inn at 2 00 P.M.

Returning to Peabody House discussions will be presented by each of the city committees on mutual local problems of the profession and the public.

Dr Gaylord Anderson of the State Department of Health will discuss mutual problems of the Department of Public Health and the medical profession

E. S. BAGNALL, M.D., Secretary

#### NEW ENGLAND PHYSICAL THERAPY SOCIETY

The first fall meeting of the New England Physical Therapy Society will be held in Parlor C the mezzanine, Hotel Statler Boston at 8 o'clock in the evening of Wednesday October 16 1935

##### PROGRAM

The Treatment of Hemorrhoids Leland S. McKittick M.D., Boston

Discussion will be opened by Vernon C. Stewart, M.D., Woburn and William D. McFee, M.D. Boston.

Preceding the meeting there will be an informal dinner in the main dining room of the Hotel Statler at six thirty. Those planning to attend will meet on the mezzanine

Members please take note of the change of meeting place

Physicians are cordially invited to attend

WILLIAM D McFEE, M.D., *Secretary*,  
Boston, Mass

### WORCESTER NORTH DISTRICT MEDICAL SOCIETY

The Worcester North District Medical Society will hold its next quarterly meeting at the State Colony in East Gardner, on Wednesday, October 23, at 4 30 P.M. Dr Charles E Mongan, President of the Massachusetts Medical Society, will be the guest speaker Luncheon.

FRANCIS M McMURRAY, M.D., *Secretary*

### TRUDEAU SOCIETY

The meeting of the Trudeau Society will be held at Rutland State Sanatorium on Tuesday, October 15, 1935, at 4 P.M. Dr Gull Lindh Muller will read a paper on "Blood Studies in Relation to Surgery and Pulmonary Tuberculosis" Dr Paul Dufault will discuss "Pneumolysis Failures With Illustrations" There will be a moving picture entitled "The Sanatorium" The meeting will be opened by Dr John S Harter of the Lahey Clinic Lunch will be served at 6 30 P.M.

MOSES J STONE, M.D., *Secretary*

### SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

#### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, OCTOBER 14, 1935

##### Monday, October 14—

9-10 A.M. Boston Dispensary, 25 Bennet Street, Boston Endocrine Clinic, Case Presentations Dr Charles Lawrence

##### Tuesday, October 15—

9-10 A.M. Boston Dispensary, 25 Bennet Street Boston X-Ray Demonstration Dr Alice Ettinger  
\*12 M The South End Medical Club, at the Headquarters of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston

##### Wednesday, October 16—

9-10 A.M. Boston Dispensary, 25 Bennet Street, Boston Ward Cases Dr S J Thannhauser  
\*12 M Clinico-Pathological Conference Children's Hospital  
\*8 P.M. New England Physical Therapy Society Hotel Statler, Boston, Parlor C, the mezzanine

##### Thursday, October 17—

\*8 30-9 30 A.M. Clinic, Surgical and Orthopedic Staffs of Children's Hospital at the Children's Hospital  
9-10 A.M. Boston Dispensary, 25 Bennet Street Boston "Vital Statistics and Medical Statistics" Dr E B Wilson  
\*3 30 P.M. Medical Clinic at the Peter Bent Brigham Hospital

##### Friday, October 18—

9-10 A.M. Boston Dispensary 25 Bennet Street, Boston Ward Cases Dr S J Thannhauser

##### Saturday, October 19—

9-10 A.M. Boston Dispensary, 25 Bennet Street, Boston Tuberculosis Clinic. Dr S J Thannhauser  
\*10-12 Staff rounds at the Peter Bent Brigham Hospital

\*Open to the medical profession

†Open to Fellows of the Massachusetts Medical Society

October 11—Massachusetts Memorial Hospitals Surgical Section See page 738

October 11—Boston University School of Medicine Surgical Clinic at the Boston City Hospital See page 738

October 11-31—Boston Dispensary Medical Conference Programs See page 738

October 14-19—Inter-State Postgraduate Medical Association of North America See page 549, issue of September 12

October 15—Trudeau Society See notice elsewhere on this page

October 15—South End Medical Club See page 698 issue of October 3

October 16—New England Physical Therapy Society See page 739

October 17—Medical Clinic at the Peter Bent Brigham Hospital See page 737

October 21 - November 2—1935 Graduate Fortnight of the New York Academy of Medicine See page 898, issue of May 9

October 22—Harvard Medical Society See page 739

October 28 - November 1—The Twenty-Fifth Clinical Congress of the American College of Surgeons See page 1065, issue of May 30

### DISTRICT MEDICAL SOCIETIES

#### ESSEX NORTH DISTRICT MEDICAL SOCIETY

October 23—See page 739

#### WORCESTER DISTRICT MEDICAL SOCIETY

November 13—Wednesday evening Grafton State Hospital, North Grafton, Mass Dinner and scientific program Subjects of program to be announced later

December 11—Wednesday evening St. Vincent Hospital, Worcester, Mass Dinner and scientific program Subjects of program to be announced later

January 8, 1936—Wednesday evening Worcester City Hospital, Worcester, Mass Dinner and scientific program Subjects of program to be announced later

February 12, 1936—Wednesday evening Worcester State Hospital, Worcester, Mass Dinner and scientific program Subjects of program to be announced later

March 11, 1936—Wednesday evening Memorial Hospital, Worcester, Mass Dinner and scientific program Subjects of program to be announced later

April 8, 1936—Wednesday evening Hahnemann Hospital, Worcester, Mass Dinner and scientific program Subjects of program to be announced later

May 13, 1936—Wednesday afternoon and evening Annual Meeting of Society Time, place and details of program to be announced in an April issue of the Journal

ERWIN C MILLER M.D., *Secretary*

#### WORCESTER NORTH DISTRICT MEDICAL SOCIETY

October 23—See notice elsewhere on this page

### BOOK REVIEW

National Medical Monographs Obstetrics for the General Practitioner J P Greenhill 304 pp  
New York National Medical Book Company, Inc  
\$3 00

This volume, in the series of National Medical Monographs, aims to present a survey of the field of clinical obstetrics in sufficiently compact form to be available as a manual for the busy practitioner. No attempt is made, therefore, to discuss the anatomic and embryological aspects of the subject. Beginning with prenatal care, the principal topics considered are those of abortion and miscarriage, premature labor, ectopic pregnancy, the toxemias and other complications of pregnancy, the management of normal labor, forceps delivery, Caesarean section, anesthesia, infections, and postpartum care. It is surprising that podalic version is dismissed with only the briefest description. One may also question the categorical statement that "low cervical Caesarean section is far safer than the classic operation." The volume is well illustrated with a series of thirty-nine cuts from DeLee's "Principles and Practice of Obstetrics"

# The New England Journal of Medicine

VOLUME 213

OCTOBER 17, 1935

NUMBER 16

## THE USE OF DILAUDID IN TREATING PATIENTS WITH CANCER\*

BY IRA T. NATHANSON, M.D.,† AND ERNEST M. DALAND, M.D.†

THE treatment of pain in the patient with malignancy has always been a difficult problem. The average practitioner feels that advanced cancer and large doses of morphine go hand in hand. Too often is the patient given a box of morphine tablets with instructions to use them as he needs them. We believe that a patient is no judge of the quantity needed or the time interval between doses and we have been impressed with the small amounts of medication needed if it is given under close supervision. Our policy is to relieve pain as far as possible by salicylates and barbiturates before resorting to opiates. We then turn to codeine alone or a combination with the above. Finally we resort to the stronger opiates, chiefly morphine.

Careful cleansing of ulcerated lesions, judicious use of deep x ray, minor surgical procedures (removal of sequestra, etc.) and careful nursing are greater factors in relieving pain than is the administration of medicines. Certain neurosurgical measures as chordotomy (severing the spino-thalamic tract), rhizotomy, division of peripheral nerves and alcohol injection of nerves may remove all need for the administration of narcotics. The opiates are used and are necessary as preoperative and postoperative medication in the cancer patient treated surgically. When deep x ray therapy is used for treatment of the disease, the discomfort is increased for a time as the reaction develops and consequently there is need for more medication. In both of these groups, the operative case and the patient treated with maximum dose of x ray it is hoped that the need for medication is but temporary. We desire, therefore, to use an agent that is not to become habit forming.

There is another group of patients suffering either from necrosis edema, or replacement fibrosis following radiation, or from extensive involvement of bone, fascia or abdominal viscera from the extension of metastases where pain lasts as long as the patient lives. Granted that these patients need opiates, it is obvious that a drug should be selected which will not produce a rapidly increasing tolerance.

Each year sees the introduction of new drugs to replace morphine. One by one they disappear until we have codeine, morphine and pantopon as the only reliable narcotics. Within the past few years, another drug, dilaudid, has been advanced as a substitute for morphine because it is supposed to possess certain advantages over the latter. It has been said to be a "stronger analgesic, requiring but a small dose, about one-fifth that of morphine. It acts more quickly and is less likely to produce undesirable side effects."<sup>1</sup> In therapeutic doses, it is stated that it has very little hypnotic action.

Before discussing dilaudid, let us consider the more common disadvantages and side effects of morphine. Morphine is habit forming and a tolerance for it is gained rather rapidly. Constipation is practically a universal result of its use. Loss of appetite, nausea and vomiting, particularly in the operative cases, are common. Euphoria is prominent and there is marked hypnosis. Does dilaudid have fewer disadvantages?

Through the courtesy of the Billhuber Knoll Corporation, distributors of dilaudid, we were able to obtain a sufficient quantity for clinical trial. Dilaudid is the hydrochloride of a hydrogenated ketone of morphine and has the chemical name dihydromorphinone hydrochloride. It was first studied by Gottlieb in 1926 who found that the effective dose was considerably smaller than that of morphine, the action set in more quickly, and there was less interference with intestinal peristalsis. This work was done with animals, although a clinical report was made by Krehl. Since that time the foreign literature has contained numerous articles on the subject.

The Committee of Experts<sup>2</sup> appointed by the Council of the League of Nations in May, 1931 in reporting on heroin states, "For the relief of pain in patients in whom it is undesirable to act on the bowels, heroin is better than morphine, but dilaudid offers the same advantages. Dilaudid has a slightly weaker effect on the respiratory center than heroin, it has the same analgesic effect as heroin, both drugs have little effect on the alimentary canal. The euphoric effects of dilaudid are weaker than both morphine and heroin as gauged by withdrawal symptoms. It was not until 1932, however, that Alvarez<sup>3</sup> introduced it in the United States. His experience was that the drug had the same prop-

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erties of codeine with the additional ones of being a much better reliever of pain, and being without effect on the bowels. He did not find that it entirely removed the nauseating and emetic effects of morphine.

Eddy<sup>4</sup> at the request of the Council on Pharmacy and Chemistry of the American Medical Association reported on the general status of the alkaloid, and made an extensive review of the literature. Experimentally, he found it to be powerfully analgesic but that, like morphine, it depressed respirations, and that the established ratio between effective doses of morphine and dilaudid for production of desirable effects was not materially different from the ratio between their toxic doses. He did not believe that dilaudid was free from tolerance and addiction evoking properties although side reactions seemed to occur less frequently. He advised that prolonged administrations should be made as cautiously as with morphine.

Menard<sup>5</sup> felt that dilaudid was more desirable than morphine because it was better tolerated, produced more effective analgesia in smaller doses and caused fewer undesirable symptoms.

Paine et al<sup>6</sup>, in studying postoperative nausea, vomiting and distention, found that while dilaudid was effective in relieving the postoperative pain, it showed no marked advantages over morphine, and stressed the possibility of respiratory depression.

David<sup>7</sup> states that in therapeutic doses, dilaudid tended to lower the basal metabolic rate as did morphine, but that it acted more rapidly and over a shorter period of time. He believed it to be ten times as active as morphine. In regard to tactile discrimination and respiratory depression, it was slightly superior to morphine. As to the side effects it appeared to produce less euphoria, more diarrhea and more itching.

Stroud<sup>8</sup> found dilaudid to be efficient in control of constant pain, and considered it superior to any other opiate as regards analgesic effects and side reactions. He advised that it be administered with sufficient frequency to permit continuous effect.

Weum<sup>9</sup> used dilaudid in labor, postpartum and postoperatively. He believes that it excels both morphine and codeine in postpartum or postoperative care especially when administered in the form of the rectal suppository.

Dilaudid was administered in various dosages, forms and combinations to 115 cases of malignant disease at the Pondville Hospital. The site and nature of the lesion is indicated in table 1. In fifteen other cases the drug was used as a pre- and postoperative medication, a like number of similar cases being given morphine to serve as controls. The indications for the medication were the same as that for the other opiates. It was given regardless of whether they had previous opiates, and if it was known that they had detailed questions

were asked to determine the dosage, the duration of administration, and the analgesic and side effects so that a favorable comparison could be made. All of the patients were observed and questioned by one of us, but additional information was obtained from members of the house staff, the nursing personnel and the house records. The patients were asked no leading questions, and they did not know the nature of the drug they were receiving. The points, upon

TABLE 1  
TYPES OF MALIGNANT CASES TREATED

Total—115

Cervix—frozen pelvis	20
Breast with and without bone metastases	15
Prostate with bone metastases	10
Lip	3
Larynx	6
Bone sarcoma	2
Ewing's endothelioma	3
Lymphoma	3
Antrum	5
Testicle	2
Skin with bone invasion	1
Parotid	1
Floor of mouth, alveolus, etc	10
Tongue	10
Stomach	2
Rectum	5
Anus	2
Bowel	3
Esophagus	2
Lung	3
Neurogenic sarcoma	1
Melanoma	1
Tonsil	3
Thyroid	1
Penis	1

which stress was laid by whatever route the drug was given, were rapidity of action, degree of analgesia, duration of analgesia, the intervals between doses, the hypnotic action, the effect on the gastrointestinal tract (loss of appetite, nausea, vomiting, constipation and diarrhea), the other side reactions, and the question of tolerance where possible.

It may be well to state here that, at the Pondville Hospital, the patient is started on a minimal amount of drug necessary to control pain, regardless of the amount and type of medication received elsewhere. The dosage is increased, or medication altered only because of increased tolerance or pain, or because of very undesirable side effects. It is interesting to note that by judicious use of the drug, the patients can be made comfortable on relatively small doses for long periods of time. Consequently, upon eradication of the disease, and even with terminal care patients, the dose is never large. In the former group they are almost always discharged without need for opiates as the amount is gradually lessened as the disease is alleviated with very little evidence of withdrawal symp-

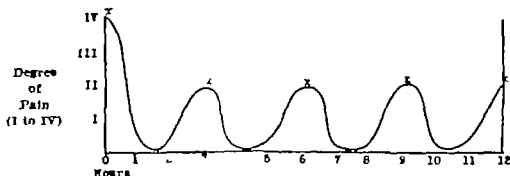
toms, as to the latter, we seldom have to resort to massive doses to control pain, even in the end stages of the disease. Because of this fact, we have seen surprisingly less evidence of tolerance or habituation during their stay in the hospital than one would expect. If these symptoms are observed on admission, every attempt is made to eradicate them. In the evaluation of the effect of any medication for the relief of pain one must take into consideration the duration, the degree, the location and the type of pain if one wishes to make a satisfactory observation. Consequently, when this study was undertaken, these factors were kept in the foreground in the estimation of our results.

Dilaudid was given by mouth, by hypodermic injection by suppositories, and in combination

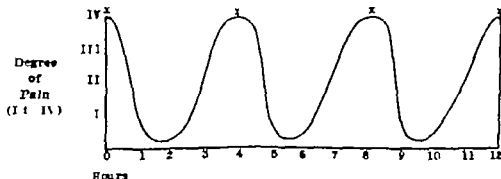
codeine. The dilaudid dosage varied from grains 1/64 to 1/20 by hypodermic injection and from grains 1/48 to grains 1/24 by oral administration. Codeine varied from grains 1/2 to grains 1, and morphine from grains 1/8 to grains 1/2. The medication was administered with sufficient frequency to permit continuous relief, i.e., it was repeated before the pain had again reached its maximum intensity. If used in this way it will be found that the single dose necessary to produce satisfactory analgesia will be smaller and more effective although the total amount in twenty-four hours may be the same as larger doses given at less frequent intervals when the pain is at its height.

The following graphs have been made diagrammatically to illustrate the point

#### Smaller Doses



#### Larger Doses



X - time at which medication is given

with synergistic drugs as aspirin and pyramidon (the latter has not been used in the past six months because of the many reports in the literature of granulocytopenia apparently resulting from it) in much the same manner as we used morphine and codeine. As soon as a case was admitted, a history of the amount and effect of previous medication if any, was taken. In one group if an opiate was necessary the patient was then placed on the amount of codeine or morphine to relieve his pain satisfactorily. After a variable period, when an evaluation of the effect of the medication could be made, he was given dilaudid in the equivalent doses as recommended by various writers, that is, one-fifth that of morphine. In other cases where no medication other than a non-narcotic was given he was placed on dilaudid directly, and the observations recorded. A control group was made up of patients who without previous narcotic medication were placed on morphine or

Observations. The following actions of dilaudid as compared with that of other opiates have been noted. Dilaudid either by mouth or by hypodermic is approximately twice as rapid in action as that of other drugs. Its effect was evident almost invariably before a fifteen minute period and it usually took effect in about ten minutes. The duration and degree of relief varied directly with the dose given and the amount of pain. It compared very favorably with morphine (Case 6). In some instances it appeared to be more efficacious (Case 8), although the reverse was also true.

In the doses given very little hypnotic action was seen although in a few cases a "dopiness" was observed. It was necessary, therefore to supplement the dilaudid with a barbiturate in those patients who could not sleep even when they experienced complete relief from pain (Case 9). In individuals who had had morphine or codeine previously it was found that although

1 with aspirin grains 10 was given with more satisfactory relief for three hours. Finally, dilauidid grains 1/24 with aspirin grains 10 was administered giving complete relief for four hours.

**CASE 8 D B** Aged twenty—Pondville No 6541. Lymphoblastoma involving skin, lymph nodes and lumbar vertebrae. The patient complained of generalized pain especially in the groins, chest and back, usually dull but intermittently sharp. Medication previous to admission was aspirin. On entry she was placed on morphine grains 1/4 subcutaneously every four hours over a period of a week. The latent period was thirty minutes, relief was complete for two and one half hours with moderate hypnosis. Constipation was marked. She was then given dilauidid grains 1/20 by hypodermic for a similar period. The latent period was ten minutes with complete relief from pain until the next dose (i.e., four hours). There was no hypnosis and constipation was much relieved. Morphine was resumed, but the dose had to be given every three hours with not such satisfactory relief as with dilauidid and constipation again became severe.

**CASE 9 M E** Aged sixty—Pondville No 7480. Carcinoma of the cervix with frozen pelvis. The symptoms consisted of excruciating pain in the pelvis radiating down the legs. No medication before entry. On admission she was given codeine grains 1 with pyramidon grains 10 over a period of six days on an average of every three hours. Relief was partial for two hours. Dilauidid grains 1/24 was given by mouth for a daily average of every four hours over a week. The action was quicker and

she experienced complete relief for periods varying from four to six hours, but required a barbiturate in addition at night for sleep.

**CASE 10 N B** Aged forty seven—Pondville No 7299. Total hysterectomy for carcinoma of fundus. Anesthesia, ether by cone method. Preoperative medication dilauidid grains 1/20 with atropine grains 1/150. Fifteen minutes after administration the respirations decreased from an average of 20 to 8, and became very shallow with development of cyanosis. Stimulation with carbon dioxide and oxygen for cyanosis was necessary throughout the operation. Relaxation was not successfully obtained and the operative procedure therefore was made more difficult and was prolonged.

#### REFERENCES

- 1 Quoted from pamphlet distributed by Bilhuber Knoll Corporation.
- 2 Report of League of Nations Committee of Experts. *Lancet* 2: 55 (July 4) 1931.
- 3 Alvarez, W. C. Dihydromorphinone hydrochloride (dilauidid, Bilhuber Knoll) a powerful analgesic with some advantages over morphine. *Proc. of the Staff Meet. of Mayo Clin* 7: 480 (Aug. 17) 1932.
- 4 Eddy, N. B. Dilauidid (dihydromorphinone hydrochloride). *J. A. M. A.* 100: 1037 (April 1) 1933.
- 5 Menard, O. J. Dilauidid for intractable pain. *Lahey Clinic Number Surg. Clin. N. A.* 13: 777 (June) 1933.
- 6 Paine, J. R., Carlson, H. A. and Wangersteen, O. H. The postoperative control of distention, nausea and vomiting. *J. A. M. A.* 100: 1910 (June 17) 1933.
- 7 David, N. A. Dilauidid and morphine effects on basal metabolism and other body functions. *J. A. M. A.* 103: 474 (Aug. 18) 1934.
- 8 Stroud, C. M. The use of dilauidid in the pain of cancer. *J. A. M. A.* 103: 1421 (Nov. 10) 1934.
- 9 Weum, T. W. The use of dilauidid in labor post partum and post operative. *The Journal Lancet* 54: 713 (Nov. 15) 1934.

## MUSCLE GRAFTS FOR HEMOSTASIS IN GENERAL SURGERY

BY HOWARD M. CLUTE, M.D.\*

**F**REE muscle tissue has a marked ability to control the oozing of small vessels by hastening the formation of blood clot. Harvey Cushing<sup>1</sup> noted this quality in muscle and made use of it in controlling bleeding vessels during brain tumor operations. Victor Horsley<sup>2</sup>, however, is given credit by Cushing for his earlier use of this method which Cushing had independently worked out.

The application of this clot-hastening quality of muscle grafts was limited to the field of brain and cord surgery for many years and has not yet been adopted to any degree by general surgeons. Risley in 1917<sup>3</sup> published the results of experimental work in which he tried muscle fat and fascia as hemostatic agents to control bleeding from parenchymatous organs. He found that both fat and fascia have hemostatic effects, but that muscle tissue was most effective. Risley recommended the use of muscle tissue to control bleeding in wounds of the liver, kidney, and possibly of the spleen. Lawen<sup>4</sup> discussed the use of muscle grafts as hemostatic agents in 1912 and reported upon their use in two heart wounds in 1917.

Further application in surgery of this hemostatic property of muscle came from the urologists. Thus Ciminata<sup>5</sup> in 1924 and Joseph<sup>6</sup> in 1931 used the principle in the control of bleeding from nephrotomy wounds. In 1934 Ockerblad<sup>7</sup> published the results of experimental and clinical work in the use of viable muscle grafts for the control of bleeding from the parenchyma of the kidney. This procedure of Ockerblad's is new in that he uses *viable* muscle grafts rather than detached or dead muscle transplants as previous workers had done. He believes that maintenance of the blood supply in the muscle graft reduces the danger of infection in the wound.

Muscle grafts are not infrequently of great value to the general surgeon in the control of oozing in the operative field. It has been repeatedly demonstrated to me that troublesome bleeding may be readily stopped by the use of free muscle grafts. In my clinical experience it has seemed that bleeding is equally well controlled by either a free or a viable muscle graft. When, therefore, a viable muscle graft is readily made, as in the bleeding from thyroid remnants, viable grafts are used. If, however, the bleeding comes from an area in which there is no adjacent muscle for transplantation,<sup>8</sup>

\*Clute, Howard M. — Surgeon in Chief, II Surgical Service, Carney Hospital. For record and address of author see *This Week's Issue* page 775.

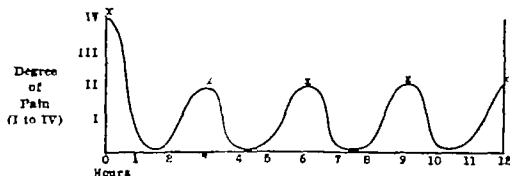
toms, as to the latter, we seldom have to resort to massive doses to control pain even in the end stages of the disease. Because of this fact, we have seen surprisingly less evidence of tolerance or habituation during their stay in the hospital than one would expect. If these symptoms are observed on admission, every attempt is made to eradicate them. In the evaluation of the effect of any medication for the relief of pain, one must take into consideration the duration, the degree, the location and the type of pain if one wishes to make a satisfactory observation. Consequently, when this study was undertaken, these factors were kept in the foreground in the estimation of our results.

Dilaudid was given by mouth, by hypodermic injection, by suppositories and in combination

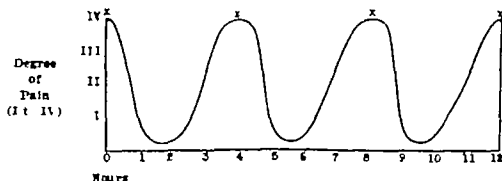
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In the doses given very little hypnotic action was seen although in a few cases a "dopiness" was observed. It was necessary therefore, to supplement the dilaudid with a barbiturate in those patients who could not sleep even when they experienced complete relief from pain (Case 9). In individuals who had had morphine or codeine previously, it was found that although



they admitted satisfactory relief from pain with dilaudid, they did not care for the drug because it did not give them the usual feeling of well-being or have the hypnotic effect to which they had become accustomed. This weaker hypnotic effect is of definite benefit to the ambulatory patient, as it gives him the opportunity to be up and around, and aware of his surroundings.

The effect on the gastrointestinal tract in our experience was found to be superior to that of morphine or codeine as regards the side actions. The appetite was seldom diminished, and constipation although present in a fair number of cases, was not so severe as from the other drugs. Nausea and vomiting which are not infrequently seen after morphine, were seldom noted, although they did occur occasionally with the administration of dilaudid (Case 1).

Other effects. It was noted that an appreciable number complained of transient dizziness or giddiness within a few minutes after the hypodermic injection. This was not noted after morphine. Itching was a much more frequent symptom than with the other opiates. Euphoria was seen in but a few cases, but in respect to this, we can make no comparison, as it was seldom noted with the doses of morphine that were used. Respiratory depression was observed more frequently from therapeutic doses than from corresponding doses of morphine. In one instance, death is believed to have occurred from it (Case 2). This depression was found to be especially evident when the drug was used preoperatively, and occurred during the administration of the anesthetic (Case 10) but it was also seen during the administration of the drug for pain especially with the first few doses.

The question of tolerance is an important one, and we believe that patients receiving dilaudid, although they do become tolerant, are less likely to become so than with morphine. This is evidenced by the fact that it is possible to continue the cases on the same doses for a much longer time, once the effective dose has become established, than with effective doses of the other opiates. In respect to habituation, we have not seen it, but this is most likely due to the fact that the drug was not given for a sufficient length of time. We have no reason to believe that the drug is not habit forming. Withdrawal symptoms when the patients had definitely become tolerant, were milder than those seen with morphine. However, with the mode of administration used at Pondville, tolerance is increased very slightly even with morphine, so that withdrawal symptoms in general are relatively infrequent.

In a group of patients who had received morphine or codeine for a considerable period (i.e., two weeks or more) prior to or after admission, the effects of dilaudid in equivalent doses in

most instances were not nearly so efficacious as the drug previously administered. The reverse was not always true. It is felt that this is definitely due to cross tolerance (Case 5). Substitution therapy with dilaudid in definite cases of morphine addiction was unsuccessful in our hands.

In this series of cases, morphine was found to be more consistent in its action than dilaudid. Dilaudid was more consistent than codeine, but when codeine was given in combination with aspirin, it was found to be more efficacious than equivalent doses of dilaudid. However, when aspirin was given with dilaudid, it was observed that this combination was much superior to the codeine and aspirin. Grains 1/48 of dilaudid with aspirin grains 10 was more efficient than codeine grains 1/2 and aspirin grains 10, and in some instances was equal to or better than codeine grains 1 and aspirin grains 10 in its action. This suggests, therefore, an efficient analgesic with a relatively small dose of a narcotic for patients suffering from moderate pain (Case 7).

The rectal suppository was felt to be superior to an equivalent dose of an opiate suppository in that its action was more rapid, and lasted longer. It is especially suitable for cases of carcinoma of the rectum, and carcinoma of the cervix, with invasion of the rectovaginal septum (Case 3).

Cough. Many writers have suggested its use in postoperative cough, in cough due to pulmonary metastases and the irritative type from lesions of the oral cavity, pharynx and larynx. We have found it to be very efficient and definitely superior to codeine. In combination with terpene hydrate it is especially efficacious (Case 4).

Preoperative and Postoperative Use. In a series of fifteen cases, dilaudid was used as a preoperative medication in combination with atropine in an effort to determine its efficiency as a preoperative drug. It was used postoperatively also to determine the effects on postoperative nausea, vomiting, and distention. The cases ranged from short anesthetics to ones requiring complete relaxation and longer anesthesia. A comparable number were observed as controls in which morphine was used as a preoperative and postoperative medication. Although the series is much too small for any conclusions, the observations seem to indicate the following: Dilaudid tended to cause more respiratory depression, thereby causing a more difficult anesthesia. In two instances, the respirations fell to 8, and stimulation with carbon dioxide and oxygen was necessary. It was found that the degree of relaxation necessary for any given type of operative procedure was less easily obtained than with morphine. The incidence of postoperative nausea and vomiting was definitely less in the dilaudid group. It was espe-

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## MORPHINE PREOPERATIVE and an

Hosp No.	Dose	Time before Anes- thesia	Duration and Type of Anesthesia	Operation	Notes
7216					1 one- Anosis aver were stim
7260	M S 1/6 Atrop 1/150	25	No <sub>2</sub> O, Ether 17	D & C Radium	1 car 1 was dur in ed to y the
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7473	M S 1/4 Atrop 1/150	20'	No <sub>2</sub> O, Ether 13	Excision Cervical Fibroid	e No This treat
7501	M S 1/4 Atrop 1/150	20	Ether 1 30	Gastro- enterostomy	3 was f and given to re-
7684	M S 1/6 Atrop 1/150	15	No <sub>2</sub> O, Ether 1 30	Radical Mastectomy	5350 trum uous took
7696	M S 1/4 Atrop 1/150	20	Ether 1 30	Amputation Hand and Axillary Dissection	3 1/6 dose. daily with e-half or six The to re- nosis to be
7299	M S 1/6 Atrop 1/150	80	No <sub>2</sub> O, Ether 18	D & C Radium	6719 1 was 1/24 hours rains
7371	M S 1/6 Atrop 1/150	20	No <sub>2</sub> O Ether 35	Excision Cancer of Breast	
7711	M S 1/4 Atrop 1/150	20	No <sub>2</sub> O Ether 19	D & C Radium	
7897	M S 1/6 Atrop 1/150	15	No <sub>2</sub> O 14	D & C	
7812	M S 1/6 Atrop 1/150	33	No <sub>2</sub> O, Ether 15	D & C Radium	
7890	M S 1/4 Atrop 1/150	25	No <sub>2</sub> O Ether 1 20	Total Hyster ectomy	
7865	M S 1/6 Atrop 1/150	20	No <sub>2</sub> O Ether 1	Hyster ectomy	
806*	M S 1/6 Atrop 1/150	25	No <sub>2</sub> O, Ether 1 15	Hyster ectomy	
7676	M S 1/4 Atrop 1/150	15	No <sub>2</sub> O, Ether 35	Radium Needle Insertion Ca. Breast	

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TABLE 3  
PRE AND POSTOPERATIVE (GRADED ON A BASIS OF I TO IV)

respira tor	Pulse Range	Induction	Re laxa- tion	Nausea In O R	In Room	Vomiting In O R	In Room	Dis- ten- tion	Dose and Effect on Pain
20 30	116-124	Smooth	III	III	I	III	0	0	IV 1/6
22-28	84 96	Smooth	III	IV	II	IV	II	0	IV 1/6
20 24	84-96	Fair	III	II	I	I	0	0	IV 1/6
22 32	96 128	Excellent	IV	0	0	0	0	0	IV 1/6
22 30	108-96	Excellent	IV	0	III	0	II	0	IV 1/4
20 28	96-108	Fair	III	0	II	0	II	0	IV 1/6
24 32	112 120	Fair	II	II	II	II	I	0	IV 1/6
22 24	108 120	Excellent	IV	0	0	0	0	0	IV 1/6
24	96 100	Fair	II	III	II	III	I	0	IV 1/6
24 22	120 128	Smooth	III	I	0	0	0	0	IV 1/6
24 1	120	Fair	II	I	II	0	II	0	IV 1/6
20 22	84-120	Smooth	II	I	II	0	II	IV	III 1/6
20 30	110 130	Smooth	III	0	III	I	III	III	IV 1/6
20-30	120 130	Excellent	IV	I	0	II	II	II	IV 1/6
22-32	72-108	Excellent	II	I	0	0	0	0	IV 1/6

cally noted that relatively few patients vomited immediately upon awakening or after cessation of anesthesia as they did with morphine. Used postoperatively, it was a very efficient analgesic, but some cases required barbiturates to obtain sleep. So far as postoperative distention is concerned, the degree of difference was not sufficient to permit any definite conclusions. In general, however, gas was passed earlier by three patients than by those with morphine and it had less constipating effect (Case report 10).

For detailed observations see tables 2 and 3.

**Summary.** Dilauid is an efficient analgesic in doses approximately one-fifth those of morphine. Its speed of action is about twice as fast as that of the other opiates and its duration of action and degree of relief compare favorably with that of morphine. It is not usually hypnotic in therapeutic doses, and requires in many instances the addition of a barbiturate to obtain sleep. The effect on the gastrointestinal tract as regards side reactions is less than that of morphine. It is an efficient reliever of cough due to various causes. It is less likely to produce undesirable side effects than morphine, but on the other hand, itching and respiratory depression seem to be more prominent. Its efficiency in combination with other drugs has been demonstrated. Tolerance, although it is believed to develop, is not so marked or rapid as with morphine. It is not so efficient as the other opiates when it is given in equivalent doses after the other opiates are used first for a period of several weeks at least. This was felt to be due to cross tolerance. Its effect pre- and postoperatively has been discussed from a small series of cases. The mode of administration is important, and it was found that small doses at frequent intervals were superior to large doses at less frequent intervals although the total twenty-four hour amount may have been approximately the same.

**Conclusion.** There is a definite place for the use of dilauid in the armamentarium available for the treatment of pain in cancer patients, but it must be used with the same caution as the other opiates.

#### CASE REPORTS

**CASE 1.** L. M. B. Aged thirty-eight.—Pondville No 2146. Carcinoma of both breasts with pleural metastases. Complained of pain in the chest. She was given codeine pantopon and morphine followed by excessive emesis in every instance. Dilauid was then given both by mouth and by hypodermic with the same results. This case demonstrates a definite idiosyncrasy to any type of opiate.

**CASE 2.** D. H. Aged seventy-six.—Pondville No 5506. Carcinoma of buccal mucosa operative excision under local anesthesia. Preoperative medication morphine grains  $\frac{1}{4}$  with atropine grains  $\frac{1}{150}$  at 3.30 P. M. one-half hour before operation. No unusual reaction was noted and operation was uneventful. At 7.30 P. M. the patient complained of

pain and was given dilauid grains  $\frac{1}{32}$  subcutaneously—twenty minutes later he developed marked cyanosis, respirations dropped to eight per minute, pupils were small, pulse was 100 and he could not be roused. Skin was warm and dry. Caffeine sodio-benzoate grains  $\frac{7}{16}$  was given in conjunction with oxygen-carbon dioxide inhalations with relief of cyanosis, rise in respiratory rate to 15 and an increase in depth. Condition fair for about one-half hour. Then he lapsed into profound cyanosis, respirations were shallow and decreased to an average of four per minute, pulse 88 and pupils were pinpoint. He did not respond to any type of stimulation including coramine and oxygen and carbon dioxide inhalation. Artificial respiration was necessary and was continued for one-half hour in spite of which death ensued. This is believed to be a case of respiratory paralysis initiated by the administration of dilauid.

**CASE 3.** G. A. M. Aged forty-nine.—Pondville No 7742. Inoperable carcinoma of the rectum with colostomy. The patient complained of tenesmus and pain in both legs. Dilauid suppositories (grains 1/24) were administered with complete relief of symptoms. Later he was given opium suppositories (grains 1) with only partial relief for a shorter period of time. Dilauid then was resumed with excellent results.

**CASE 4.** J. T. Aged seventy-three.—Pondville No 8527. Carcinoma of tonsil and soft palate. This patient developed a bad cough after x-ray treatment. It was especially severe at night. He was given codeine grains 1 with only partial relief and continued to have paroxysms. He was then given dilauid grains  $\frac{1}{24}$  which gave him complete relief and allowed him to sleep.

**CASE 5.** T. J. L. Aged sixty-two.—Pondville No 7443. Epidermoid carcinoma of left temporo-occipital region involving mastoid cells. The patient complained of pain in the left head and face. He was given codeine grains 1 and aspirin grains 10 for a period of three weeks on an average of three times daily. The latent period of action was between one-half and one hour. He was completely relieved for four hours. Dilauid grains  $\frac{1}{24}$  was then given by mouth for an average of four times daily for a period of six days. Relief was only partial for two and one-half hours although the latent period of action was only fifteen minutes. Dilauid grains  $\frac{1}{32}$  was then administered by hypodermic, with approximately the same results. Codeine and aspirin were then resumed with the same results as originally.

**CASE 6.** C. K. Aged fifty-nine.—Pondville No 5350. Carcinoma of right cheek involving nose, antrum and orbit. The patient complained of continuous sharp pain in that area. Previous to entry she took only aspirin. On admission morphine grains  $\frac{1}{6}$  hypodermically was found to be the effective dose. It was required on the average of four times daily and gave complete relief for four to five hours with moderate hypnosis and a latent period of one-half hour. Dilauid grains  $\frac{1}{32}$  was then given for six days with a daily average of four doses. The latent period was fifteen minutes and complete relief was obtained for four hours without hypnosis. In this case the effects of the drugs appeared to be about the same.

**CASE 7.** R. V. Aged forty-five.—Pondville No 6719. Carcinoma of cervix with frozen pelvis. There was pain in the pelvis and legs. Dilauid grains  $\frac{1}{24}$  was given orally with partial relief for two hours over a period of two weeks. Then codeine grains

1 with aspirin grains 10 was given with more satisfactory relief for three hours. Finally, dilaudid grains 1/24 with aspirin grains 10 was administered giving complete relief for four hours.

CASE 8 D B Aged twenty—Pondville No 6541 Lymphoblastoma involving skin, lymph nodes and lumbar vertebrae. The patient complained of generalized pain especially in the groins, chest and back, usually dull but intermittently sharp. Medication previous to admission was aspirin. On entry she was placed on morphine grains 1/4 subcutaneously every four hours over a period of a week. The latent period was thirty minutes, relief was complete for two and one-half hours with moderate hypnosis. Constipation was marked. She was then given dilaudid grains 1/20 by hypodermic for a similar period. The latent period was ten minutes with complete relief from pain until the next dose (i.e., four hours). There was no hypnosis and constipation was much relieved. Morphine was resumed, but the dose had to be given every three hours with not such satisfactory relief as with dilaudid and constipation again became severe.

CASE 9 M E Aged sixty—Pondville No 7480 Carcinoma of the cervix with frozen pelvis. The symptoms consisted of excruciating pain in the pelvis radiating down the legs. No medication before entry. On admission she was given codeine grains 1 with pyramidon grains 10 over a period of six days on an average of every three hours. Relief was partial for two hours. Dilaudid grains 1/24 was given by mouth for a daily average of every four hours over a week. The action was quicker and

she experienced complete relief for periods varying from four to six hours, but required a barbiturate in addition at night for sleep.

CASE 10 N B Aged forty seven—Pondville No 7299 Total hysterectomy for carcinoma of fundus. Anesthesia, ether by cone method. Preoperative medication dilaudid grains 1/20 with atropine grains 1/150. Fifteen minutes after administration the respirations decreased from an average of 20 to 8, and became very shallow with development of cyanosis. Stimulation with carbon dioxide and oxygen for cyanosis was necessary throughout the operation. Relaxation was not successfully obtained and the operative procedure therefore was made more difficult and was prolonged.

#### REFERENCES

- 1 Quoted from pamphlet distributed by Billhuber Knoll Corporation.
- 2 Report of League of Nations Committee of Experts. *Lancet* 2: 55 (July 4) 1931.
- 3 Alvarez, W C. Dihydromorphine hydrochloride (dilaudid, Billhuber Knoll) a powerful analgesic with some advantage over morphine. *Proc of the Staff Meet of Mayo Clin* 7: 480 (Aug 17) 1932.
- 4 Edly, N B. Dilaudid (dihydromorphine hydrochloride). *J A M A* 100: 1032 (April 1) 1933.
- 5 Menard O J. Dilaudid for intractable pain. *Lahey Clinic Number Surg Clin N A* 13: 727 (June) 1933.
- 6 Paine J R, Carlson H A and Wangersteen O H. The postoperative control of distention, nausea and vomiting. *J A M A* 100: 1910 (June 17) 1933.
- 7 David N A. Dilaudid and morphine effects on basal metabolism and other body functions. *J A M A* 103: 474 (Aug 18) 1934.
- 8 Stroud C M. The use of dilaudid in the pain of cancer. *J A M A* 103: 1421 (Nov 10) 1934.
- 9 Weum T W. The use of dilaudid in labor post partum and post operative. *The Journal Lancet* 54: 713 (Nov 15) 1934.

## MUSCLE GRAFTS FOR HEMOSTASIS IN GENERAL SURGERY

BY HOWARD M. CLUTE, M.D.\*

**F**REE muscle tissue has a marked ability to control the oozing of small vessels by hastening the formation of blood clot. Harvey Cushing<sup>1</sup> noted this quality in muscle and made use of it in controlling bleeding vessels during brain tumor operations. Victor Horsley<sup>2</sup>, however, is given credit by Cushing for his earlier use of this method which Cushing had independently worked out.

The application of this clot-hastening quality of muscle grafts was limited to the field of brain and cord surgery for many years and has not yet been adopted to any degree by general surgeons. Risley in 1917<sup>3</sup> published the results of experimental work in which he tried muscle fat and fascia as hemostatic agents to control bleeding from parenchymatous organs. He found that both fat and fascia have hemostatic effects, but that muscle tissue was most effective. Risley recommended the use of muscle tissue to control bleeding in wounds of the liver, kidney, and possibly of the spleen. Lawen<sup>4</sup> discussed the use of muscle grafts as hemostatic agents in 1912 and reported upon their use in two heart wounds in 1917.

Further application in surgery of this hemostatic property of muscle came from the urologists. Thus Ciminata<sup>5</sup> in 1924 and Joseph<sup>6</sup> in 1931 used the principle in the control of bleeding from nephrotomy wounds. In 1934 Ockerblad<sup>7</sup> published the results of experimental and clinical work in the use of viable muscle grafts for the control of bleeding from the parenchyma of the kidney. This procedure of Ockerblad's is new in that he uses *viable* muscle grafts rather than detached or dead muscle transplants as previous workers had done. He believes that maintenance of the blood supply in the muscle graft reduces the danger of infection in the wound.

Muscle grafts are not infrequently of great value to the general surgeon in the control of oozing in the operative field. It has been repeatedly demonstrated to me that troublesome bleeding may be readily stopped by the use of free muscle grafts. In my clinical experience it has seemed that bleeding is equally well controlled by either a free or a viable muscle graft. When, therefore, a viable muscle graft is readily made, as in the bleeding from thyroid remnants, viable grafts are used. If, however, the bleeding comes from an area in which there is no adjacent muscle for transplantation, a

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piece of free muscle has been used with equal success and with no later complications

Since my attention has been directed to the value of this method for the control of bleeding numerous opportunities have arisen for its use. The first was in a patient with a very large and badly adherent pyonephrosis. During the course of the removal of this kidney the vena cava was torn. With considerable difficulty the hole in the vena cava was caught with a fine silk suture. This did not control the oozing, and therefore a piece of muscle tissue was laid over the wound in the vein and held in place lightly with a suture (Fig 1). This effect-

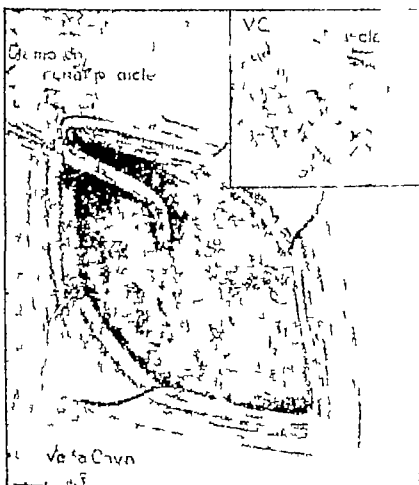


FIG 1. Longitudinal tear in the vena cava in the course of nephrectomy. Silk suture in the vein did not entirely control the bleeding. A small piece of muscle tissue lightly held in place gave complete control.

tively controlled the bleeding and the patient made an excellent postoperative recovery.

Bleeding from the cut surface of the thyroid gland may be very difficult to control. Usually this type of hemorrhage is readily managed by ligation of the superior and the inferior thyroid arteries combined with the pressure made by folding the thyroid remnant over to the midline. Occasionally the remnant of thyroid is so indurated that it cannot be folded over with sutures and the oozing cannot be readily controlled. It has been the practice in the past to control this persistent oozing by placing a cigarette drain down to the bleeding area. This, I believe, can be largely avoided by the use of both free and viable grafts of muscle tissue. The edges of the sterno-thyroid muscle are readily available for grafting into the remnant of thyroid gland. If they do not adequately and

completely control the bleeding, small free grafts from the adjacent sternomastoid muscle can be placed over the thyroid remnant (Fig 2). Usually one feels more secure if these grafts are held in place with fine catgut sutures. These grafts of muscle tissue have frequently made the field so dry that not even rubber dam drainage was necessary. No infection in these cases has been observed.

In one instance a free muscle graft proved very useful in controlling the bleeding from a tear in the internal jugular vein. Here, of course, control of bleeding is easier than in tears of the vena cava and if need be, one can ligate the entire vein above and below the injury. In this case, however, the jugular was very large

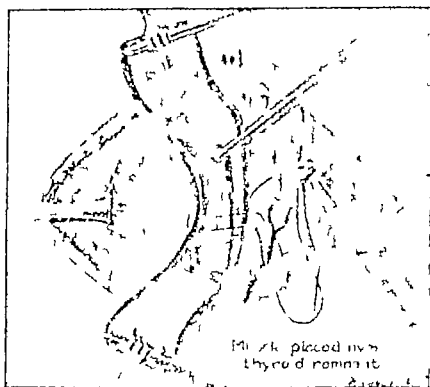


FIG 2. Thyroid remnant after thyroidectomy occasionally oozes persistently in spite of ligation of the major thyroid arteries. The border of the sterno-thyroid muscle serves as a viable muscle graft to control bleeding. A free muscle graft occasionally a necessary additional help and makes the use of packs and drains unnecessary.

and the tear was low and partly under the clavicle. Silk sutures were placed in the wall of the jugular and reinforced with a free graft of muscle tissue. The result was entirely satisfactory.

It is the experience of every abdominal surgeon that large oozing areas occasionally are present following the removal of certain pelvic tumors. In a recent case the patient had a very large right-sided intraligamentous ovarian cyst in which there was malignant degeneration. Following its removal persistent oozing arose from the layers of the broad ligament and the lateral wall of the pelvis. Attempts to catch individual bleeding points were unsatisfactory and the close proximity of the ureter made the procedure hazardous. Free muscle grafts were taken from the rectus muscle and laid in the bleeding area. (Fig 3). The peritoneum of the broad ligament was sutured over the bits of muscle and all bleeding was completely checked. Recovery was entirely uneventful.

Similarly, bleeding from the liver bed after cholecystectomy can be very neatly checked and large packs and drains avoided by the use of free muscle grafts. I have had no personal experience with the use of muscle tissue in ruptures of liver tissue, but both clinical and ex-

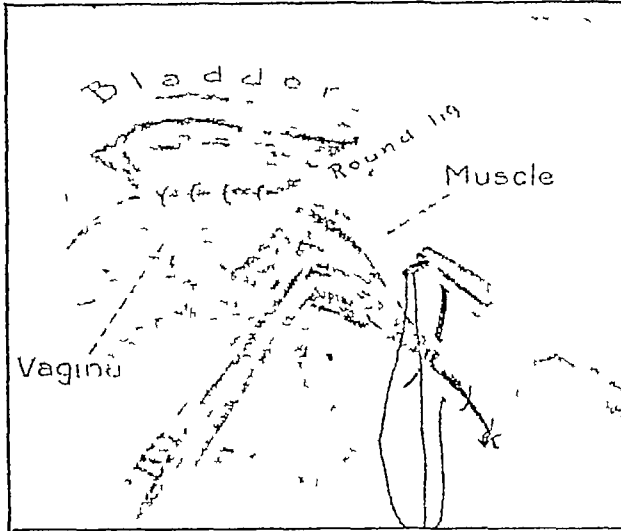


FIG 3 Troublesome bleeding in the pelvis not infrequently follows the removal of adherent tumors. Ties and ligatures may endanger the adjacent ureter. A free muscle graft will often serve admirably to control the oozing.

perimental evidence is at hand as to its usefulness in such cases.

It has been demonstrated by Ockerblad and others in animal experiments that viable muscle grafts are sufficient to control the bleeding from

an extensive nephrotomy wound. There may, no doubt, be occasional clinical situations where such a wound must be managed by this means, but these occasions will probably be rare. Usually the surgeon will insist that the control of the major portion of the bleeding in any operative field shall be by the orthodox methods already in use and only supplemented by the use of muscle grafts. Certainly in general surgery it would appear that the most helpful place for the hemostatic action of muscle grafts is in the small persistent ooze that defies control from the usual snap and tie method. Here it has a great deal of value and a field of application much wider than has previously been used.

#### REFERENCES

- 1 Cushing Harvey. The control of bleeding in operations for brain tumors with the description of silver clips for the occlusion of vessels inaccessible to the ligature. *Ann Surg* 54: 1 (July) 1911
- 2 Horsley Sir Victor. Note on haemostasis by application of living tissue. *Brit M J* 2: 8 (July 4) 1914
- 3 Risley Edward H. Haemostasis by interposition of muscle fat and fascia in parenchymatous organs. *Surg Gynec. & Obst.* 24: 85 1917
- 4 Joseph Eugen. Der Wert der Muskelimplantation in die Nephrotomie wunde besonders bei Einnierigen. *Deutsche Ztschr f Chir* 234: 817 1931
- 5 Ciminata A. Über die Resorption der Muskelamponade bei Nierenresektion. *Ztschr f urol Chir* 16: 37 1924
- 6 Ockerblad Nelse F. Some departures from beaten path in kidney surgery. experimental studies. *New Eng J Med* 210: 908 (April 26) 1934
- 7 Neuhof Harold. The Transplantation of Tissues. *Surgical Monographs*. New York and London D Appleton Century Co Inc. P 167 1923
- 8 Dixon O J. A departure in the management of thrombophlebitis of the sigmoid sinus. *Tr Sect Laryng, Otol. & Rhin. A. M. A.* 1932
- 9 Låwen A. Freie Muskelplastiken bei Hertz und Leber-nühten. *Verhandl d deutsch Gesellschaft f. Chir* 41: 47, 1912
- 10 Låwen A and Jurasz, A. Experimentelle Untersuchungen über die freie Übertragung von Muskelstücken aufs Herz und in einige andere Organe zum Zwecke der Blutstillung. *Arch f Klin Chir* 104: 955 1914

## THE NEW HAMPSHIRE MEDICAL SOCIETY

### AMEBIASIS IN A RURAL COMMUNITY\*

BY FRANK H. CONNELL, PH D †

IN discussing amebiasis, one finds himself immersed in a subject where loose use of terminology has been the rule rather than the exception. It will be time well spent, I believe, if we take a few minutes to define our terms, that we may all speak the same language.

As Craig (1934) points out, the term "amebiasis" really means an infection by any of the six species of amebae known to infect man. "Clinical amebiasis" on the other hand, means the invasion of the tissues of man by pathogenic or disease-producing amebae. The only ameba which actually invades tissues is *Endameba histolytica*. This invasion usually occurs in the mucous membrane of the large intestine, or much more rarely, through the lower portions of the small intestine.

The symptoms of such infections vary all the way from slight digestive disturbances to the most severe symptoms of amebic dysentery and liver abscess.

By the term, "amebic or tropical dysentery" is meant a bloody, mucoid diarrhea, caused by *Endameba histolytica*, as one of the manifestations of amebiasis. This is a most unfortunate choice of name. It has led to a confusion of ideas. In the first place, dysentery is only one of the many symptoms of amebiasis and a rare one at that. In the second place, amebiasis is not limited to the Tropics. The first recorded case, described by Loesch in 1875, was from Leningrad.

Let us consider the symptoms of amebiasis only in a very general way. My real purpose today is to acquaint you with the methods used in finding amebae, and to indicate their incidence in this region.

Dr French is much more experienced in the

\*Read at the Annual Meeting of the New Hampshire Medical Society at Manchester N H May 7 1935

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manifestations of amebiasis than I and it is to him that I refer you for a more detailed account of Clinical Amebiasis

Let me impress upon you that no one can carry the amebae without harm. It is impossible for *Endameba histolytica* to live except at the expense of host tissues. While considering the symptoms arising from amebiasis, let us keep always before us the fact that here as in all parasitic infections, we have essentially a host-parasite relationship, the parasite living not wilfully, but of necessity, at the expense of its host, and the host, using all means within its power to destroy or adjust itself to its unwelcome guest.

The appearance of clinical symptoms is, then, indicative of the direction in which the tides of battle are running. When the host is strong and healthy, repairing the damage as fast as it is made, a carrier condition results for the duration of which normally formed stools are passed which contain thousands of the infective cysts of the ameba. Truly healthy carriers are very rare, as most infected persons, well over fifty per cent, show some symptoms.

As listed by Craig, such symptoms include abdominal pain, abdominal distention, constipation, diarrhea, disturbances of appetite, loss of weight, headache, sleepiness, poor memory, muscle aches, nervous irritability, fever, poor circulation, sallow skin. It is this carrier condition which occurs most commonly in our latitude. For some reason, unknown to us, dysentery is more common in tropical countries than here. Symptoms appear, on the average, about one hundred days after infection, but amebae can usually be demonstrated in stools within ten days after infection.

There are three methods by which amebae may be demonstrated in feces, by culture, by concentration or by direct microscopic examination. Choice of methods depends largely upon conditions. If but one specimen can be examined, the culture method is undoubtedly the best, revealing, as it does, about ninety per cent of all infections in any given group after one examination. Examination of one specimen by the concentration technique will usually uncover about seventy per cent of the infections, while a single examination by the direct microscopic method reveals only about forty per cent of the infections in any one group.

In my opinion, diarrheic stools which contain only motile amebae, should be examined whenever possible by both the culture and direct microscopic methods. In cases where formed stools are being passed, we feel that one method is as good as another, if there is no limit upon the number of stools that can be obtained, or the amount of time that can be expended upon such work. One must keep in mind that envi-

ment seems to be of a cyclical nature, that thousands of cysts per gram of feces may be passed on one day and a very, very few on the next. If but a single examination can be made, we must then adapt our methods to the stool in order that the infection may not be missed if the cysts happen to be few in number.

The most important thing for clinicians to remember is that diarrheic stools should be examined almost immediately and formed stools as soon as possible, preferably within twenty-four hours. It may be of interest to you that in the handling of dysenteric stools, there can be no real danger of acquiring an amebic infection, as such stools contain only active or motile amebae, which are unable to pass the stomach. The mature infective cysts, found only in formed or semi-formed stools, are resistant to all ordinary germicides for considerable periods of time. The only adequate protection against them which has been found thoroughly practicable is a prolonged and thorough drying of the hands. Desiccation is one condition that cysts cannot stand. Ten minutes' use of a mechanical dryer will apparently kill cysts effectively.

The distribution of the causative organism of amebic dysentery, *Endameba histolytica*, is world-wide. Wherever men have looked for it, it has been found. The incidence is higher in unsanitized regions. The incidence varies among different classes of people, depending upon opportunity for infection, being highest among people of low economic status, travelers, and those living in institutions.

Picked at random from the literature we find the incidence in Java to be twenty-three per cent, New Zealand eleven per cent, the Mediterranean region seventeen per cent, Peking twenty per cent, England nine per cent, food handlers in Leningrad thirty-six per cent, Morocco forty per cent, house servants, Haiti fifty per cent, Lucania twenty per cent, United States about ten per cent.

During the past three years, I have had the opportunity to make fecal examinations on sixty-three persons, living in and around Hanover, most of them patients of Dr. Harry French. In addition, during the past semester, I have been attempting a survey of the seven hundred Dartmouth freshmen, in order that men bringing amebiasis to the college community might be discovered and treated, protecting them and their classmates from the infection. I had hoped to lay before you today the results of that survey complete. Making, as we did, a permanent slide for direct microscopic examination from each of two specimens from each student, the work of the survey thus entails the examination of some fourteen hundred slides. To date, I have finished half of them. The figures which I am about to show you are those of infections found in that part of the survey



now completed, plus a certain number found in the rest of the class while destaining slides

In this work we have had the complete cooperation of Dr Howard Kingsford, the Medical Director of the College, and Dr Harry French, who has treated all carriers. Without their help, the survey would have been useless from a practical viewpoint and impossible of completion. I also wish to acknowledge about one thousand hours of technical assistance from students made possible by federal aid under the FERA.

Following are the preliminary results of our survey

TABLE 1

Townpeople examined since records were started	63
Infected with <i>Endameba histolytica</i> .....	0
<i>Endameba coli</i> .....	7
<i>Endolimax nana</i> .....	3
<i>Dientameba fragilis</i> .....	1
<i>Giardia lamblia</i> .....	2

TABLE 2

Students to be Examined (See above).....	700
<i>Infections with</i>	
<i>Endameba histolytica</i> .....	6
<i>Endameba coli</i> .....	76
<i>Endolimax nana</i> .....	59
<i>Iodameba</i> .....	2
<i>Giardia</i> .....	14
Liver Flukes ( <i>Clonorchis</i> ).....	1
Whip worm.....	2

## CONCLUSIONS

In addition to its practical aspects, the finding of infections among students, the purpose of our survey is to show the value of routine fecal examinations in hospitals and other institutions, and to reiterate, what we all know, that amebiasis is not limited to the Tropics, and that carriers of amebae sit among us in this room.

In spite of articles in our journals, the detection of amebic infection remains the province of trained microscopists. The average physician has neither the time for the constant practice nor the equipment necessary to make accurate fecal examinations in an economical fashion.

## REFERENCE

- Craig C F (1935) Amebiasis and Amebic Dysentery. Thomas Baltimore

## DISCUSSION

PRESIDENT LORD I wish to thank Dr Connell for his fine paper. I will now call upon Dr Norman W Crisp of Nashua to discuss this paper.

DR NORMAN W CRISP *Mr President, Ladies and Gentlemen*—There is no question but that this paper represents much work. Just the fact of his mention of 1400 (?) stools is enough to scare most anybody.

There have been papers in the literature for years concerning the occurrence of amebic dysentery in the north temperate zones, but it is only since the recent Chicago epidemic that the doctors have been active. If statistics are right as to the incidence of the disease in the United States of five

to ten per cent, there is more potential danger than we have figured.

Diarrhea and the symptoms described by Dr Connell should cause us to search for the parasite, for the diagnosis rests upon the identification of that parasite. Unfortunately, only a relatively few people are competent to identify the *Endameba histolytica*.

In the south, proctoscopic examination and recovery of the ameba from the base of the ulcer constitute the routine procedure of choice over stool examinations. The punched out, discrete ulcers, especially at the valve margins, are pretty suggestive of amebic ulcerations.

The mucosa between the ulcers is normal. Such is not the case in that loathsome disease, chronic ulcerative colitis, caused by the diplococcus of Bar gen.

Amebic colitis does not give diagnostic roentgen characteristics. X-ray will however, rule on the presence or absence of other types of colitis and carcinoma.

There is a satisfactory complement fixation test (Craig), but the antigen is too hard to prepare to permit of practical use. When such a test becomes practical, our problem in diagnosis will be easier.

The response of this disease to treatment is usually rapid and fairly good. Surgical drainage of liver abscesses is infrequently necessary. The universal treatment is, of course, emetine and arsenic.

The importance of differential diagnosis, from acute conditions in the abdomen, hardly needs to be mentioned. Yet in a recent epidemic, all the fatal cases of amebic dysentery had been operated upon. This disease is another straw for us to carry in our thoughts.

PRESIDENT LORD I will call upon Dr Harry T French of Hanover to continue this discussion on Dr Connell's paper.

DR HARRY T FRENCH *Mr President, Ladies and Gentlemen*—This survey of Dr Connell's is very timely, in view of the Chicago epidemic of 1933, in which something like eight hundred cases of amebic dysentery developed, with seventy deaths reported from those cases.

There are probably at least six cases that show no symptoms to one that does, it means that the number of cases from the Chicago infection is probably several thousand rather than eight hundred.

The survey of the United States, as Dr Crisp and Dr Connell pointed out, shows an incidence of any where from five to ten per cent of amebic carriers. And these carriers pass cysts that are thick walled and very resistant to any method of killing. They are resistant to heat and to practically all of the chemical disinfectants and they will live for long periods where conditions are favorable.

In the Chicago epidemic, we know that the spread was probably due to a water borne infection, due to contamination and with that the contamination of the food supplies. It is possible that it was also spread through the food handlers, as a survey showed several hundred of the food carriers in Chicago were infected with the disease.

As Dr Connell has pointed out, there is a danger in the spread of this disease, and the contagion comes not from the acute dysentery cases, as practically no cases will result from these people, but from carriers.

The treatment that we used in connection with the carriers we found in the college group was carbosone given in 0.25 Gm doses twice a day, with intramuscular injections of one-half grain of emetine twice daily until ten grains had been given. This treatment produced stools that were free from the cysts and amebae, and have continued to remain free in further tests.

There is one danger that I think should be spoken of in connection with the use of emetine. It is apt in overdoses to produce peripheral neuritis and involvement of the heart muscles leading to fatalities.

Another thing in connection with emetine in acute cases is that not a sufficient amount of it will be given to clear the case entirely and the infection may become resistant to the action of emetine. It is not a good drug on which to rely in the treatment of carriers for this reason.

## MISCELLANY

### PERSONALS

Dr and Mrs Clifton S. Abbott arrived in New York July 18 after a trip of several weeks in Europe. During their trip they visited Lisbon, Gibraltar, Algiers, Palermo, Naples, Rome, Venice and climbed the Jungfrau in Switzerland before going on to Lucerne and Paris.

Dr Robert J. Graves of Concord was elected President of the New Hampshire Surgical Club at the thirty-eighth annual convention held at the Sunnyside Hotel, Rye Beach, September 7.

Dr and Mrs. Wallace H. Tarbell of Contoosook have recently returned from a two week vacation on Cape Cod.

Dr Clarence E. Butterfield of Concord is convalescing from a recent operation.

Dr Charles W. Adams of Franklin was recently elected Chairman of the Central New Hampshire Savings Bank Association. This election automatically makes him Vice President of the New Hampshire Savings Bank Association.

### HOSPITALS

The annual drive for the benefit of the Memorial Hospital in Conway was held August 15 to 18 inclusive.

Nearly 400 persons including several from Massachusetts, Maine, and other New England states were conducted August 8 on an inspection tour of the Laconia Hospital, the Nurses Home and the "Cottage" purchased by the hospital two years ago and within recent months entirely renovated for use as an annex to the Nurses home. Dr Melba Stewart Perley, roentgenologist and pathologist at the Laconia Hospital, took the visitors through the laboratory, x-ray and treatment rooms.

### MEETINGS

Members of the State Board of Welfare and Relief met with physicians of Belknap County Wednesday July 18. Representative Allan M. Wilson, Chairman of the Board, discussed with the members the subject of medical charges in the county.

The annual meeting of the New England Surgical Society was held at Manchester on Friday September 27 and Saturday September 28. Operative clinics took place at the Elliott Hospital and scientific papers were given in the ballroom of the Hotel Carpenter which served as headquarters during the meeting. The annual dinner was held on Friday evening at the Manchester Country Club.

## NURSES

The quarterly meeting of the New Hampshire Graduate Nurses Association was held at the Elliot Community Hospital, Keene, N. H. September 11. Dr. Hugh Galbraith of the New Hampshire State Hospital spoke before the League of Education section on "Mental Hygiene from the Viewpoint of the Nurse." Mr. James Hamilton, Superintendent of the Mary Hitchcock Hospital in Hanover addressed the general session on Group Hospitalization.

## CLINICS

A Committee has been formed to start a Birth Control Clinic which will be called Concord Maternal Health Center. It was hoped that this would be started about the first of October. The purpose of this clinic is to assist those financially unable to have private physicians. Dr. Ursula Sanders is President. The other doctors serving with her are Robert O. Blood, Warren Butterfield, Carl H. Dahlgren, Thomas M. Dudley, Donald G. McIvor and James W. Jameson.

## RECENT DEATHS

**SPEAR**—FRANKLIN E. SPEAR, M.D., practicing physician in Woodsville, N.H., for twenty-one years died after a short illness on September 5, 1935.

Dr. Spear was born July 18, 1873 in Charlotte, Vermont. He attended the academy at Shelburne, Vt., and then the University of Southern California. He secured his medical degree at the University of Vermont and did postgraduate work at the Mayo Clinic. He first practiced in Lisbon, N.H., and then moved to Woodsville where he enjoyed an extensive practice until the time of his death.

On June 27, 1907 Dr. Spear married Maudie Wilcox Gibson who survives him together with two sons, Franklin E., of Washington, D.C. and Edgar G. of Woodsville. He is also survived by five brothers.

Dr. Spear was a member of the American Medical Association, New Hampshire and Grafton County Medical Societies and the New Hampshire Surgeons Association. He was also a member of the Congregational Church and of the American Legion. During the World War he volunteered for service and was appointed first lieutenant in the Medical Corps, September 13, 1918. On November 9 he entered service at Camp Greenleaf, Fort Oglethorpe, Ga., with Co. 12, 3rd Battery and received his discharge December 21, 1918.

**GARLAND**—WILLIAM R. GARLAND, M.D., one of the leading physicians and surgeons of that section died at his home in Plymouth, N.H., on June 5, 1935 after a long illness.

Dr. Garland was born on March 22, 1865 a son of George W. and Eliza (Batchelder) Garland at Thornton, N.H. He received his early education

in the public and high schools of Plymouth and Holderness, later attending the New Hampton Institute and graduating from that school in 1883. He then attended Dartmouth Medical School, graduating in 1885. He took postgraduate courses at Boston and San Francisco.

He began his practice in Lancaster, remaining there but a short time. He then removed to Camp ton where he remained until 1895. At that time he went to Plymouth, opened a new office and began building up what proved to be a successful practice.

He served as medical referee for Grafton County for a time and was president of the Plymouth Hospital Association.

He held membership in the American Medical Association, New Hampshire Medical Society, Grafton County Medical Society, Eastern Society of Anesthesia of New Hampshire, International Anesthesia Research Society and was a contributing member of Current Research in Anesthesia and Analgesia.

Besides his widow, he is survived by a daughter, Mrs. Maurice Morrill, of Bristol.

## NEW HAMPSHIRE SURGICAL CLUB

### CARCINOMA OF THE BREAST IN NEW HAMPSHIRE\*

#### A Preliminary Report

BY JOSEPH C. DONCHESS, M.D.†

**M**ALIGNANT breast tumors have received an increasing amount of attention in recent years. Great progress has been made in the stimulation of propaganda to the laity for the purpose of bringing early lesions to the foreground. However, since extensive tumor masses of the breast with metastases still come into our hospitals, one may frankly conclude that our education of the laymen and even of some physicians is still far from efficient. MacCarty<sup>1</sup> states that carcinoma is certainly not being diagnosed early despite the repeated pleas of surgeons and the campaigns of various medical associations. Any work, therefore, however small, that is done to inform and to safeguard the patient adds to the impetus which may eventually decrease the death rate toll in carcinoma of the breast. That this painstaking effort on the part of many authors can and should show good results is borne out in the fact that early, small lesions without metastasis give 96 per cent cure when these tumors are completely removed surgically.<sup>2</sup>

The rôle of the pathologist goes hand in hand with that of the surgeon. Some lesions even when grossly exposed may look perfectly harmless, while under the microscope they may have potentialities of a highly malignant tumor. It is not uncommon to find a small mass in the breast which may show extensive metastasis. Consequently one may conclude that no tumor, however small, should be disregarded by the physician or surgeon without excision and biopsy.

In this report, which includes all breast tu-

mors sent to the Pathological Laboratory at Hanover from 1898 until July 1934, there were 1728 specimens of which 810 were malignant and 918 benign. Each slide available was carefully examined under the microscope. It was remarkable to note the preservation of the cellular structure and color stain of slides nearly thirty-seven years old. Perhaps, at this time, it would be well to honor and give credit to Dr. H. N. Kingsford whose diligent work made this report possible. Breast tumors were sent in from many towns throughout the State of New Hampshire. Data concerning each individual case were incomplete in many instances and for this reason the present report includes only those data presented in the three tables to which we shall refer later.

An attempt was made to divide the cases of carcinoma of the breast into three groups in accordance with their histological structure regarding differentiation, namely, carcinoma simplex, adenocarcinoma and colloid carcinoma (see table 1). Tumors which showed the presence of solid masses or cords of cells without the presence of definite glandular formation are classified as carcinoma simplex. In this group were included all gradations between scirrhus and medullary types. Scirrhus and medullary carcinoma, as reported in the literature, occur in about equal proportions. No definite dissimilarity has been established between the two types concerning metastasis or prognosis, except at extremes of classification. Some investigators believe a soft cellular mass recognized as medullary tumor is potentially more malignant than one of more firmness and fibrosis. Greenough<sup>3</sup> and Haagensen<sup>4</sup> have shown that fibrosis, lvalization and lymphocytic infiltration have no relation to prognosis in breast carcinoma. Many discrepancies by various men have arisen from

\*Presented at the Thirty-Seventh Semi-Annual Meeting of the New Hampshire Surgical Club in Manchester, N. H., April 23, 1935.

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the fact that very often a specimen may well be placed in the medullary or the scirrhous group depending on the observers' viewpoint. Grossly carcinoma simplex may be a small or large lesion, it may be freely movable or adherent to the skin or thoracic cage. Not uncommonly there may be bleeding of the nipple and in some cases retraction of the nipple with or without

and ducts while ten cases were purely ductal in type. The average age of the acini duct type was found to be 54.2 years and for the ductal type 58.2 years. The youngest age for both types was thirty-six years.

The average duration of the tumor mass before operation for the first group was 9.25 months and for the ductal type 7.7 months.

TABLE 1  
MALIGNANT TUMORS OF THE BREAST

Cases	Num ber of Cases	Aver age Age (Yrs)	Old est Age (Yrs)	Young est Age (Yrs)	Average Duration of Tumor (Mos.)	Duration of Tumor Mass (5 Yrs or More Not Included in Average Duration)			
						No 3-5 Yrs	No 6-10 Yrs	No 11-15 Yrs.	No 16-25 Yrs
Classified Group									
Carcinoma Simplex (Acinar and Ductal Type)	746	54.2	88	36	9.25 Mos (1 Wk. 24 Mos)	23	8	5	1
Carcinoma Simplex (Ductal Type)	10	58.2	71	36	7.7 Mos (1 Wk. 2½ Yrs)				
Adenocarcinoma	25	54.7	77	24	9.3 Mos. (1 Wk. 24 Mos)				
Colloid or Gelatinous Carcinoma	3	58.0	83	42	26.3 Mos				
Unclassified Group									
Papillary Cystadenoma, Malignant	12	55.0	77	35	6.9 Mos (1 Wk 12 Mos)				
Fibrosarcoma	5	49.0	63	30	6.25 Mos (3 Wks 12 Mos)				
Paget's Disease	3	48.5	57	40	22.3 Mos.				
Basal Cell Carcinoma	1	34.0							
Epidermoid Carcinoma of Nipple	1	69.0			16 Mos.				
Epidermoid Carcinoma of Sweat Gland Type	1	44.0							
Angiosarcoma	1	10 Mos.			2.5 Wks				
Lymphoblastoma	1	51 Yrs.			1 Mo				
Hemangio-endothelioma	1	7 Mos. (Male)							

ulceration of the skin. On section either glandular or fibrous tissue predominates. Almost always foci of degenerative necrosis are noted. Metastasis may occur very early or late. Lesions in the upper inner sector of the breast may involve the supraclavicular and mediastinal glands before they involve the axillary lymph nodes, in which case expectancy of cure is hopeless. Shields Warren and Witham have shown that metastasis occurs twice as frequently in the distant as it does in the regional nodes.

The diagnosis of carcinoma simplex was made in 766 cases, 746 of which involved both acini

and ducts. Thirty-six cases carried a mass three to fifteen years, while one had the mass twenty-five years before operation. From this, one might surmise that a benignancy eventually developed malignant transition.

In the next group that more highly differentiated than carcinoma simplex, were placed the adenocarcinomas, which showed at least one-fourth of new growth with definite alveolar or glandular arrangement. There is a variable amount of stroma found in adenocarcinoma. Grossly, this tumor may not be unlike carcinoma simplex, but on section adenocarcinoma usually appears more cellular. Metastasis is

later than that of carcinoma simplex, thereby indicating a better prognosis. The secondary glandular involvement in this tumor frequently shows an absence of alveolar arrangement.

Only twenty-five of our cases were classified as adenocarcinoma. The average age was 54.7 years, the youngest was twenty-four years of age. The average duration of the tumor mass was 9.3 months.

In the third group were placed the highly differentiated group of colloid or gelatinous carcinoma, which is recognized by the secretion of a great amount of mucinous material. Grossly the local lesion is usually large and on section shows a variable amount of clear jelly-like material. Metastasis is usually late, the prognosis being much better than in either of the first two groups. This tumor occurs in a small percentage of all cases. Lee, Hauser and Pack<sup>6</sup> found colloid carcinoma occurs in about 1 per cent to 2 per cent of all carcinomas of the breast.

In this series three cases or 0.3 per cent of all malignant tumors were classified as colloid carcinoma. The average age was fifty-eight years and the average duration of the tumor mass was 26.3 months.

In addition to these groups there were twenty-six cases that could not be classified (see table 1), these included (1) malignant papillary cystadenoma, twelve cases, (2) fibrosarcoma, five cases, (3) Paget's disease, three cases, (4) basal cell carcinoma, one case, (5) epidermoid carcinoma of nipple, one case, (6) epidermoid carcinoma of sweat gland type, one case, (7) angiosarcoma, one case, (8) lymphoblastoma, one case, and (9) hemangio-endothelioma one case.

No attempt was made in this study to grade these malignant breast tumors. Hansemann's<sup>7</sup> conception of anaplasia expressed in 1902 instituted the modern trend of grading tumors according to their degree of malignancy. Broders<sup>8</sup> was one of the first to attempt a system of grading. Greenough<sup>9</sup> and more recently Haagensen<sup>4</sup> have made extensive studies in an attempt to grade tumors of the breast in accordance with prognosis. The grades of low, medium and high were selected. Their statements and reports show that there are so many sources of possible inaccuracies that at best, any system of grading of breast tumors by the degree of anaplasia is roughly an approximation and is of no practical value in determining prognosis. Plaut<sup>9</sup>, Reimann<sup>10</sup> and Shields Warren<sup>5a</sup> are of the opinion that histologic characteristics of the breast carcinoma are of little or no prognostic significance. Some observers believe that whenever a breast tumor shows a large number of abnormal mitotic figures, metastasis is more rapid and the prognosis very poor. In general, the less differentiated carcinoma simplex is more grave than adenocarcinoma or colloid carcinoma.

The number of right breasts is equal to the number of left breasts involved. That frequency of malignancy is more apparent in females whose breasts have never been nursed is evident in a report of Daland<sup>11</sup> who found seventy-one out of eighty-three carcinomas occurring in "unused breasts." Incidentally, the American Indian<sup>12</sup> shows no trace of carcinoma of the breast.

Radical surgical excision offers the treatment of choice of breast carcinoma. "Conservative" operations, such as simple radical amputation, on early cases yield better results than extensive operation on well-advanced cases. Five year cures with lymph node involvement average about 26 per cent to 46 per cent with different observers, while five year cures without lymph node involvement average about 71 per cent. Harrington and Judd<sup>13</sup> report 55 per cent of their cases without node involvement living ten years after operation. Some authors report twenty or more year cures. We have one patient living twenty years after operation. Different authors report 40 per cent to 80 per cent lymph node involvement at time of operation. Involved nodes may not always be palpable through the axilla, and likewise enlarged nodes do not always indicate metastasis.

Prognosis of carcinoma in the young is about the same as in those of the middle age<sup>14, 15</sup>. Average life expectancy of untreated cases is three years.

Every breast tumor, however benign it may seem to the examiner, should be regarded as malignant until proved otherwise.

In this group there were 918 benign lesions or 53.2 per cent (see tables 2 and 3), which only slightly exceeded the malignant tumors which was 46.8 per cent. These were divided into four major groups: (1) fibro-epithelial tumors 266 cases, (2) hyperplasia and fibrosis 367 cases, (3) chronic inflammation 271 cases, and (4) non-indigenous tumors 4 cases.

Benign tumors not uncommonly develop malignant traits. Not infrequently one sees transition of fibro-adenoma to malignant fibrosarcoma, also, intraductal papilloma are believed to develop into malignant papillary cystadenoma. Tietze<sup>16</sup> and J. C. Warren<sup>17</sup> believe that carcinoma develops in 10 per cent of cystic disease of the breast. Dietrich<sup>18</sup> found 233 cases of cystic fibrosis in 500 cases of cancer of the breast.

In this series of tumors were included twelve cases of male breast tumors ten of which were benign and two malignant. The latter included one case of carcinoma simplex and one case of hemangio-endothelioma in an eleven months' old child. The remaining lesions were all of the female mammary gland.

#### SUMMARY AND CONCLUSION

1. A study of a group of breast tumors occurring over the past twenty-six years in the State of New Hampshire was made. One thou

TABLE 2  
BENIGN TUMORS OF FEMALE BREAST

	Num ber of Cases	Aver age Age (Yrs.)	Old est Age (Yrs.)	Young est Age (Yrs.)	Average Duration of Tumor Mass (Mos.)	Duration of Tumor Mass (3 Yrs and Over Not Included in Average Duration)			
						No 3-5 Yrs	No 6-10 Yrs	No 11-15 Yrs.	No 16-30 Yrs
<i>Fibro Epithelial Tumors (Fibrous Type)</i>									
Intracanalicular Fibro-adenoma	153	34.1	70	16	6.3 Mos. (1 Wk. 2 Yrs)	6	5		2
Pericanalicular Fibro-adenoma	34	31.8	68	10	9.2 Mos. (1 Wk 2 Yrs)	1	2		1
Intra and Pericanalicular Fibro-adenoma	35	30.0	44	18	8.2 Mos. (1 Wk. 2 Yrs)	3			
Fibro-adenoma	3	38.0	53	?	2 Wks				
Fibroma	14	47.2	79	14	6.3 Mos (3 Mos 1 Yr)	2			
Myxofibroma	1		*4						
<i>Fibro Epithelial Tumors (Epithelial Type)</i>									
Adenoma	18	38.1	76	5	9.6 Mos (2 Wks 2 Yrs)				
Adenocystoma	2	53.5	63	44	(1.3 Wks) (1.3 Yrs)				
Papillary Cystadenoma Benign	5	35.4	65	30	1.6 Mos (1 Wk. 3 Mos.)	1			
Intraductal Papilloma	1		63		(6 Wks)				
<i>Hyperplasia and Fibrosis</i>									
Hyperplasia	10	48.1	77	21	10 Mos (1 Mo 2 Yrs.)				
Hypertrophy	4		19	13	1 Yr				
Chronic Cystic Mastitis	214	42.9	72	2	3.86 Mos (1 Wk. 2 Yrs)	6	2		2
Fibrosis, Local	118	41.1	76	20	6.8 Mos (1 Wk. 2 Yrs)	2	1		1
Fibrosis Diffuse	21	31.1	47	4	20.9 Mos (2 Wks 2 Yrs)	1		1	
<i>Chronic Inflammation</i>									
Chronic Mastitis	206	38.9	81	3	8.2 Mos (1 Wk 2½ Yrs)	2			
Chronic Suppurative Mastitis	8	37	51	23	2.5 Mos (6 Wks 4 Mos.)				
Abscess with Chronic Inflammation	13	41.3	62	23	4.4 Mos (2 Wks 2 Yrs)	1		2	
Simple Retention Cyst	34	41.9	69	17	5.55 Mos (3 Wks 2 Yrs)				
Hematoma	3		78		7 Mos				
Hemorrhagic Cyst	1		35						
Traumatic Fat Necrosis	2		49	11	1.4 Yrs 1.4 Wks				
Tuberculosis	4		73	40	6 Mos				
<i>Non Indigenons</i>									
Lipoma	2		59	44	4 Yrs				
Lipomatosis	2		72	54	3 Wks				

TABLE 3  
BENIGN LESIONS OF THE MALE BREAST

Cases	Number of Cases	Oldest Age (Years)	Youngest Age (Years)	Duration of Tumor Mass
Intracanalicular Adenofibroma.....	1			
Papillary Cystadenoma, Benign.....	1	78		5 yrs
Hyperplasia, Ducts.....	2	70	13	6 mos
Chronic Cystic Mastitis.....	1	25		2 yrs
Fibrosis, Local.....	3	62	23	6 mos
Gynecomastia.....	1		16	
Chronic Mastitis.....	1	31		

sand seven hundred and twenty-eight specimens were examined of which 810 were malignant and 918 benign

2 The malignant tumors were classified according to their differentiation into 1 Colloid carcinoma 2 Adenocarcinoma. 3 Carcinoma simplex

3 No attempt was made to grade these tumors for this report

4 Benign lesions were briefly discussed and presented in outline form.

5 Only twelve of the lesions occurred in the male breast.

## REFERENCES

- MacCarty W C The cancer problem today J A. M A 103: 957 (Sept. 29) 1934
- Scott, A C Jr Five year cures of cancer of the breast and of melanoma Surg Gynec. Obst 60: 465 (Feb) 1935
- Greenough R. B Varying degrees of malignancy in cancer of the breast. J Cancer Research 9: 453 1925
- Haagensen C D The bases for the histologic grading of carcinoma of the breast. Am. J Cancer 19: 285 (Oct.) 1933
- Warren Shields, and Witham E M. Studies on tumor metastasis 2 The distribution of metastases in cancer of the breast. Surg Gynec. Obst. 57: 81 (July) 1933

- 5a. Personal communication
- Lee B J Hauser H and Pack G T Gelatinous carcinoma of the breast Surg Gynec. Obst. 59: 841 (Dec) 1934
- Hansemann D P Studien über die Spezifität, den Altruismus und die Anaplasie der Zellen mit besonderer Berücksichtigung der Geschwülste Berlin A Hirschwald P 93 1893 Also —Die mikroskopische Diagnose der bösartigen Geschwülste. Berlin A Hirschwald. P 254 1902
- Broders A. C Squamous-cell epithelioma of the skin. Ann Surg 73: 141 1921
- Plaut A. The relation between the histologic picture and prognosis of tumors Arch Path 3: 240 (Feb) 1927
- Reimann S P The issues at stake in the grading of tumors Arch Path 8: 803 1929
- Daland E M Cancer of the breast Am J Cancer 15: 236 (July) 1931
- Ill E J Cancer of the breast. Ann Surg 95: 401 1932
- Harrington S W and Judd E S Carcinoma of the breast. Surg Gynec. Obst. 58: 440 (Feb) 1934
- Lewis Dean and Rienhoff W F Jr A study of the results of operations for the cure of cancer of the breast. Ann Surg 95: 336 (March) 1932
- Clayton Janet E Lane Public Health and Medical Subjects No 51 Ministry of Health London, 1929
- Tietze A Ueber das cystadenoma mammae (Schimmelbusch) und seine Beziehungen zum Carcinom der Brustdrüsen. Deutsche Ztschr f Chir 56: 512 1900
- Warren J C The surgeon and the pathologist A plea for reciprocity as illustrated by the consideration of the classification and treatment of benign tumors of the breast. J A. M A. 45: 149 (July) 1905
- Dietrich A Cystenmamma und Krebs ihre Erkennung und Bedeutung Med Welt. 6: 797 1932

CONTINUED REEDUCATION OF THE  
PHYSICIAN

From time to time legislative measures have been proposed requiring periodic examinations of practicing physicians and surgeons, the purpose being to determine by some form of qualifying procedure whether the practitioner had kept apace with the continued progress of medical knowledge That such a requirement would be difficult of operation is obvious, as it would entail the establishment of special examining boards capable in each instance of properly fulfilling the functions of such qualification

It is therefore fortunate that the medical profession has assumed as its obligation the continued postgraduate education of the physician The organization of medical societies and the spread of medical journalism have been important factors in this process of reëducation With increasing facilities of transportation, graduate courses have been de-

veloped at nearby medical schools and, through the medium of extension courses, postgraduate instruction has been made available for practicing physicians without seriously interfering with their regular practice

It is to be hoped that the tendency toward specialism in the future will be confined to physicians who conform to such preparation and qualification as will justify their certification as specialists The real need of this day is the properly trained family doctor who shall be able to care for the 85 per cent of all illness that does not require the service of the specialist in a limited field For the family doctor of the twentieth century the refresher courses that are arranged convenient to his territory will have a special appeal The real attraction of a medical career at all times has been the urge and opportunity for continued study, and it is this quality that truly exemplifies the ideal practitioner of medicine—*Federation Bulletin*, September 1935

## EVOLUTION OR REVOLUTION\*

BY ROY J. WARD, M.D.†

ONE hundred and forty years ago next month Dr Babbitt gave the first of the annual orations before this Society. Since that time many distinguished men have appeared as orators and it is with considerable trepidation that I attempt to occupy a rôle with such company. The subjects, which have been discussed during these one hundred and forty years, have varied much. Many of them were about the social relations of the physician to the community. Some were epoch making in meeting the medical problems of the day, others have been historical in nature and, had they been preserved, would have been a veritable mine of information for the future historian of Worcester County medicine.

Since the appearance of the report of the Committee on the Costs of Medical Care there has been the most acrimonious debate, on a purely professional problem, which has been noted for many a generation. In fact the physician, in his relationship to social welfare, has been, so to speak, "put on the spot."

Many plans have been suggested to give adequate medical care to all classes of people. The methods which have been in vogue in Germany since 1883 and in Great Britain since the war have been studied carefully. Congress is considering, at the present time, a bill to provide federal subsidies to the states for maternal welfare, child welfare, and sickness insurance. Many of the states have similar bills before their legislatures.

The Bureau of Medical Economics of the American Medical Association, the Julius Rosenwald Fund of Chicago, the Milbank Memorial Fund of New York and the newly established Department of Medical Economics of the Harvard Medical School are all studying the problem which these Congressional and State bills propose to solve.

Many medical societies in Texas, California and Michigan have plans, actually in use whereby the profession controls forms of health insurance and the payment of medical costs. They have elaborate organizations for studying the social need and responsibilities of the individuals in the low income groups and their ability to pay part or all of the costs. These plans have been advanced to forestall the entrance of politics into a purely professional problem.

Dr Ernest L. Hunt has called to my attention a new method of financing the expense of sickness which I have never before seen sug-

gested. The plan is to have savings banks or organize Health Clubs patterned after Christmas Clubs. Such clubs would obviate many of the objections which are inherent in compulsory health insurance. Some control over funds raised for this purpose should be maintained by the bank in order that they should not be dissipated for luxuries. As an inducement hospitals and physicians should offer a discount to those who may pay from such funds. Under such a plan the individual has no chance of losing and has everything to gain. This plan would tend to even up the unequal distribution of money between the luxuries and the necessities of life.

One of our members, Dr Gilbert Haigh, has worked out a plan which has been submitted to several legislatures. He proposed putting the entire profession in all of its branches under state control but this plan was so all inclusive that it gained few supporters. He antedated by several years that which may be forced upon us.

With these few exceptions, however, most of the activities of organized medicine have been directed in opposition to any and all plans which have been brought before Congress and many of the State Legislatures. In some instances general policies have been suggested. This attitude of organized medicine has not been constructive and often it has been destructive. The *New England Journal of Medicine* recently said, "The medical profession can supplement and guide—it cannot ignore—public opinion." Antagonism will only bring our profession to the point where the British physicians were when Lloyd George forced upon them a plan for socialized medicine. It was only after a hard battle that any modification of that act was obtained. William Hard, journalist, of Washington says, "Legislation for government compulsory health insurance is inevitable in Washington." He sends this word, "My dear doctors, those of you who are not converted to the idea, remember that when a thing is inevitable in Washington it is smart to jump in and swim along with the current and you may be able to help it along your way a bit."

The history of the growth of state medicine shows that it has been put forward as a stop-gap to an oncoming revolution. Bismarck, in Germany, first suggested this method of appeasing a rapidly growing dissatisfaction with social conditions among the poorer classes. The same background was present in England when Parliament crowded state medicine upon the profession. Evidently this is one of the reasons that Washington is now forcing this subject to the front i.e., to forestall social unrest.

\*The annual oration delivered at the Annual Meeting of the Worcester District Medical Society May 8, 1935.

†Ward, Roy J.—Visiting Physician, Worcester City Hospital. For record and address of author see "This Week's Issue," page 171.



Many of us who have watched the development of and the increasing interest in some form of state medicine feel that we are fast approaching the time when the entire background of the practice of our profession is to change. It behooves us to develop some concrete program of our own before a political program is forced upon us. The first step in such a plan is to develop a community of interest among the members of this society and I trust that the suggestions advanced before us last December by Dr. William Lynch will bear fruit. The Worcester District Medical Library, Inc., with new quarters in Town House will be of great help in this. I anticipate that the younger members will show the community that the study of medicine costs the most in time and money of any of the professions and, in the words of Dr. Channing Frothingham of Boston, "while good medical service is expensive, poor medical service at any price is more expensive."

Most of the plans for meeting the cost of medical care which have so far been suggested by medical societies have some form of contributory sickness insurance in them and concern only people of the low income groups. Very little attention has been given to the group with no income, i.e., the indigent.

I am going to devote the remainder of my paper to a discussion of the problem of providing adequate medical care for the group of people with no income. I feel that this problem should be solved, by experimenting first with the no income group. Then after a successful plan has been evolved, I should like to see it carried along to the low income groups.

Among the many booklets and pamphlets sent to me by the Bureau of Medical Economics of the American Medical Association was a sheet which gave the majority report of the Committee on the Costs of Medical Care, the minority report of the same committee, the attitude of the Committee on Medical Education, and the editorial opinions of the *Journal of the American Medical Association*. These differed in all phases except one. All agreed that medical relief to the indigent should be provided from public funds. With this consensus probably most of us agree. Let us now discuss how far we have already gone on the road to state medicine.

In 1878 Dr. Rufus Woodward was appointed to the newly created Board of Health in Worcester. The first report of the board dealt with complaints about sources of filth, the keeping of swine within the city limits and the supervision of the cleaning of privies. Dr. Woodward declared that drainage running from sinks into the gutters on Main Street should no longer be tolerated.

Thus some fifty-five years ago, state medicine had its beginning in Worcester and for the first time our city government began to take a paternal

interest in the health of the citizens. Evidently Dr. J. Kelley had prophetic vision some fifty-four years ago, since he took for the subject of his annual oration "State and Preventive Medicine." If time allowed I should like to trace in detail the gradual increase in the activities of the Board of Health from the time of privy inspection to the present, and how the state and local health authorities have taken on step by step added functions in caring for the health of our citizens.

Let me briefly enumerate some of the epoch-making advances which began with compulsory reporting of contagious diseases and the quarantine of that dread disease, smallpox. Our Dr. Frederick Baker was instrumental in establishing the first municipal laboratory in New England for the bacteriological examination of sputa and diphtheria cultures. Following his oration, which he gave twenty years ago, on "The Relation of Venereal Disease to Public Health" a great impetus was given to the control of gonorrhea and syphilis by the diagnostic aids which were added to his laboratory services.

Soon after the discovery of diphtheria antitoxin, and, while it was still out of the reach of the ordinary patient because of its cost, the state came forward to furnish this expensive therapeutic aid to all. The need for a hospital for contagious diseases was soon seen and Belmont Hospital was established, where, at the present time, a large per cent of the patients are cared for by the city free of charge. A large group of employees have been added to the Health Department such as sanitary inspectors, milk inspectors, school physicians, epidemiologists, school nurses and dentists. The City Health Department, in conjunction with the State Health Department, furnishes consultation services to general practitioners for tuberculosis, infantile paralysis and cancer and supplies a large number of biological and pharmaceutical products. Charitable and volunteer organizations are antedating the public health programs and are carrying on many health projects. Some of these have paid staffs, such as the Medical Milk Commission of Worcester, the District Nursing Association, the Tuberculosis Association and Cancer Follow-Up Clinics. Probably many of these activities will be taken over by the Health Department when they have proved their value.

I wish to pay a tribute to the late Dr. Thomas Kenney, former director of public health in Worcester, who had a vision of the needs and possibilities of health work which was far beyond his strength to carry out. He saw the importance of the public health nurse as the liaison between medical science and the mother in the home. He raised the work of public health in Worcester to a high level and by his personality obtained a better recognition of the monetary value of a trained health worker.

The City Hospital is also engaged in state medicine in that it furnishes hospital service to a large group of patients 66 per cent of whom pay nothing to either the hospital or their physicians. The City Hospital Out Patient Department has been overwhelmed all through these years of depression with the volume of service which has been thrust upon a willing but overworked staff whose services are given gratuitously to the city. People on welfare who apply to other hospitals are immediately sent to join the crowd at the City Hospital. The Welfare Department employs three physicians who can only make the most perfunctory examinations because of the many patients they are asked to see. They either send the patient to the hospital or give them a bottle of medicine.

I have tried to sketch the growth and development of the public interest in the health of the community and how the City and State has gradually broadened its scope of work to include not only preventive but also curative medicine. I have listed some of the functions of the voluntary organizations which are pointing the way and demonstrating the value of further activity along public health lines. I have tried to bring to your attention how free public clinics are being overwhelmed with work they cannot do satisfactorily and how physicians for the Welfare Department under the direction of social workers are operating under great hardships with results which are not satisfactory to any one.

As mentioned before all of the plans advocated by social workers, politicians and even medical societies which would provide adequate medical care to the various groups in our communities, have failed to give proper attention to the needs of the indigent. In spite of all that the State, the City and private charity are doing the medical dental and nursing professions have to give the major part of the service without remuneration.

The New Deal has spent millions of dollars for the relief of this indigent group yet little of it has reached the medical profession. In many of the states the ERA has furnished medical services to their workers and their families. Dr. Hunt tells me that in Massachusetts the money allocated by the Federal Government for medical care has, through some maneuvering been used by the local communities to reduce the tax rate leaving all the burden on the shoulders of the profession. Unemployment faces the doctors as well as other white collar classes. In a recent questionnaire it was disclosed that forty-eight of our profession stated that they knew physicians who were on the welfare. Unemployment insurance or health insurance will never solve this problem.

Medical relief to the indigent has as much monetary value as any other form of relief for which the millions are being poured out. Provision should be made for it in every budget

which is made up. In approaching a plan to give medical relief to the indigent we must avoid, if possible the errors and pitfalls which have developed in other countries. If we do too much for these irresponsible individuals we shall take away from them the will to get well and to a certain extent, we shall be defeating our own ends. Some stimulus must be given which will aid in creating an ambition to rise out of that class if possible. The major problem of malingering has always been, and always will be with us and some way to lessen this evil must be found.

There is some difference of opinion concerning the question of the administration of a public medical service. Should it be by a department of social welfare or by a department of health? Dr. Thomas Parran, Jr., Commissioner of Health in New York says "I hold very strongly to the view that all public medical and health work should be done by the health department. Here we have the medical backbone which is lacking in social workers. Countervailing this however the social workers make out a good case for unifying medical relief with other relief and social reconstruction measures. This argument, plus the continual barrage of some medical groups to make prevention and not cure the objective of health service may reduce health departments to the status of sanitary police while the major health promoting functions of the community are carried on by non medical agencies."

Most of us will agree that the medical problems in all branches should be under medical control and we must also agree that our health departments, by a gradual process of evolution have changed from purely preventive medicine to curative medicine in several particulars. They have skeleton organizations, already functioning, which can be enlarged to care for the indigent. It has been said that 80 per cent of the troubles which need medical care can be handled by the regular practitioner with the equipment which he has with him. This being approximately correct with an enlarged personnel the health department could care for much of the work that now crowds our out patient departments and could at the same time care for at home many of the cases which now occupy valuable hospital beds. The necessities to good medical service such as the x ray the laboratory and nursing services, which because of the large extra cost, are prohibitive to many can be furnished by the state with some enlargement of the service which they already supply. In fact it is for laboratory and x ray studies that a large number of patients are sent into hospitals to occupy valuable beds.

The next question to arise is "How shall this enlarged personnel be recruited and how shall they be paid?" In New Hampshire the County Commissioners who have the care of the indigent refer cases to local physicians and pay

them on a fee basis of two-thirds of the regular rates. Dr Robert J Carpenter has written to me that in North Adams they are operating on the plan that all people who are on the welfare are eligible to receive medical care from their former physicians. The physicians send bills to the city at regular rates for office and house calls, the city takes fifty per cent off the bill and pays the rest.

I suggest that for the people who are only temporarily on the welfare the North Adams or New Hampshire method be adopted and that those people be taken care of by their former physicians because we all know that individual attention by a skilled and interested doctor is the best type of medical care. Those who are regular recipients of welfare aid should be referred to recent graduates of our hospital internships who have obtained membership in this society. I hear some one ask, "Why limit such service to members of this society?" Membership in this society should be a yardstick of medical competency and this society has the best plan to maintain this competency through post-graduate courses and medical meetings. Few of us can maintain our hold on our rapidly advancing science without faithful attendance upon the proceedings of this society and the perusal of current literature. We must make membership in this society an honor and a privilege.

The amount of work which any one on the health department panel should do ought to be limited to that which he can satisfactorily carry out. Or better still, the work should be evenly

distributed among those in the first years of their practice. With the aid of the municipal laboratories these men should be able to care for many of the cases that are now sent into the hospitals. This would liberate valuable hospital service for diagnostic, surgical, and maternity cases. Provision should be made for research work. Under competent supervision these recent graduates can make this large amount of clinical material contribute to medical knowledge.

I have already pointed out that it would not be wise to make the lot of the recipient of state or city medical relief too attractive because of the liability of the loss of ambition to improve one's condition. It is an injustice to have all patients in our hospital wards getting the same care when only one out of three pays for the service rendered. It puts a premium on the lazy man and it is discouraging to the one who provides for the rainy day.

I visualize, in the future, physicians' offices grouped around our hospitals, state or municipal laboratories where all the essential accessories to good medical service will be supplied by the state. Our hospitals will be largely reserved for diagnostic problems, maternity service and surgery. Physicians will receive compensation for medical relief rendered to the indigent and, with a large part of the overhead cost of medical service furnished by the state and the physician freed from his burden of caring for the poor, the expense to the average citizen will be materially reduced.

## THE ADULT TUBERCULOSIS CONTACT\*

BY HERBERT R. EDWARDS, M D †

THE examination of the adult tuberculosis contact is an old theme. It has been allowed to drift into the background for the important, but far less productive child contact. Tuberculosis workers are prone to seek the dramatic, large scale project that gives numbers, but proportionately fewer cases. Our responsibility as investigators and workers in this field demands that we tackle the job at the sorest point, and until we have made reasonable strides in that direction, I doubt that we are justified in placing all of our emphasis on the easier and more intriguing routes.

Our greatest problem in any sound program of control always has been, and will continue to be, the adult contact. There is abundant evidence to corroborate this statement in a perusal

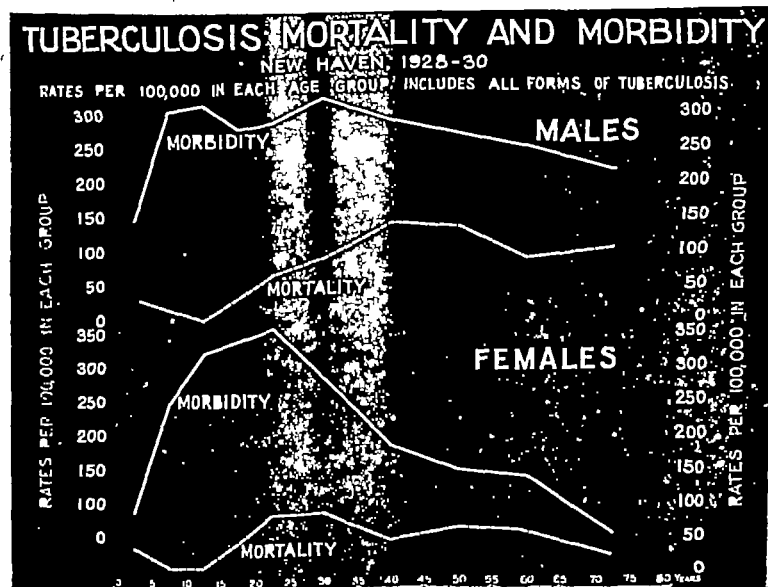
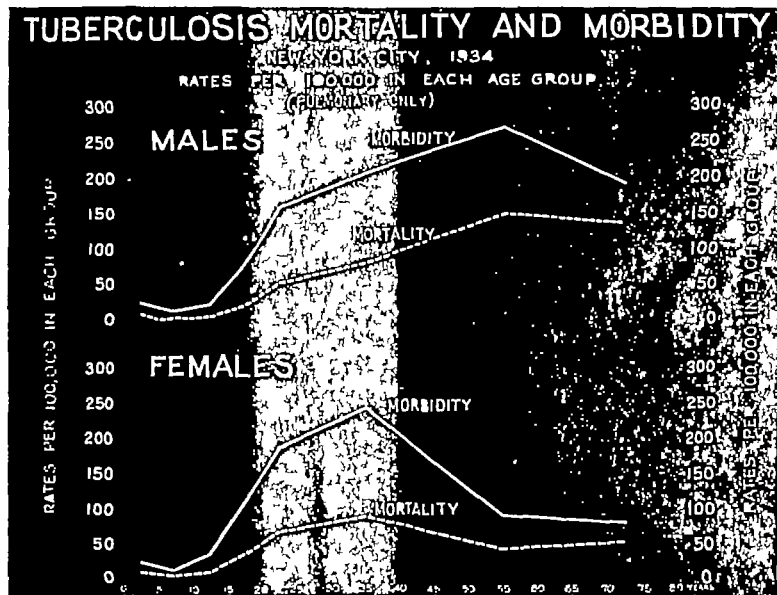
of our morbidity and mortality statistical data. Our new cases are reported chiefly among individuals above fifteen years of age, and our mortality data show clearly that the problem of death from tuberculosis is chiefly one of the adult groups. The problem becomes sharply acute among females between fifteen and thirty-five years, and among males between forty and sixty years.

Pulmonary tuberculosis is the most characteristic form of the disease among adults, and it is this type of the disease that accounts for the major portion of infections. The seriousness of the bacillary case is well known, and of particular importance is the case untreated at the time of death.

Contact examination regardless of age is a difficult problem and one for which we have not as yet found a reasonably satisfactory solution. In selected families, 100 per cent cooperation is possible, but in the average community the contact problem is usually less than half solved,

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†Edwards, Herbert R.—Director, Bureau of Tuberculosis, New York City Department of Health, 1934.—For record and address of author see "This Week's Issue," page 775.



and the greatest percentage of unexamined are invariably found among adults. In New Haven, after the most intense efforts had been made to clear contacts, we found that in only 31.1 per cent of 1428 families registered as presenting a tuberculosis problem, had we secured examinations of all household contacts.

The promptness and energy with which we approach the family following the discovery of the primary case, do not appear to solve the problem. In New Haven<sup>1</sup> and at the Henry Phipps Institute<sup>2</sup> a check of contact examinations within a year of the discovery of the primary case showed only about 47 per cent complete, with essentially the same amount of disease in both studies. In both places, it is reasonable to assume that every modern method of approach was utilized to secure cooperation from the contact. As a matter of fact, if we consider the cost involved, there is a serious doubt as to how far we are justified in going with present-day methods. This does not imply that we are to accept a defeatist attitude, but rather that we shall approach the problem with newer and more effective weapons.

Every tuberculosis worker has seen time and again in his experience the acute case of tuberculosis develop in a heretofore unexamined contact, and it is logical to believe that many of our family reinfections occur through similar sources. The inference is clear that had we known more about that individual in the years preceding his break, it might easily have been averted.

The problem may be visualized by a comparison of morbidity and mortality by sex and age groups (Charts 1 and 2).

Some recent studies dealing with contact examination throw direct light on the problem and the seriousness of the adult contact. Haywood et al<sup>3</sup> examined 604 or 96 per cent of all contacts in 156 families. The highest percentage of manifest lesions was found in the age groups fifteen to nineteen years (14.2 per cent) and in the individuals over sixty years (16.6 per cent). Males showed a persistently higher proportion of positive x-rays in all age groups except fifty to fifty-nine. When the source of infection was parental, there was found to be a greater danger to children. Of the 604 individuals examined in their study, twenty-nine or 0.48 per cent were classified as clinically active. Of these, 24.1 per cent were between fifteen to nineteen years, and 58.5 per cent twenty years or above.

Jessel<sup>4</sup> reporting on the examination of contacts in Lancashire County, England, came to the following conclusions: (1) In 15 per cent of the cases accepted as cases of pulmonary tuberculosis, instances of one or more secondary cases occurred. (2) Nearly all secondary cases were directly related to those primary cases

where tubercle bacilli were found in the sputum. (3) The average interval between the discovery of the primary and secondary cases was three and a half years. (4) Relatively more attention should be paid to adults, and especially middle-aged contacts. (5) A single negative examination result may well lead to a false sense of security.

Turner<sup>5</sup> reporting from North Worcestershire on tuberculosis morbidity and mortality among 833 house contacts of sputum positive cases in 185 households, concludes as follows: (1) Of 185 sputum positive cases, only one was under fifteen years, 146 between fifteen and forty-five years, and thirty-eight beyond that age. (2) There were seventeen deaths due to pulmonary tuberculosis, one under fifteen years, ten between fifteen and twenty-five years, and the remainder, or six, above twenty-five years. These occurred during a period of thirty-two months' observation. (3) During the same period, there were twenty cases of tuberculosis with positive sputum reported, all above fifteen years, thirty-two cases with negative sputum were reported, eighteen of which were above fifteen years. Sixteen cases of non-pulmonary forms were reported, chiefly under fifteen years. Of the suspicious group, twenty-eight of the forty-nine were found in contacts over fifteen years. (4) The incidence of tuberculosis among his series of contacts was 116.4 per 1,000, of which 82.8 per cent were pulmonary, this development of disease occurring in the short space of thirty-two months. (5) The modal age at death from phthisis occurs in the age groups fifteen to twenty-five among contacts and is well marked, whereas in the general population the modal age at death occurs in the twenty-five to thirty-five years age group and is not well defined.

Barclay<sup>6</sup> reporting on 413 contacts of pulmonary tuberculosis in 132 families demonstrated tuberculous lesions in 21.8 per cent and active tuberculosis in 17.2 per cent, 15.5 per cent having pulmonary lesions. He states that the most fruitful field for intensive effort is among contacts of bacillary tuberculosis and those relatives exposed to a recently fatal untreated case. The incidence of tuberculosis was greatest under five years and over fifteen years. He reports 18.6 per cent of consorts as having tuberculosis, 9.8 per cent husbands and 27.5 per cent wives, which he accounts for on the basis of the wives giving more intimate care to the husbands than the reverse.

In New Haven<sup>7,8,9</sup> for several years, we placed great emphasis on the examination of contacts, and our findings indicate clearly that the adult contact is by all means the most important contact for study.

In a series of 162 families in which the primary case was one of pulmonary tuberculosis, we were able to examine all contacts. Of the adults, 15.5 per cent were diagnosed as pulmo

nary tuberculosis, compared with 5.4 per cent in children. In a series of nine families in which the primary case was tuberculous meningitis, pulmonary tuberculosis was found in 38.1 per cent of adults, compared with 6.9 per cent of those under fifteen years.

An analysis of 155 children originally classified as Childhood Type Tuberculosis showed that nine or 5.8 per cent developed pulmonary tuberculosis during adolescence or early adult life. Hall and Chang<sup>10</sup> reporting on a similar study among the professional class of Chinese found that 4.1 per cent developed a manifest pulmonary lesion in young adult life. These studies indicate not only the adult phase but the importance of repeat examinations.

Another observation of importance to this subject in New Haven<sup>8</sup> was based on an analysis of 661 families representing 3856 contacts. Two thousand, six hundred and ninety-three or 69.8 per cent were examined adults, 59.8 per cent and children 79.5 per cent. Substantially higher percentages of examinations were made in families where the primary case was pulmonary tuberculosis. Pulmonary tuberculosis was diagnosed in 28.36 per cent of the contacts, and adults accounted for 83.0 per cent. There were 323 or 42.3 per cent of those diagnosed pulmonary tuberculosis who were known to have been bacillary cases. This percentage is undoubtedly low. There were 306 deaths due to tuberculosis and 83.3 per cent occurred among adults.

The further reiteration of studies dealing with the adult contact is superfluous. It is the problem of first importance in any sound program designed to prevent and eradicate tuberculosis. The real problem confronting us is how best to develop our program.

There are certain types of families in which the problem is more acute and they should constitute our first and most intensive efforts toward case finding among adult contacts:

1. Families in which a bacillary case is discovered.
2. Families in which there has been a case or death of tuberculous meningitis, or other acute forms.
3. Families in which the primary case was discovered at death. Barclay<sup>6</sup> states that 25.7 per cent of contacts to cases dying at home were found to have tuberculosis.

Families in which a non-bacillary case is discovered are important depending upon the character of the lesion. Families with a non-pulmonary form of tuberculosis are of the least importance though they cannot be entirely ignored.

The public health nurse and tuberculosis clinician are in the first line of attack. After careful study of the problem in New Haven and elsewhere the conclusion becomes obvious

that a part of our difficulty in securing cooperation from the adult contact may be traced to the first and subsequent associations of the family with the representatives of the public health agencies. The frequent changing of nurse or clinicians handling the individual family tends to weaken the position of the health authorities, and this situation is aggravated if those associations have been made by untrained and disinterested individuals. The fact must be accepted that all nurses do not and cannot approach the tuberculous individual with equal confidence, interest, and the ability to mold the attitude of the patient. There are nurses who, from personality and training, are able to carry their campaign with the family through to a successful conclusion. The generalized nursing service as generally adopted at this time is based on sound economic lines, and it is not possible in many communities to change the situation yet with it we must accept a less efficient service for many of the tuberculous.

The clinician, occasionally not appreciating the sociological and economic problems involved, fails to command the interest of the patient, and that unfavorable reaction is carried into the home of the patient.

Indifference of the patient is one of the most common problems met with in contact work. It may be the result of poor handling by the nurse or clinician, or due to fear. Jessel states, "Reluctance to be examined is a suspicious feature in itself. Such persons frequently become patients sooner or later and a source of infection to others. The readiest to permit examinations are often those obviously in good health."

The question may well be raised as to the length of time the adult contact should be supervised. In New Haven, we endeavored to follow all contacts through their twenty-fifth year. This age would appear to be a minimum for both males and females, on the basis of the sharp rise in deaths during that period. The general factors determining the frequency of re-examination will depend upon the seriousness of the original infection in the home, the intimacy and duration of the contact, the general health status of the individual and the factors determining the economic conditions of the family.

It is difficult to keep the interest of the patient if re-examinations are spaced far apart. Yearly examinations should be the maximum, with preferably nine-month intervals. It will require rare tact on the part of the clinician to hold the interest of the patient without causing undue alarm about his condition. It is in such cases that the idea of the annual physical examination should be presented in its most tempting and alluring form.

The re-examination of the adult beyond twenty-five years could well be predicated on the above suggestions. There are undoubtedly many contacts not in need of persistent follow

up A choice must be made of those most likely to show a spread of disease, if our program is to be economically feasible Racial susceptibility and occupational hazards should be carefully considered in the selection of the group for extended care

In practically all of our case-finding work, our programs have been built around the clinic, sanatorium or practitioners, at all events, we have expected the patient to come, to us These methods permit of better diagnostic facilities, and will serve for the major part of our work There is, however, need for more intensive work in the home The undiagnosed case constitutes a major public health problem, and it would seem that if the established method is inadequate, we should go to the home to locate possible open foci of infection It does not necessarily follow that such a plan would discourage clinic attendance The contact made in the home, on the other hand, should serve to convert the patient to his responsibility in the control of tuberculosis

Turner<sup>5</sup> and Jessel<sup>4</sup> both secured part of their reported examinations in the homes of the patient They depended upon careful histories and physical examinations for their diagnoses On this point, Barclay<sup>6</sup> states that 51.1 per cent of his contacts exhibited definite or suggestive recent symptoms, and about 40 per cent could have been diagnosed entirely on this basis In only three of his contacts did the initiative come from some member of the family or the patient himself, and only 61.1 per cent of his series were examined at the request of the sanatorium physician As efficient as these simpler methods of diagnosis may be, they do not preclude the use of a portable x-ray in the home The apparatus is available, and can be used in many homes

It is our present plan in New York City to develop a mobile clinic staff with portable x-ray facilities, to develop the possibilities latent in this newer approach.

Public health education has gone far to change the attitudes of the populace in regard to tuberculosis, but there is still a wide field that has thus far been only partially touched Such measures must reach the individuals in the

tuberculous household and help to create a more intelligent attitude toward their responsibility to their family and the community

#### SUMMARY

A review of certain of the recent contributions to the literature on the tuberculosis contact indicates beyond a doubt that the adult contact is the major problem in our case-finding efforts

It is not enough to examine these individuals once if found to be negative, the effort must be repeated at periodic intervals, as not infrequently a latent unrecognized disease develops into an active infectious one

The difficulties in securing cooperation from the family contact are manifold Indifference may be the result of a poor technique in the approach by the representatives of health agencies, fear on the part of the patient, and the limited horizon of the patient in his responsibility to his family and the community This may be altered through the channels of public health education

An approach to the present uncooperative contact should be made through the medium of home visiting Such a plan demands a well-trained and sympathetic staff of physicians and nurses, and portable x-ray facilities

#### REFERENCES

- 1 Edwards H. R. An attempt to secure x-ray examination of the uncooperative tuberculosis contact *New Eng J Med.* 212: 198 (Jan. 31) 1935
- 2 Weisner Dorothy E. and Smith S. Margaret Tuberculosis clinic and contact study *Am Rev Tuberc.* 29: 170 (Feb) 1934
- 3 Haywood Eloise Morris, W. H. and Wilson Geo. C. The incidence of tuberculosis in the families of a group of sanatorium patients *Am. Rev Tuberc.* 28: 637 (Nov) 1923
- 4 Jessel George The examination of tuberculosis contacts *Tubercle* 11: 493 (Aug) 1930
- 5 Turner H. Midgley The actual tuberculosis morbidity and mortality among house contacts of sputum positive cases in North Worcestershire *Tubercle* 12: 146 (Jan.) 1931
- 6 Barclay W. S. A study of tuberculosis contacts in families *Am Rev Tuberc.* 28: 192 (Aug) 1923
- 7 Edwards H. R. A cost analysis of clearing tuberculous family contacts *The Milbank Memorial Fund Quarterly* 12: (Oct.) 1934
- 8 Edwards H. R. The development of adult type pulmonary tuberculosis following the recognition of a childhood form. To be published in *Am J Pub Health*
- 9 Edwards H. R. Tuberculosis dispensary practice in New Haven Conn. *Am Rev Tuberc.* 27: 611 (June) 1933
- 10 Hall G. A. M. and Chang C. P. Latent pulmonary tuberculous infections in Chinese adults of the professional classes *Am Rev Tuberc.* 30: 193 (Aug) 1934

## THE CO-INCIDENCE OF CHOLECYSTITIS AND PEPTIC ULCER\*

BY EDMUND G. LAIRD, M.D.†

**D**URING the past year attention was called to the apparent frequency with which peptic ulcers were observed coincident with gallbladder disease at the New York Hospital A great

number of writers have reported varying numbers of cases of gallbladder disease coexisting with peptic ulcer, but few have offered actual statistics For instance, MacLaren<sup>1</sup> (quoted from Bruce) reports five such cases, Ochsner in lectures mentioned its occurrence Baumgarten<sup>2</sup>, L. B. Wilson, C. L. Mix<sup>3</sup>, B. G. A. Moynihan and a multitude of others cite small groups

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of cases but gave no data concerning large series.

Wilkie<sup>7</sup> recognizes a clinical picture, especially common in women, in which the patient presents symptoms more suggestive of gallbladder disease but at operation is found to have duodenal ulcer. He calls this the "cholecysto-duodenal syndrome."

On reviewing the literature on this subject one becomes almost inevitably involved in the various theories of the origin of the so-called "abdominal triad", i.e., peptic ulcer, cholecystitis and appendicitis. Lichtenfeld, Talma and especially Rössle<sup>8</sup> have furthered the somewhat more recent belief in the neurogenic origin of these conditions, that is to say, that they are due to visceral vascular and muscular reflexes arising from the central nervous system, especially common in the vagotonic types of individuals. Rössle, supported by Preusse, Richer, Reischauer, Schmieden, Bergmann and Westphal, familiarized the term "zweite Krankheit" for the conditions in this triad in order to emphasize the idea that they are not primary affections of the local parts but conditions secondary to disturbances of the autonomic nervous system. Hinrichsen<sup>9</sup> cites a rather large group of cases in which these three conditions occurred in each patient. A diseased appendix was found by Larimore<sup>10</sup> in all cases of associated cholecystitis and peptic ulcer. Moynihan<sup>11</sup> states that all cases of peptic ulcer and gallstones are probably "secondary" to some infection or toxemia arising in some abdominal organ, most frequently the appendix.

Lymphatic connections between the duodenum and gallbladder have been demonstrated by many observers (Sudler, Cuneo, Deaver, MacCarthy and Jackson, Graham, Judd and Peterman). Braithwaite<sup>12</sup> injected dye into the region of the ileocecal angle of human beings and demonstrated its flow or extension by way of the lymphatics up to the subpyloric glands on the inner side of the pylorus and into the subserous coat of the duodenum. Occasionally it could be made to pass into the subserous lymphatics along the common duct itself. This, he admits, is not the usual pathway but is favored by a chronic lymphatic infection congesting or obliterating the normal channels of lymph flow. Moynihan and Oldfield (quoted from Braithwaite) have seen examples of similar lymphatic flow in patients with tuberculous infections of this region. Braithwaite consequently adheres to the infectious or focal theory for the etiology of cholecystitis and peptic ulcers as opposed to the neurogenic, circulatory (embolic) or digestive theories.

The purpose of this paper is not to attempt to evaluate these theories but to consider briefly the available data on the subject of the frequency of concurrent gallbladder disease and peptic

ulcer, and to present the results of a study of a group of such cases.

Four patients with persistent, refractive duodenal ulcers were studied by Baumgarten<sup>13</sup> at St. Luke's Hospital and were eventually found to have a coexistent cholecystitis. Cholecystectomy caused in all four patients an almost immediate disappearance of the peptic ulcers, so that the author formed the conclusion that cholecystography should be a routine part of the study of patients with peptic ulcer.

Bruce<sup>14</sup> found five cases of duodenal ulcer, unsuspected from either the clinical symptoms or x-ray findings, in 100 consecutive gallbladder cases, plus two which were recognized before operation as coexisting.

In 1929 McVicar and Weir<sup>15</sup> observed a case of coincidental gallbladder disease and peptic ulcer. As a result of this finding they compiled some statistics on 500 consecutive cases of gallstones and 500 consecutive cases of duodenal ulcer. Moreover they separated the sexes and found a slight difference. Their results were as follows:

Coincidence in Males		
Coexisting gallstone disease in duodenal ulcer		10.0%
Coexisting ulcer in gallstone disease		1.0%
Coincidence in Females		
Coexisting gallstone disease in duodenal ulcer		3.6%
Coexisting ulcer in gallstone disease		7.1%
Coincidence in both groups (500 ulcer cases and 500 gallstone cases)		
Males		3.9%
Females		4.3%

The coincidence in both males and females in the total series of 1000 cases was thus found to be 4.1 per cent. In conclusion they say, "In fact it is probable that the incidence of cholecystic disease in the ulcer group is not much greater than that of any comparable age group of the general population and conversely that the incidence of duodenal ulcer in patients who have cholecystic disease is not greater than the incidence in those of comparable age who have normal gallbladders."

This report is based on a study of 250 consecutive patients with gallbladder disease upon whom cholecystectomy was performed. Out of these 250 patients, twelve or 4.8 per cent of the total number were found in which cholecystitis and peptic ulcer coexisted.

Examination of these twelve patients revealed the following facts:

- 1 Ten patients showed evidence of a chronic gallbladder infection. One patient was admitted with a subacute cholecystitis and another with acute cholecystitis.
- 2 Cholelithiasis was associated with the cholecystitis in five instances.



- 3 Of the twelve patients, eleven had simple duodenal ulcers, the twelfth had one gastric ulcer and multiple duodenal ulcers
- 4 In ten the ulcers were in the first portion of the duodenum, usually on the anterior surface and near the pylorus
- 5 Gastric analyses were carried out in five of the twelve patients. Gastric acidity was normal or high in every instance
- 6 Occult blood was found in the stools in two instances and a history of tarry stools was elicited in two others
- 7 The appendix was not mentioned in five instances, previously had been removed in one, was definitely diseased in four, and was normal in two
- 8 Over varying periods of follow-up observation, eight patients recovered without further symptoms of gastric pathology, three continued to have mild symptoms of dyspepsia, one subsequently died from septicemia following a carbuncle

To return to our figure of 4.8 per cent of coexisting cholecystitis and peptic ulcer, it seemed essential to compare this with the percentage of ulcers that one would encounter in a large number of individuals selected at random. Examination of the literature disclosed abundant statistical material suitable for such a comparison. Finney and Hanrahan<sup>12</sup> have compiled much of the literature dealing with the occurrence of peptic ulcer in large, general series of autopsies. As reported by them, Brinton, Fenwick, von Jaksch, Leube and Welch studied 100,000 autopsy reports and found the incidence of gastric ulcers to be 4.5 per cent to 5.0 per cent. These figures, based largely on the findings in Europe, are uniformly higher than those found in more recent American reports. In 31,815 American autopsies, gastric ulcer was found in only 1.3 per cent. Bassler (1922) compiled 59,450 records showing 4.4 per cent of gastric or duodenal ulcer. In 2081 autopsy examinations, Carl Hart<sup>13</sup> found 7.17 per cent of the adults (5.2 per cent of the total) showed gastric ulcers, 4.6 per cent of the adults (3.8 per cent of the total) showed duodenal ulcers. These percentages are higher than those of Gruber (2.98 per cent), Schönberg (3.16 per cent), or Nauwerck (2.4 per cent), but not so high as those of Rossle (8.3 per cent—12.4 per cent).

From a glance at the above figures it would appear that the percentage of people showing peptic ulcers is not appreciably higher among those suffering from gallbladder disease than among the general population.

A comparison of our findings (4.8 per cent) with other available data shows that they agree quite closely with those of McVicar and Weir (4.1 per cent) and less closely with those of Bruce (7 per cent). Schutz<sup>14</sup> observations are

also in accord with ours. He claims that such a coincidence is an infrequent occurrence, as would be expected since most duodenal ulcers occur in men whereas cholelithiasis is chiefly found in women.

Kalk and Siebert<sup>15</sup>, however, believe in a closer relationship between the two conditions and, by determinations of the icteric index in a series of patients, have demonstrated that the bile passages are affected in about one third of the cases of duodenal ulcer. Gruber<sup>16</sup> also finds a more frequent coincidence between the two conditions and states that 16 per cent of a large series of cadavers with duodenal ulcer showed cholecystitis with cholelithiasis. Lessening the significance of this finding is that of Ehrman who in 15,000 unselected autopsies performed during fifteen years, found gallstones in 16 per cent of the females and 6 per cent of the males.

A more or less incidental investigation of the 250 records studied concerned the status of the appendix. It was found that in 104 or 41.6 per cent of the patients a diseased appendix had been removed before the operation upon the gallbladder or was simultaneously removed with the gallbladder because it showed evidence at the operating table of disease. This figure is considerably higher than those commonly found in the literature.

#### SUMMARY

Two hundred and fifty cases of cholecystectomy are reported with special study regarding the coexistence of gastric or duodenal ulcer. Peptic ulcers were proved to exist in 4.8 per cent of the cases. A review of the literature shows comparatively few statistics on this relationship but such as may be found are in close agreement with the above figure. As determined by reported autopsy records this incidence of peptic ulcer with cholecystitis is not markedly higher than the percentage of ulcers found in the general population. Therefore no close interrelationship between the two conditions is suggested by this study. Evidence of a diseased appendix was found in approximately 41 per cent of the cases of gallbladder disease and it is probable that the relationship between appendicitis and cholecystitis is a more important one than that between ulcer and cholecystitis.

#### REFERENCES

- 1 MacLaren A and Oertling H. The coexistence of cholecystitis and duodenal ulcer in the same case. *Surf. Gynec. Obst.* 38: 92, 1924.
- 2 Baumgarten W. The relationship between cholecystitis and the persistence of duodenal ulcer. *M. Clin. N. Amer.* 11: 473, 1927-28.
- 3 Mix C L. Duodenal ulcer combined with cholecystitis. *M. Clin. N. Amer.* 7: 337, 1923-24.
- 4 Wilkie D P D. Duodenal ulcer in the female. *Lancet.* 2: 1228, 1927.
- 5 Rösle R. Das runde Geschwür des Magens und des Zwölffingerdarmes als zweite Krankheit. *Mitt. a. d. Grenzgeb. d. Med. u. Chir.* 25: 766, 1912-13. Zur Genese der Magen- und Duodenalgeschwüre. *München med. Wchnschr.* 59: 1407, 1912.

6. Hlarichsen, H. M.: Klinische Beobachtungen über die Zusammenhänge zwischen Appendicitis Cholocystitis und Ulcus ventriculi bzw. duodeni. *Bruna Beiträge zur klin. Chir.* 140: 149 1927
7. Larimore J. W.: Duodenal and gastric ulcer, cholecystitis and appendicitis—a consideration of their pathological relations. *Surg. Gynec. Obst.* 60: 59 1920
8. Moynihan R. O. A.: Duodenal Ulcer. Ed. Philadelphia W. B. Saunders Co., 1911 p. 134
9. Braithwaite L. R.: The flow of lymph from the ileocecal angle and its possible bearing on the caus. of duodenal and gastric ulcer. *Brit. J. Surg.* 11: 7 1913
10. Bruce H. A.: Association of cholecystitis with duodenal ulcer. *Ann. Surg.* 54: 347 1911
11. McVicar C. S. and Weir J. F.: The association of gallstones and duodenal ulcer. *M. Clin. N. Am.* 18: 1631 1913-29
12. Pinney J. M. T., and Hanrahan E. M.: Gastric ulcer. In "Practice of Surgery" Edited by Dean Lewis. Hagerstown, Maryland W. F. Prior Co., Inc. 1919 Vol. 6 Chap. 8
13. Hart C.: Betrachtungen über die Entstehung des peptischen Magens und Zwölffingerdarmgeschwüres. *Mitt. a. d. Grenzgeb. d. Med. u. Chir.* 31: 350 1918 19
14. Schütz, D.: Ueber die Frage der Beziehungen zwischen Ulcus duodeni, Appendicitis und Cholelithiasis. *Wien klin. Wochenschr.* 34: 484 1921
15. Kalk H. and Riehl P.: Ulcus Duodeni und Gallenwege. *Klin. Wochenschr.* 6: 313 1927
16. Gruber O. B.: Zur Frage über das Zustandekommen des peptischen Magens und Duodenalgeschwüres. *Deutsches Arch. f. klin. Med.* 110: 461 1914 (See p. 469)

# COMPARISON OF DISEASE INCIDENCE IN CONNECTICUT WITH 1934 AND SEVEN YEAR AVERAGE

MONTH ENDING SEPTEMBER 14 1935

Diseases	1935				Average cases reported for week corresponding to Sept. 14 for past seven years	1934			
	Week ending Aug. 24	Week ending Aug. 31	Week ending Sept. 7	Week ending Sept. 14		Week ending Aug. 25	Week ending Sept. 1	Week ending Sept. 8	Week ending Sept. 15
Anthrax	1	—	—	—	—	—	—	—	—
Chicken Pox	12	—	2	3	4	6	6	2	13
Diphtheria	2	—	3	1	8	1	—	1	—
Dysentery Bacillary	5	1	0	46	—	1	—	32	3
Encephalitis Epidemic	1	1	—	2	—	1	—	—	—
German Measles	—	—	2	—	1	1	3	—	—
Influenza	—	—	—	1	3	2	1	—	8
Measles	16	6	1	4	7	7	10	8	10
Meningococcus Meningitis	1	3	1	—	—	1	—	—	—
Mumps	4	7	6	10	8	6	11	4	3
Paratyphoid Fever	4	1	4	12	—	—	—	1	1
Pneumonia (Broncho)	7	10	7	6	9	6	10	4	7
Pneumonia (Lobar)	11	6	6	6	7	7	7	0	3
Pollomyelitis	40	39	38	38	15	1	2	2	2
Rocky Mt. Spotted Fever	—	—	—	1	—	—	—	—	—
Scarlet Fever	6	13	8	22	11	3	4	8	11
Streptococcus Sore Throat	—	1	1	1	1	—	—	—	2
Tetanus	—	—	—	1	—	—	1	—	2
Trichinosis	—	—	1	—	—	—	1	—	1
Tuberculosis (Pul.)	33	12	14	17	26	18	25	11	24
Tuberculosis (O. F.)	4	—	—	—	3	3	3	2	2
Typhoid Fever	2	3	1	6	4	1	6	1	3
Undulant Fever	3	1	—	—	—	—	2	2	—
Whooping Cough	37	27	33	70	40	36	35	47	30
Gonorrhea	20	61	21	53	36	19	42	24	51
Syphilis	26	31	22	40	34	15	50	26	60

Remarks No cases of Asiatic cholera, glanders, plague or yellow fever during the past seven years

# CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C CABOT, M D

TRACY B MALLORY, M D, *Editor*

CASE 21421

## PRESENTATION OF CASE

A one year old female child contracted a head cold in February, approximately one month before entry. Associated with this was a nasal discharge and slight elevation in temperature. She developed bilateral otitis media and both ears were opened and drained for a few days, following which they healed. Ten days before admission the child started to cough and her temperature again became elevated. On this day she also fell from her crib, became quite pale, but did not lose consciousness. Five days later she appeared much sicker than usual, was quite drowsy and sleepy all day. There was no vomiting. Three days before admission the cough and fever increased and her legs seemed stiff. Her eyes became glassy and her father believed that the child had some impairment in vision. No stiff neck was noted and there were no convulsions. She became gradually more drowsy and on the day of admission seemed almost semicomatose.

The family history is non-contributory.

The only significant fact in her past history was pneumonia at the age of three weeks which was treated at the Children's Hospital. She had none of the childhood infectious diseases.

Physical examination showed a well-developed and nourished drowsy female child. The pupils were equal and reacted normally. The right ear was negative. No landmarks were seen in the left ear but the drum did not bulge. The pharynx was red and filled with mucus. The tonsils were slightly enlarged and injected. The lungs were clear. The respirations were irregular consisting of about six deep rapid breaths followed by a period of apnea. The heart was not enlarged and no murmurs were heard. The abdomen was negative. The extremities were spastic. The neck was not stiff. The Babinski was positive on both sides and there was also a positive Gordon test. The anterior fontanelle was slightly depressed. The abdominal reflexes were absent. There was a tache cérébrale.

The temperature was 101.5°, the pulse 120. The respirations were 38.

No urine examination was made. The blood showed a red cell count of 5,320,000, with a

hemoglobin of 90 per cent. The white cell count was 17,900, 71 per cent polymorphonuclears. A blood Hinton test was negative.

A lumbar puncture showed a low initial pressure with a slow rise and prompt fall upon right jugular compression and no response upon left. Ten cubic centimeters of clear fluid was removed, there were 14 cells, 8 polymorphonuclears and 6 lymphocytes, the sugar was 74 milligrams per cent, Pandy test was negative, the protein was 30 milligrams per cent and the goldsol was 0011000000, Wassermann test was negative and culture showed large Gram positive cocci.

X-ray films of the long bones were negative. A chest plate was also negative.

She rapidly failed. The temperature rose to 104° on the second day and terminally to 108.2° on the third day.

## DIFFERENTIAL DIAGNOSIS

DR. HAROLD L HIGGINS. This is clearly a child with some cerebral condition. She fell ten days before coming into the hospital. It is true that with practically every patient having a cerebral condition there is the story of some trauma not infrequently irrelevant. In most cases of tuberculous meningitis the parents will look back and recall some sort of fall or blow on the head. The fall of this child was apparently of little significance, so far as we can tell, at least, she did not lose consciousness nor did she become unconscious within the next twelve hours. I should be inclined to feel that the fall had no bearing on the case.

She presents many striking symptoms that indicate pathology in the brain. She was comatose. There may have been impairment of vision. She had a very high fever, and the temperature of 108.2° definitely points toward medullary involvement. She had irregular breathing, apparently the type of Biot rather than of Cheyne-Stokes. Biot's breathing indicates some pathology in or near the medulla. I think the Babinski sign is not significant in young children, one finds a positive Babinski in a large percentage of children one year of age. But the tache cérébrale is usually present in patients with cerebral involvement, we find its absence of value in deciding that a child has not poliomyelitis.

The lumbar puncture report presents some rather contradictory statements. There is no response on left jugular compression. This may make you first suspect that the trouble may be a sinus thrombosis involving the left lateral sinus. However, there are cases in which one fails to get response on jugular compression and in which sinus thrombosis is not present.

The fluid was not under pressure and it had a sugar level of 74 milligrams per 100 cubic centimeters. That is a relatively high sugar and if

the spinal fluid contained bacteria, as is indicated in the last statement, one would expect that the bacteria would have consumed all the sugar in the spinal fluid and the spinal fluid sugar would be practically nil. Also, with such a large number of cocci one would expect a large number of cells. I think we can safely say that the finding of Gram positive cocci in the spinal fluid was due to contamination and probably the cocci were staphylococci. The fluid showed fourteen cells, but practically no increase in protein—a negative globulin test by the Pandy determination. In irritation of the meninges we find that there is an increase in cells and increase in globulin. We have very few cells here and no globulin, I feel there was very little, if any, irritation of the meninges. Occasionally in a poliomyelitis we get a cell count of fourteen with a very small amount of globulin.

The roentgenograms of the long bones were taken, of course, to rule out lead poisoning; no laboratory evidence for lead poisoning was found. The x ray of the chest rules out a general military tuberculosis.

In the differential diagnosis of this case one must consider tuberculous meningitis, however, I think it can be quite readily ruled out, there was no increase in spinal fluid pressure, fewer cells were found than ordinarily seen in cases of tuberculous meningitis, no tubercle bacilli were reported as found and there was no globulin. The spinal fluid findings are not those you would expect in tuberculous meningitis.

Another possible diagnosis is mastoiditis with sinus thrombosis and inflammatory reaction in the meninges. The story of the ear trouble is very minor to expect a sinus thrombosis. The ears seemed pretty normal at admission. She had a running ear a month previously. If it is sinus thrombosis, there might possibly be an abscess in the brain at some distance from the meninges. There might be an abscess outside the dura, but in either of these cases I should have expected more globulin to be present in the spinal fluid. I think mastoid complications are possible but very unlikely. In a child of one year with mastoiditis the inflammation is more likely to extend out so that there is postaural swelling rather than push in toward the lateral sinus and brain. Personally, I feel inclined to believe that the ear is not a responsible factor.

I do not believe cerebral hemorrhage is the factor here. I think we would have found more abnormalities in the spinal fluid.

The spinal fluid findings are as much in keeping with poliomyelitis as anything we have. They might be in keeping with a tumor.

We can pretty definitely say that this child had an encephalitis. I do not think there is very much doubt about that. She was drowsy. She was spastic. She showed probable signs

of loss of vision. Her respiration was irregular. She had a very high fever and showed spinal fluid changes quite in keeping with many cases of encephalitis. Encephalitis which is near the surface of the brain is likely to lead to changes in the spinal fluid. Encephalitis that is far removed from the surface of the brain and the meninges may be accompanied by no change in the spinal fluid at all. I am rather inclined to approach this as a case of encephalitis terminally involving the medulla. To decide the cause of the encephalitis, let us consider what the possible causes of encephalitis are. There is suppurative encephalitis, usually resulting in a brain abscess, I do not believe that is the diagnosis here. We must consider toxic encephalitis due to lead, but there was no lead line found on x ray of the long bones. I presume no stippling of the red blood cells was found. A toxic encephalitis may also be due to bacterial toxins, such as found in typhoid fever, pneumococcus, and bacillary dysentery. We do not seem to find here any definite disease caused by toxin producing bacteria. She did not have dysentery, or typhoid fever. The child had no nutritional disturbance such as might lead to an encephalitis from insufficiency disease (lack of Vitamins B). The encephalitis was not from cerebral anemia. She had a normal hemoglobin and no cyanosis. There is no suggestion of parasites affecting the brain although the data is not 100 per cent complete on that point.

The other type of encephalitis is the encephalitis that accompanies or follows from a virus disease. Practically any of the virus infections may at times lead to encephalitis. Probably the best known of them is poliomyelitis. I am inclined to feel that this case was not due to poliomyelitis or polioencephalitis because of the time of the year, February, which is not the season when poliomyelitis is prevalent. Of the other virus infections, cases are reported where encephalitis occurred with measles, smallpox, vaccinia, mumps, rabies, chickenpox, epidemic encephalitis is presumably a virus disease, this morning I learned of a case of encephalitis in a child with rubella.

I am inclined to think our patient had a virus encephalitis and not poliomyelitis. The virus, I should say, was that of the ordinary grippé. I am inclined to think she got the grippal infection and with it the virus encephalitis. This winter I have seen two small babies who developed convulsions near the onset of a respiratory infection, and it impressed me that they might have had an encephalitic manifestation of ordinary grippé. My diagnosis in this case is, thus, a virus infection (grippé) with encephalitis. This is a diagnosis of something we do not know much about. Most of the encephalitis cases that accompany grippal infections do not

end fatally, the diagnosis could not be proved pathologically. Possibly this is a case where we may get some data on a previously not recognized condition.

#### DR HAROLD L. HIGGINS' DIAGNOSIS

Virus infection (grippe) with encephalitis

#### ANATOMIC DIAGNOSES

Encephalomyelitis

Otitis media, chronic, bilateral

Pulmonary atelectasis

Pulmonary edema, slight

Duodenal diverticulum

#### PATHOLOGIC DISCUSSION

DR TRACY B. MALLORY: The autopsy on this case was entirely negative except for the finding in the cerebral nervous system. The only things we found in the body were areas of atelectasis and slight edema of the lungs, a very common finding in the terminal stage of a variety of central nervous system diseases. Dr. Kubik will tell you about the brain findings.

DR CHARLES S. KUBIK: There was bilateral otitis media and, as Dr. Higgins suspected, encephalitis or rather encephalomyelitis, since both brain and spinal cord are affected.

Microscopic examination reveals numerous small lesions in the brain, brain stem, cerebellum and spinal cord. A striking feature of these lesions is their perivascular arrangement. In a fair-sized zone around the vessel myelin is destroyed and there is a pronounced glial reaction consisting of proliferation of microglia and probably also of other glial elements. In the zone of demyelination nerve cells are damaged and some are destroyed, axis cylinders are thinned out but a fair number of them are preserved. In the adventitial tissues of the affected vessels there is a cellular infiltration with monocytes, a smaller number of lymphocytes and a few plasma cells. In the forebrain the lesions are most numerous in the subcortical white matter but are also found in the gray matter, in the midbrain gray matter is affected more than the white, while in the spinal cord gray and white matter are affected to about the same extent.

In the spinal cord, in addition to numerous perivascular lesions, there is just beneath the pia a narrow zone of myelin degeneration with glial proliferation having no relation to blood vessels.

The findings here are those of disseminated encephalomyelitis. This condition has been observed most often in association with measles and vaccinia although it may occur, as in this case, with other infections and possibly also without any preliminary disease.

Because the pathology is the same in each case there is reason for suspecting that the causative factor is the same whatever the associated disease may have been, and that measles, vaccinia, or other infection simply constitute a predisposing factor.

Although positive proof is probably lacking

it has the earmarks of an infectious disease, very likely a virus infection.

#### CASE 21422

#### PRESENTATION OF CASE

A fifty-one year old Canadian housewife entered complaining of pain in the chest radiating to the arms, of a month's duration.

At the age of twenty-four, approximately twenty-seven years before admission, she noticed the onset of failing vision. Associated with this were severe headache and occasional vomiting. An oculist informed her that very little could be done for her vision. Ten years later, during her first pregnancy, she had frequent daily vomiting, and five months after conception she miscarried. A persistent non-productive cough accompanied this illness. At the time of her miscarriage she had practically no vision at all. She was stone blind for the following eight weeks. There were no convulsions or edema at that time. She was told, however, by a local physician that she had very high blood pressure. Eight months later the patient again became pregnant. She vomited daily and her vision again started to fail. A therapeutic abortion was performed at the end of one month. Her blood pressure was very high even after the abortion. Three years later she had her third and last pregnancy. Associated with this was the usual amount of vomiting but she did not lose her vision. At the end of six months she miscarried. Her blood pressure a week after delivery was 200 systolic. For the next twelve years she was well and symptom free, except for headaches and some slight dyspnea on exertion. One month before admission she noticed a sharp pain in her chest upon climbing stairs. The pain appeared off and on during the day and radiated to both arms. The pain produced a gripping, suffocating feeling in the chest. Her physician found her blood pressure higher than it had ever been. She was put to bed for two days with morphia and for the next three weeks she had the same pain on exertion only in a much milder form. Nine months before admission she had this pain at night associated with gas and relieved by hot water and soda. Her physician gave her morphia. On the morning of the day before admission she experienced sudden pain and numbness in both legs. She was unable to get out of bed, and sweat profusely. The pain in her legs increased and she was brought into the Emergency Ward by ambulance.

Her father died at the age of seventy-five of a stroke. Her mother died at the age of seventy-two also of stroke. Two siblings were living and well.

Physical examination showed a fairly well-developed and nourished, slightly thin, middle-aged woman lying in bed in no acute distress. The skin was cold and slightly moist. The lips were rather deeply cyanotic. The fundi showed marked narrowing of the arteries and distention of the veins. There was a slight exudate

in the macular region of the left fundus. The heart was enlarged to the left, the left border of dullness being 11 centimeters from the mid sternal line, the right 2 centimeters. The rate was 120 rhythm regular. There was a proto diastolic gallop. The sounds were of poor quality. The blood pressure was 180/110. A few medium moist râles were heard at the left base with some bronchovesicular breathing. The abdomen was soft. The liver dullness was down 2.5 centimeters in the midclavicular line. Both lower legs were cold, dusky with a pallid cyanotic hue. The feet were not stone cold however, and there was a tinge of pink in each foot which blanched readily on pressure and quickly returned. The dorsalis pedis popliteals and femorals were not palpable on either side. There was some hyperesthesia to pinprick.

Examination of the urine showed a specific gravity of 1.030 with a slight trace of albumin and large numbers of white blood cells. The blood showed a red cell count of 4,370,000, a hemoglobin of 70 per cent and a white cell count of 12,000, 88 per cent polymorphonuclears. The stools were negative. A Hinton test was negative. The non protein nitrogen was 31 milligrams.

Electrocardiogram showed sino auricular tachycardia, rate 120, left axis deviation and inverted T.

A note was made on the fourth day that both legs and feet had cleared remarkably well. There was no cyanosis and the numbness had almost entirely disappeared. No pulsations however could be felt in any of the arteries. On the sixth day digitalization was begun. Twelve days after admission the heart sounds were poor but the chest was remarkably clear. There was no cyanosis or edema. She became markedly disoriented and confused was unable to focus her eyes and on the eighteenth day she became almost comatose. Her temperature, pulse and respirations gradually began to rise finally reaching 105°, 158 and 68 respectively on the twenty-fourth day the day of her death.

#### DIFFERENTIAL DIAGNOSIS

DR. WILLIAM B. BREED. The first part of the history is a fairly straightforward picture of either actual kidney disease or of low functioning kidneys associated with hypertension that cannot stand pregnancy. If she had not become pregnant she might perfectly well have gone for a long time with these kidneys. There are a great many women who have kidneys that will function under normal conditions so that they do not have any symptoms referable to high blood pressure until a lot later but the added burden of pregnancy gets them into trouble. She probably had some essential hypertension ten years before she became pregnant. Then with this story of various pregnancies and break down in function of the kidneys she went along pretty well until she began to get

into trouble from the hypertension itself, and now we read of beginning trouble with the heart on the basis of long standing hypertension.

"The day before admission she experienced sudden pain in the chest and numbness in both legs." That of course brings up the question of dissecting aneurysm on the basis of long standing hypertension with or without some coronary disease. Until you get to the point where this sudden episode occurred the day before admission, your attention is focused on the question of angina on the basis of coronary disease, and of the possibility of her having had a month before a small coronary thrombosis, but there is not enough evidence to tell you whether she did have it or not. The last episode is certainly suggestive of dissecting aneurysm.

There is an arteriosclerotic family history here, but the ages mentioned are so advanced that it is not really significant it seems to me from a hereditary point of view. If her parents had died in the fifties with evidence of arteriosclerosis I think the hereditary factor would be of more importance.

What else have we to consider in this history as regards differential diagnosis? Of course you can put down on paper any number of possibilities such as gall stones or pulmonary infarction, which might have caused this acute episode but it does not seem to me worth while making such a broad differential diagnosis, but the story on the whole seems pretty straightforward on a cardiovascular basis.

The physical examination confirms the general impression that we get from the history namely, that she probably had some coronary disease on the basis of long standing hypertension or perhaps a dissecting aneurysm. An electrocardiogram would help us a good deal in ruling in or out coronary disease here. Her blood pressure stays up well. She has not had a severe coronary thrombosis presumably because the blood pressure is reasonably high although of course we do not know what it was when she had her accident.

It is very interesting to see that the renal function, at least as measured by the nitrogen retention test, is as good as it is with that long history in the past of fairly acute renal insufficiency during pregnancy. She had probably had some albuminuric retinitis. It is remarkable how the kidneys will stand a thing like that and return to pretty good function. I think this is unusual however. One would expect that kidneys which had been put to such a strain would not be so good as they are now.

Unless there is something very unusual and hidden in this story it seems to be pretty straightforward. It would be interesting to speculate as to what sort of kidneys you will find here. I think you will find rather small

white kidneys and no acute glomerulonephritis. You will find some coronary disease, possibly an old small coronary occlusion, but I should say no fresh infarct. I should think there might well be a dissecting aneurysm extending a good way down the aorta, possibly down into the iliacs, although inasmuch as the leg has cleared somewhat, one is led to believe that the dissection does not extend down into either of the iliacs. It shut off the circulation however to the extent that it could not be felt.

A PHYSICIAN: What do you think about the urinary sediment?

DR BREED: The large number of white cells does not interest me at all. Presumably there are no casts or red blood cells. You have to assume that. The albumin might perfectly well be on the basis of chronic passive congestion. I do not think that would lead me to make a diagnosis of glomerulonephritis or an acute process. I still think she has a small white kidney.

A PHYSICIAN: How about nephrosclerosis?

A PHYSICIAN: Should she not have a low specific gravity?

DR BREED: I think that is a perfectly good point. There is a high specific gravity.

A PHYSICIAN: It is of thirty years' duration.

DR BREED: Yes, it is a long time. It is possible that you will not find very much vascular nephritis so to speak. But if you do find anything, that is the type of abnormality you will find. Maybe the kidneys are not bad.

A PHYSICIAN: Is it possible that when she had the pregnancy some of each kidney was infarcted but there was left enough good kidney tissue to take care of things pretty well?

DR BREED: I am not quite clear about infarction of the kidney in relation to this sort of story. Are you, Dr Mallory?

DR TRACY B MALLORY: I have seen one case of massive infarction of the renal cortex of both kidneys during pregnancy. It is a very rare but recognized condition.

A PHYSICIAN: Do you associate infarction of the kidney with this kind of story of pregnancy?

DR MALLORY: The condition is not one of isolated infarcts, single or multiple, such as are seen in embolism but rather a massive necrosis of the whole cortex, a condition which could hardly be survived. There is one case on record where massive necrosis of the renal cortex was proved by biopsy yet the patient got well. I think one must assume, however, that the necrosis was incomplete.

DR BREED: If you got to the point of massive necrosis of the renal cortex you would not have this story of ten years' freedom?

DR MALLORY: No. One of the theories of the pathogenesis of the pregnancy kidney is that a diffuse arterial spasm occurs which lasts long enough to cause more or less degeneration of the cortex, usually slight, occasionally massive, according to this hypothesis the pregnancy

kidney represents a reaction to local circulatory lack brought on by very persistent spasm in the smaller renal vessels and the results can naturally be very variable depending on how long the spasm lasts.

DR BREED: So that she might have had periodic spasms associated with pregnancy and not enough to do permanent damage to the cortex. I will be willing to say that maybe the kidneys are not bad except that they will show some result of long-standing hypertension. She is still relatively young, only fifty-one.

DR MALLORY: I should like to ask one question of Dr Breed. Would he not consider it unusual that she should live so long after the acute episode if she had a dissecting aneurysm?

DR BREED: As I have said, I assume because of the improvement after the accident that the dissection was not very low but shut off enough circulation to prevent feeling the arterial beat.

DR MALLORY: Dissecting aneurysm, as we have seen it here, has been a pretty rapidly lethal disease, three to six days.

A PHYSICIAN: Might she not have showered emboli from vegetations upon a valve? She shows some mental symptoms toward the end. She became disoriented and confused and could not focus her eyes, and had paresthesia, too.

DR BREED: I think that is a perfectly good suggestion, that this woman had vegetations in her left auricle and that she did shoot off some emboli. That is perfectly reasonable.

I think I shall have to retract and put it on the basis of vegetations and emboli and thrombosis in the peripheral vessels.

#### CLINICAL DIAGNOSES

Hypertensive and coronary heart disease  
Coronary thrombosis  
Cerebral embolism  
Arterial (bifurcation of aorta) embolism

#### DR WILLIAM B BREED'S DIAGNOSES

Hypertensive and arteriosclerotic heart disease  
Mural thrombus—left auricle  
Emboli in peripheral vessels  
Old coronary occlusion

#### ANATOMIC DIAGNOSES

Coronary thrombosis  
Mural thrombus, left ventricle  
Ball thrombus, left auricle  
Thrombosis of the abdominal aorta, common iliac and internal iliac arteries  
Circulatory insufficiency, both lower extremities  
Renal infarction, right  
Arteriosclerosis coronary and aortic  
Arteriolarsclerosis pancreatic, splenic and renal

## PATHOLOGIC DISCUSSION

DR. MALLORY We had one dramatic case of dissecting aneurysm that started off with a history almost identical with this and I am sure that was in Dr. Breed's mind. However, this woman did not have one. She had a very severe arteriosclerosis which involved the aorta and the coronaries, and a branch of the left descending was completely occluded. There was a fresh infarct of the heart, possibly a month old, with a thrombus overlying it. There was also another thrombus in the left auricle. The aorta from just below the renal arteries was completely filled with fairly old blood-clot that was beginning to organize. It must have been present from the history about three weeks. It had run down into both iliacs and part way into both femorals.

The heart in spite of thirty years of hypertension was not hypertrophied. The weight was only 325 grams. The kidneys were somewhat small, 175 grams, but she was a very small woman so that is probably not so much atrophy as the weight would suggest. I should imagine that for an average sized individual this would

correspond with kidneys about 200 grams in size. Microscopically they show a benign type of vascular nephrosis, not particularly severe, nothing acute about it, exactly the kidney you would expect to find with long standing, not too severe hypertension.

DR. BREED There is nothing to give any lead as to what the acute episodes in the previous pregnancies may have been?

A PHYSICIAN What did the valves show?

DR. MALLORY They were perfectly normal. The embolus came of course from the left heart, but I cannot say whether it was from the auricular or the ventricular thrombus.

DR. BREED That is what I was going to ask you Dr. Mallory. How do you explain thrombi in the auricles when there is no directly underlying infarct?

DR. MALLORY Of course in any case in whom there is prolonged heart failure with marked dilatation of the auricles and especially fibrillation you get enough stagnation of blood to make thrombosis fairly probable. But in a case like this where you never found a symptom of heart failure, and no fibrillation, I find it much harder to explain. Perhaps she had fibrillated at some time.



# The New England Journal of Medicine

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## THE BERGER RHYTHM AND BRAIN PHYSIOLOGY

THE brain is in a continuous state of electrical unrest. Hans Berger, in recent years, has been able to record the action potentials of the brain and to demonstrate that under standard conditions they are fairly regular in time and equal in intensity. In other words by the use of suitable amplifying and recording devices, a continuous series of rhythms of electrical potential, justly called by Adrian and others the Berger rhythm, may be measured and recorded. These action currents of the brain are comparable to those of the heart which are visualized by means of the electrocardiogram. The new method is termed "electroencephalography." The currents may be led off directly from the brain by electrodes inserted in it, but may be almost equally well obtained from electrodes placed on the scalp. Thus a method has been devised of studying the electrical activity of the brain with an apparatus comparatively easily set up.

The results have been curiously uniform in the hands of various workers. The waves of electrical activity of the brains of different individuals appear similar in their general form, although there may be variations in amplitude. Adrian finds a focus of response in the occipital lobe which may shift from time to time and be greater in some persons than in others. When sensory stimuli induced by sudden light or noise intervene, the rhythmic waves immediately decrease greatly in amplitude. Thinking decreases the size of the waves, but in spite of the many things which decrease or distort them, "at rest" the rhythm is extremely uniform. Few facts at present are known about this surprising electrical rhythm, but as a method of physiological experimentation it would seem that we have a new and important procedure with which to attack the age-old problem of brain function.

The effects on the Berger rhythm by disease processes have begun to be studied. Professor Otfried Foerster of Breslau has used electroencephalography as a means of localizing brain tumors. The work is only in its earliest stages of development and no conclusions of its value can be reached at the present time. Work on epilepsy, however, has progressed farther, especially in the hands of Boston investigators. Working in the Department of Physiology of Harvard Medical School, Drs. Fred Gibbs, Lowell Davis and William G. Lennox have conducted a series of researches on patients with epilepsy. Dr. Lennox presented a résumé of their results at the Second International Neurological Congress, held in London in August of this year.

These studies were largely made on patients with petit mal. A normal Berger rhythm was obtained during quiescent periods, with the exceptions noted below. Proceeding or accompanying the attack, however, the rhythm was greatly distorted, there being a burst of electrical potentials about ten times the voltage and about one-fifth the frequency of the patient's usual potentials. When clonic movements were present, they were synchronous with the large waves, but similar voluntary movements were unattended by differences in electrical potentials. It is interesting to note, moreover, that the form of the large waves was individual for each patient and that some patients, symptom free, showed small disturbances of rhythm suggestive of laval or sub-threshold seizures. States of alkalosis or anoxemia caused the waves to be come slower and larger and if continued till a seizure was induced, the action currents were identical with those which accompanied the patient's spontaneous seizures.

New light is thus thrown upon the complicated problem of the epileptic seizure. Of particular interest are the observations of sub-threshold attacks, a point often considered in

the past but never previously demonstrated. That this new method will open up a wide field of investigation of brain function, both normal and abnormal appears to be a justifiable conclusion from these preliminary studies.

### ALLERGY AND "THYMIC" DEATH

A DEGREE of temerity, brazenness or ignorance is necessary even to raise again the question of the enlarged thymus thymic death or status lymphaticus. The subject has been argued from A to amperesand, and the proponents of the theory of thymic death have been regarded by the majority of latter day investigators to be limbo inhabited by the Druids of old and any other upholders of mysticism and superstitious beliefs. The enlarged thymus has been demonstrated by Boyd and others to represent the normal size of the organ in a state of health and Farber has shown that certain cases supposedly dying from status lymphaticus had actually succumbed to an acute streptococcus infection.

As is natural with such a sudden and spectacular type of demise hyperallergy and anaphylactic shock have received their share of attention and thus thesis Waldbott<sup>1</sup> supports in an article entitled *The Allergic Theory of So-Called Thymic Death*. Waldbott, having noted on several occasions in allergic families sudden death which presented the clinical and pathologic characteristics of so-called thymic death (enlargement of the thymus gland and other lymphoid tissue and a decrease of medullary substance of the adrenals) reviewed a series of 104 autopsies in which the diagnosis of thymic death had been made. Sixty of these cases were excluded because there were sufficient other indications to account for death. Of the remaining forty four all showed uniform changes in the lungs namely edematous hemorrhagic areas into the alveoli with a more or less severe degree of necrosis. Traumatic emphysema alternating with atelectasis was observed, and occasionally eosinophil cells were present. In some cases a secondary enlargement of the right heart appeared to be present and in some hypoplasia of the medullary portion of the adrenals was noted.

These lesions are strikingly different from those of true bronchial asthma but they are those described as the most characteristic changes in the pathology of anaphylactic shock in man, corresponding accurately with those described in death following the administration of tetanus antitoxin. The deductions drawn by this author are that enlargement of the thymus gland may constitute a preallergic phenomenon since true allergic symptoms frequently develop in later years in children who had formerly

had roentgen evidence of an enlarged gland, and that "thymic death" represents a preallergic phenomenon that is probably identical with anaphylactic shock.

It is beyond the boundaries of common sense to assume that all cases of sudden death in childhood attributed to the thymus gland are due to hyperallergy or to any single cause, it is more than reasonable to admit that anaphylactic shock may play the decisive part in many of them.

#### REFERENCE

<sup>1</sup> Waldbott G. L. J. A. M. A. 105: 657 (Aug) 1935

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

NATHANSON IRA T. BS. M.S. MD. North Western University Medical School 1930. Lieutenant Clinical Resident Fellow, Harvard University Medical School. Formerly, Surgical Resident, Pondville Hospital, Wrentham. Address: Huntington Memorial Hospital, 695 Huntington Avenue, Boston, Mass. Associated with him is

DALAND ERNEST M. AB, MD. Harvard University Medical School 1918. F.A.C.S. Instructor in Surgery, Harvard University Medical School. Chief of Staff, Pondville Hospital, Wrentham. Assistant Surgeon, Massachusetts General Hospital. Address: 483 Beacon Street, Boston, Mass. Their subject is "The Use of Dilaudid in Treating Patients with Cancer" Page 741

CLUTE HOWARD M. BS. MD. Dartmouth Medical School 1914. F.A.C.S. Surgeon in Chief, II Surgical Service, Carney Hospital. Surgeon, New England Baptist Hospital. Associate Surgeon, New England Deaconess Hospital. His subject is "Muscle Grafts for Hemostasis in General Surgery" Page 746. Address: 171 Bay State Road, Boston, Mass.

CONNELL, FRANK H. M.A., Ph.D. Assistant Professor Parasitology, Dartmouth Medical School. His subject is "Amebiasis in a Rural Community" Page 748. Address: Hanover, New Hampshire.

DONCHERS JOSEPH C. BS. MD. University of Pittsburgh School of Medicine 1932. His subject is "Carcinoma of the Breast in New Hampshire" Page 752. Address: Department of Pathology, Dartmouth Medical School, Hanover, New Hampshire.

WARD ROY J. AB. MD. Dartmouth Medical School 1900. Visiting Physician, Worcester City Hospital. Consulting Physician, Belmont Hospital, Worcester. Epidemiologist, Department of Health, Worcester. His subject is

"Evolution or Revolution" Page 757 Address 9 Bellevue Street, Worcester, Mass

EDWARDS, HERBERT R M D College of Medical Evangelists, California, 1918 Director, Bureau of Tuberculosis, New York City Department of Health 1934, and New Haven Department of Health, New Haven, Conn His subject is "The Adult Tuberculosis Contact" Page 760 Address Department of Health, 139 Centre Street, New York City

LAIRD, EDMUND G B S, M D Johns Hopkins University School of Medicine 1931 Surgical Interne, Johns Hopkins Hospital 1931-1932 Assistant Resident in Surgery, New York Hospital 1933-1935 Assistant in Pathology, Pathological Institute of the University of Berlin, 1932-1933 His subject is "The Co Incidence of Cholecystitis and Peptic Ulcer" Page 764 Address New York Hospital, 525 East 68th Street, New York City

## The Massachusetts Medical Society

### SECTION OF OBSTETRICS AND GYNECOLOGY\*

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524 Commonwealth Ave., 472 Commonwealth Ave.,  
Boston, Mass Boston, Mass

### TREATMENT OF CANCER OF THE FUNDUS OF THE UTERUS

In determining what line of treatment should be undertaken in a case of cancer of the body of the uterus, one must begin by considering what therapeutic procedures are possible Treatment in some form is necessary since the disease does not spontaneously disappear

One thinks of cancer as due to some perversion of the vital processes of the body cells On this account there arises the hope that in some way, at some time, cancer can be controlled by modifying the activity of living cells Various chemicals, especially in the form of elements, have been suggested and tried In spite of much experiment no foundation for the realization of this hope has been discovered Although some favorable results in dealing with cancer in lower animals have been obtained, chemotherapy offers, as yet, nothing for the human patient

Radiotherapy is more hopeful As a rule the type of carcinoma found in the body of the uterus is somewhat radiosensitive, but an obstacle to effective treatment by this means is the practical difficulty of getting the radium close to the growth If the growth is massive, or if a small growth is associated with myomata

which deform the uterus, it is not a reasonable expectation that the rays will be thoroughly effective If the growth is small, and the uterus not enlarged, the method may be curative, as shown by recorded cases

More hopeful than radiotherapy is operation, removal of the whole uterus with tubes and ovaries This has given the best gross and corrected results

What should be done in some specific case depends on not only the resources of treatment but also on the case If the risk of operation seems great because of some contraindication as obesity, or heart or kidney disease, it may be better to try radiotherapy, x-ray is steadily becoming a more effective supplement to radium in the uterine cavity If the risk of operation seems not too great, vaginal or abdominal hysterectomy should be employed As a considerable proportion of these patients have never given birth to a child, the vaginal approach is likely to offer more difficulty than in a multiparous woman Whether vaginal or abdominal hysterectomy is performed, the cervical canal should be closed by sutures to prevent escape of uterine contents during manipulation The growth may prove to be more extensive than was suspected at first so that vaginal hysterectomy may become complicated by involuntary morcellation, necessary because of undue traction, but it is a dangerous procedure It is not necessary to make a wide resection of parametrial tissue at panhysterectomy Metastasis is not common and progress of the disease is usually by direct extension The course of the round and especially of the ovarian ligaments should be scrutinized closely for growth It is very unusual to find outward growth as low as the level of the uterine artery where it crosses the uterus

The results of treatment should be studied critically Operation gives the higher immediate mortality and more ultimate cures Radiotherapy may be followed by considerable general disturbance Some patients who have had radiotherapy and later operation, have said that the former procedure made them feel worse than did the operation Perhaps narcotics have produced this mental reaction Pyometra and sepsis may follow radium In any case its use is not to be undertaken lightly

A word should be said as to the treatment of the patient before the lines of therapy noted above are considered it is to make sure the patient has cancer of the fundus of the uterus This disease has no characteristic symptoms Therefore any patient who has symptoms which are found with cancer of the body of the uterus may have that disease In the present state of knowledge of the possibility of danger, it is criminal neglect to refuse to find out what is wrong and to throw out a smoke screen called "change of life" Every year the use of this smoke screen by physicians costs many women their lives

\*A series of short selected articles by members of the Section will be published weekly  
Comments and questions by subscribers are solicited and will be discussed by members of the Section

### THIRD ANNUAL POSTGRADUATE MEDICAL EXTENSION COURSE

The following sessions have been arranged by the Committee for the week beginning October 20

#### Barnstable

Sunday October 20 at 4 00 P.M., at the Cape Cod Hospital Hyannis. Subject Cancer of Stomach Bowel and Genito-Urinary Tract. Modern Care of the Inoperable and the Incurable the Development of Improved Methods of Caring for these Cases with Less Pain and Discomfort with Minimum of Drug Therapy. Instructors I J Walker and F H. Colby J I B Vall, Chairman.

#### Bristol South (Fall River Section)

Monday October 21 at 4 00 P.M. at the Stevens Clinic of the Union Hospital Prospect Street, Fall River. Subject Neurological Aids in the Diagnosis and Treatment of Disease from the Medical Viewpoint. Problems of History and Examination with Special Reference to (a) Neurosyphilis Multiple Sclerosis and Other Degenerative Conditions (b) Diseases with Acute Onset, such as Meningitis and Cerebral Accidents. Instructor H R. Viets Eugene A. McCarthy Sub-Chairman.

#### Essex North

Friday October 25 at 4 00 P.M., at the Hotel Bartlett, 95 Main Street, Haverhill. Subject Cancer of Stomach Bowel and Genito-Urinary Tract. Modern Care of Inoperable and the Incurable the Development of Improved Methods of Caring for these Cases with Less Pain and Discomfort with Minimum of Drug Therapy. Instructors E G Crabtree C C Lund and H. F. Friedman Francis W. Anthony Chairman

#### Essex South

Tuesday October 22 at 4 00 P.M., in the Nurses Home of the Salem Hospital Salem. Subject Cancer of Breast and Uterus Sarcomas of Bone Lymphoma and Leukemia Their Early Diagnosis Discussion of Life History of Cancer and Grades of Malignancy. Instructors J V Meigs, C E. Dumas and Dudley Merrill. Walter G. Philpen Chairman

#### Hampden

Thursday October 24 at 4 00 P.M. at the Academy of Medicine Professional Building 20 Maple Street, Springfield and at 8 00 P.M. at the Holyoke City Hospital Holyoke. Subject Kidney and Bladder Diseases A Acute Nephritis — Etiology Diagnosis and Treatment. Nephrosis and Its Treatment. (Medical.) Instructor E. M. Chapman

George L. Schadt and George D. Henderson, Chairmen

#### Hampshire

Wednesday October 23 at 4 15 P.M., in the Nurses Home of the Cooley Dickinson Hospital Northampton. Subject Cancer of Breast and Uterus Sarcomas of Bone Lymphoma and Leukemia. Their Early Diagnosis Discussion of Life History of Cancer and Grades of Malignancy. Instructors G W Taylor and E. M. Chapman. Robert B. Brigham Chairman.

#### Middlesex East

Wednesday October 23 at 4 00 P.M. at the Melrose Hospital Melrose. Subject Lung Diseases (a) Differential Diagnosis and Treatment of Lobar Pneumonia. (b) The Surgical Problems of Empyema. Instructors Maxwell Finland and R. H. Overholt. Joseph H. Fay Chairman

#### Middlesex South

Tuesday October 22 at 4 15 P.M. at the Cambridge Hospital Cambridge. Subject Psychiatry Management of Psychotic States in the Care of General Diseases Especially Chronic Disorders Subpsychotic States. Instructors G C. Caner and Maurice Fremont Smith Edmund H. Robbins, Chairman.

#### Norfolk South

Monday October 21 at 8 30 P.M., at the Quincy City Hospital, Quincy. Subject Diseases of the Liver Hepatitis and Painless Jaundice Problems in Diagnosis and Treatment. Instructors Channing Frothingham and E. L. Young David L. Belding Chairman.

#### Plymouth

Tuesday October 22 at 4 00 P.M., at the Brockton Hospital Brockton. Subject Ophthalmology and Otolaryngology (a) The Major Hazards in Diagnosis of Diseases of the Eye, Ear Nose and Throat as Seen in General Practice (b) Special Treatment in Acute Medical and Traumatic Diseases of Eye Emergencies Arising in the Treatment of the Ear Nose and Throat. Instructors F L. Wellie and T. Gundersen. W H. Pulsifer Chairman

#### Worcester North

Friday October 25 at 4 30 P.M., at the Burbank Hospital Fitchburg. Subject Syphilis Modern Treatment. The Use of Neosalvarsan, Trynarsamid, Bismuth Mercury Potassium Iodide, etc., in Office Practice. Gonorrhea Treatment of Complications as Seen in General Practice. Instructors O F Cox, Jr., and A. W. Cheever Edward A. Adams Chairman.

MISCELLANY

ANTERIOR POLIOMYELITIS CASES FOR 1935  
WEEKLY LIST, OCTOBER 7-11

City or Town	
Attleboro	1
Fall River	3
Norton	5
Wareham	1
Brockton	2
Franklin	1
Natick	1
Quincy	2
Boston	17
Cambridge	2
Malden	1
Medford	1
Revere	2
Somerville	2
Waltham	1
Watertown	3
Haverhill	1
Lawrence	1
Lynn	3
Reading	1
Adams	1

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UNITED STATES EMPLOYEES' COMPENSATION  
COMMISSION  
Washington

September 19, 1935

From United States Employees' Compensation Commission  
To State Works Progress Administrators and Federal Establishments having Employees receiving Security Wages under the Emergency Relief Appropriation Act of April 8, 1935  
Re Endorsement of Vouchers for Medical, Hospital and Allied Services

The Rules and Regulations No 1, issued by the Commission July 15, 1935, governing compensation and medical treatment for Works Progress Administration employees, requires that all vouchers, Form S-69 for medical services and all services in connection therewith be endorsed by the Local Compensation Representative (See Paragraph 15 of Rules and Regulations No 1) In Federal establishments the Official Superior is regarded as the Local Compensation Representative for purposes of Rules and Regulations No 1, and the Official Superior's endorsement on the Form S 69 will meet the requirements of Paragraph 15 of Rules and Regulations No 1

Many physicians have been submitting vouchers and bills for medical treatment direct to the Commission This procedure should be discouraged, since it results in unnecessary delay and expense

occasioned by the necessity of returning such vouchers for endorsement by the Local Compensation Representative or the Official Superior of the injured employee, as the case may be

All physicians, hospitals, and all others submitting charges should be instructed to submit vouchers Form S 69, to the Local Compensation Representative, or in the case of Federal establishments, the Official Superior of the injured employee, who in turn should see that the services were authorized, charges are itemized on Form S 69, and signatures are proper, before endorsing the voucher and transmitting it to the Commission Written authorization, if not previously submitted, should accompany the voucher for services

Attention is particularly invited to Sections IV and V, Paragraphs 8 to 36 inclusive, of Rules and Regulations No 1 for detailed information.

The earnest cooperation of all persons concerned is essential to expedite adjustment of medical and other charges by this office

Special Bulletin WP No 1

CORRESPONDENCE

WHERE STATE MEDICINE IS A BOON

Editor, *New England Journal of Medicine*,

In the midst of our discussions of the high cost of modern specialized medical service, it may be of interest to note the existence within a thousand miles of Boston of a region where the problem is to obtain any medical service at all The whole world is familiar with Dr Grenfell's medical mission to the fishermen of the Labrador and northern Newfoundland The eastern section of Newfoundland is taken care of through close communication with St. John's, but there is a section of the southwest coast which is without help from either of these sources Scattered along about 150 miles of coast, running eastward from Cape Ray, are a number of fishing villages totaling in population some ten thousand persons

Although distinctly limited in its economic life this region has been settled by English speaking people for many generations, and is by no means devoid of culture The children have reasonable opportunities for schooling, at least through the primary grades, and the percentage of illiteracy is not particularly high The people are not without benefits of the clergy, and every community of more than a few hundred people has at least one church Yet medical service is limited to one doctor in Port aux-Basques, and the nearest hospital is either six hours north on the railroad, or a night's sail across to Cape Breton Island, trains and boats run three times a week to these points

Transportation along the coast is slow and difficult. A regular steamer service runs every two weeks, otherwise the only transportation is by fishing boats, which travel about four or five miles per hour at a cost of some twenty cents per mile for gasoline alone Fog prevails about 70 per cent of the time, making travel dangerous along the irregular

lar rocky coast, and night travel is utterly impossible.

Rose Blanche a typical community of twelve hundred people used to have a doctor and nurse up to five years ago. Before the depression when fish commanded a good price the traditional system of private practice was sufficiently remunerative to maintain the inhabitants and the community was as well served as it could be by one competent general practitioner. With the coming of hard times there began a series of medical economic changes which are interesting to compare with the various remedies which have been proposed for our own difficulties.

Learning that the doctor was having trouble making both ends meet and was considering leaving town, some of the more enterprising of the citizens proposed the scheme of having each family pay the doctor an annual fee the only extra charge to be for medicine. About half the town joined this scheme and for a year it was quite successful (Health Insurance). However after the first year many of the citizens, finding that they had not needed his services dropped out of the scheme and things became difficult again. As hard times increased came government relief in the form of the dole and when those on the relief rolls were sick the doctor was paid by the government for his services (quite similar to our own ERA scheme).

This system worked reasonably well until the doctor became corrupted and was discovered turning in to the government larger accounts than the services he had rendered warranted. Then he was dismissed from the town and there has been no doctor in residence since. At the present time a single visit from the nearest doctor (when he is available) costs about forty dollars which approximates 10 per cent of the annual cash income of the average family. To go to visit the doctor in his office means a day's trip at a minimum cost of ten dollars besides the doctor's fee. To get to a hospital takes three days on the average although there are times when, with prompt connections the trip can be made within twenty four hours. It is small wonder that several of the fishermen with whom I talked had lost wife or child from appendicitis operated on too late to save them. All obstetrics is apparently done by one local untrained midwife.

Into this situation now enters that dread demon State Medicine. The government taking pity of the plight of these people is now in the act of building three cottage hospitals on the coast and has already placed in operation this last week a hospital ship carrying the doctor who is in charge of these hospitals and who makes visits in the various settlements when summoned carrying the patient to a hospital when necessary. The hospital ship is a refitted former New Yorker's yacht, which is well suited to the coast conditions and can reach nearly all of the communities along it within a few hours time.

As I was passing through this particular town a few days ago I was asked to see a woman who had

been taken acutely ill that morning with a severe infection of her leg. After giving the best advice I could I suggested that they telegraph (wireless) for the hospital ship the Lady Anderson. Two hours later as I was chugging out of the harbor in a fishing smack we passed the Lady Anderson just coming in. There was something impressive even thrilling about the sight of that little ship which would convince even the most ultraconservative that for this particular community State Medicine was going to prove a blessing.

JAMES H. TOWNSEND M.D.

#### LADIES HELPING HAND HOME FOR JEWISH CHILDREN

October 1 1935

Editor *New England Journal of Medicine*

The Ladies Helping Hand Home for Jewish Children desires to call to your attention the continuance of its health program for undernourished Jewish children as announced to you in previous communications.

We are also equipped to care for those children who need convalescent care during their recovery from operative procedures and severe illnesses.

This program includes a definite schedule of medical care, rest, diet and recreation, under the supervision of our medical nursing and consulting staffs.

This service is intended for such worthy patients as may come within the above specifications.

Applications may be procured by writing to the Ladies Helping Hand Home for Jewish Children.

Sincerely yours

MRS MAURICE SAPIEN, President

35 Chestnut Hill Avenue  
Brighton Mass

#### A HANDBOOK OF COMMUNITY RESOURCES

The Commonwealth of Massachusetts  
Department of Public Health  
State House Boston

September 30 1935

Editor *New England Journal of Medicine*

There has come to my notice an editorial in a recent issue of *The New England Journal of Medicine* urging that there be made available for physicians a handbook of community resources. You have pointed out the valuable service rendered locally by the handbook published by the Massachusetts General Hospital and have felt that an enlargement along this line to serve the State would serve a similar purpose.

Throughout the past year this Department has been working on a handbook of this nature which is now in the hands of the printers. We hope it will appear as an issue of *The Commonwealth* during the present year and that it will be possible for us to send a copy to every physician in the State. For various reasons a book published by the State cannot cover all of the field included in the Massachusetts General handbook. At the same time however it should contain and we hope that in this instance it does much additional information that

more properly belongs in this type of a publication. The Department realizes that at best such a publication is an incomplete guide to community resources, but has felt that in this first issue it should confine itself pretty largely to public health and related subjects rather than to some of the more detailed problems that have a personal rather than a community bearing. I trust that this handbook when it is ready will fill a useful purpose in this State.

Very truly yours,

HENRY D CHADWICK, M.D.,  
*Commissioner of Public Health*

#### SIXTY SEVEN TAPPINGS

September 19, 1935

Editor, *New England Journal of Medicine*,

Apropos of the letter of Dr Coues in your issue of September 12 regarding an epitaph in England which he considers an "all time record" of "Tapping." This must be true in one way because 310+ gallons in 28 operations would mean an average of somewhat over 11 gallons a tap.

I venture to send you a copy of an epitaph on a gravestone, in an old churchyard at Kensington, N H. It is partly obscured but I am able to make out the following words:

Benjamin Rowe, Esq

who after a life of great suffering departed  
1790—in the 71st year of his age

He was tapped 67 times and from his body  
was drawn 2385 pounds of water

Very truly yours,

THOMAS W LUCE

Portsmouth, N H

#### RECENT DEATHS

FITZ SIMMONS — HENRY JOSEPH FITZ SIMMONS, M.D., of 857 Centre Street, Jamaica Plain, and an office at 370 Commonwealth Avenue, Boston, died at his home, October 5, 1935. Dr Fitz Simmons was born in 1880 and graduated from the Harvard Medical School in 1908.

He joined the Massachusetts Medical Society in 1910 and was also a Fellow of the American Medical Association and the American College of Surgeons. He specialized in Orthopedic Surgery, and served on the Staff of the Children's Hospital since 1912.

MAY—JOHN SHEPARD MAY, M.D., of 20 Lockstead Avenue, Jamaica Plain, with an office at 90 Warren Street, Roxbury, died suddenly October 10, 1935.

Dr May was born in Augusta, Maine, in 1870, the son of John H and Ellen F (Guild) May. His preliminary education was acquired in the public schools of Augusta and the Boston Latin School. He graduated from Bowdoin College in 1893 and from the Jefferson Medical College in 1897. After receiving his medical degree, he settled in Roxbury

where he practiced the remainder of his life. He was a Fellow of the Massachusetts Medical Society and the American Medical Association and a member of the West Roxbury Medical Association.

Dr May is survived by his widow, Mrs Helen E (Lovell) May, a sister, Mrs C H Blackington, of Weymouth, and a brother, Charles L May, of Winthrop.

PARKER—WALTER HENRY PARKER, M.D., of Brewster, Massachusetts, died suddenly at his home, October 12, 1935. He had practiced in Dorchester, Massachusetts, previous to 1925.

Dr Parker was born in 1872 and graduated from the Baltimore Medical College in 1896. He joined the Massachusetts Medical Society in 1899.

He began his practice in Coventry, Vermont, his native town, but soon moved to Dorchester, Massachusetts, where he built up a large practice. He was prominent in Masonic and Odd Fellow Societies.

Dr Parker is survived by his widow, Mrs Ida (Creelman) Parker, and two daughters, Mrs Madeline P B Fee of Hartford, Connecticut, and Mrs Isabelle P Rice of Medford, Massachusetts.

MacDONNELL—JOHN MACDONNELL, M.D., of 536 Broadway, South Boston, died at his home, October 11, 1935, after a long illness. He was born in Ireland, the son of Matthew and Mary (Farley) MacDonnell.

He received his M.D. degree from the College of Physicians and Surgeons (Boston) in 1894 and settled in South Boston.

He is survived by three sons, five daughters, a sister and two brothers.

#### OBITUARY

##### DR JOHN J MANGAN

In the passing of Dr John J Mangan, the Staff of the Lynn Hospital loses one of its oldest, as well as one of its most conscientious members.

Dr Mangan, for a long period, devoted his professional activities to Pediatrics and for many years served the hospital in this department. His interest was sincere, and his handling of these little patients was always gentle and considerate.

Above all else, Dr Mangan was a scholar, and wrote upon a variety of subjects. His *magnum opus* was his life of Erasmus, in the preparation of which he spent several years traveling extensively in Europe, tracing and visiting the various abodes of this noted Ecclesiastic.

This monumental work brought to him the world-wide recognition of scholars, and for his achievement he received both honorary degrees and medals.

By his colleagues he is best remembered for his mild and courteous demeanor and his earnestness of purpose.

The Staff has lost a scholarly and cultured mem-

ber and the hospital a faithful worker and an influential friend

WILLIAM T. HOPKINS M.D.  
Memorial Committee.

## NOTICES

### MEDICAL CLINIC AND STAFF ROUNDS AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 P.M. on Thursday, October 24 in the amphitheater of the Peter Bent Brigham Hospital Dr. Henry A. Christian, Physician-in-Chief, Hersey Professor of the Theory and Practice of Physic in the Harvard Medical School, will give a medical clinic. To it are cordially invited practitioners and medical students. These clinics will be repeated on Thursdays, October to May.

On Saturdays in the wards of the Peter Bent Brigham Hospital, from 10 to 12 staff rounds will be conducted by Dr. Christian.

## ANNOUNCEMENT

JACOB I. ABRAMS M.D. has opened an office at 311 Commonwealth Avenue Boston.

### BOSTON UNIVERSITY SCHOOL OF MEDICINE SURGICAL CLINICS AT THE BOSTON CITY HOSPITAL

Friday, October 18, 121 Cheever Amphitheatre.  
Dr. Arthur R. Kimpton, Surgeon-in-Chief, Fourth Surgical Service, Boston City Hospital, will talk on "The Surgery of the Spleen."  
Physicians and medical students are invited.

Friday, October 25, 121 Cheever Amphitheatre.  
Dr. William R. Morrison, Associate Professor of Surgery, will present the following cases:  
1. Perforated ulcer of the stomach and duodenum.  
2. Pancreatitis.  
3. Empyema of the gallbladder.  
Physicians and medical students are invited.

## A DOCTOR WANTED

Chebeague Island, Maine, is in need of a good physician at once. The town pays a yearly salary of \$1,000 in addition to what a doctor can earn. The winter population is around 400 with an additional 1,000 in the summer season. Apply to the Selectman.

## REPORTS AND NOTICES OF MEETINGS

### FAULKNER HOSPITAL CLINICAL MEETING

The October clinical meeting was held on Thursday, October 3, at 5 00 P.M. at the hospital.  
During the summer an unusual number of cases have come to autopsy in which thrombosis of arter-

ies or veins had been the primary disease which eventually led to death. Three cases from this group were selected: the oldest, seventy-eight years of age, and the youngest, thirty-three years of age. In the patient, seventy-eight years of age, shortness of breath was the first symptom and within a few days the patient had died with what was presumed to be myocardial weakness and terminal bronchopneumonia. At the postmortem examination pulmonary infarctions were present and were the cause of death. These infarctions came from emboli which originated in the uterine and pelvic veins. No cause for the primary thrombosis in these veins could be made out. Another patient, about fifty years of age, entered the hospital in a comatose condition. Examination of the nonprotein nitrogen in the blood ruled out uremia and it was felt that the patient had some type of vascular accident within the skull. At postmortem examination a thrombosis of an artery at the base of the brain with softening of the area supplied by this artery was found. No cause for the thrombosis was made out. The third case was in a young man of thirty-three years of age who had gradually increasing shortness of breath with sudden attacks of dyspnea and cyanosis over a period of six weeks. The possibility of coronary thrombosis was considered during life. At autopsy old and fresh infarctions of the lung were found with a large embolus in the pulmonary artery. Some hypertrophy of the right side of the heart was present. The source of the emboli was from prostatic veins and the veins around the rectum. There were no hemorrhoids. No cause was made out why thrombosis should have taken place in these veins. The hypertrophy of the right side of the heart was of interest. Although some of the infarctions were probably of six weeks' duration, an x-ray picture of the chest taken three weeks before death did not suggest any appreciable infiltration in the lungs except for one small area. It is interesting to speculate if this hypertrophy of the right side of the heart could have developed within two or three weeks as the increased resistance to the circulation in the pulmonary arteries gradually developed over that time.

Following the presentation of these cases, Dr. Eugene E. O'Neill talked about certain features of vascular disease. He was unable to throw any light upon the etiology of this type of thrombosis in veins and arteries but took up the problem of the prevention of thrombosis in general, especially postpartum and postoperative. He emphasized the importance of placing the patient in the Trendelenburg position with an elevation of ten to twelve inches if it was practical in relation to the type of operation. He urged active and passive exercises as soon as possible after the operative procedure. He has found practically no value in the use of drugs and is not convinced that thyroid extract or hirudin are of any real use. He considers that the reduction of trauma at the time of operation has been overemphasized and doubts the importance of



infection and seems to think that there is as much thrombosis in non-infectious cases as in infectious ones. After thrombosis has developed, he feels that the procedure varies with the location of the thrombosis, and separates a thrombosis in superficial veins from that in the deep ones. Although emboli from thrombosis in superficial veins frequently produce pulmonary infarctions, these infarctions are rarely fatal. On the other hand, if it is possible to tie the vein above the thrombosed area he recommends doing so and in occasional instances, he favors injecting into the vein a sclerosing substance between the clot and the blood stream returning to the heart. In thrombosis in the deeper veins he favors motion in the active stages rather than fixation of the part.

Then Dr John Homans gave his views about thrombosis and like Dr O'Neill did not have any suggestions in regard to what is the real etiological factor in these cases. He called attention to the fact that thrombosis is increasing and thought it might be due to stasis produced by keeping patients too quiet. He emphasized that dehydration, trauma and general debility were contributing factors. When trauma is a factor in thrombosis he suggested the possibility of some substance from the injured muscles being a factor in production of thrombosis. He reported on the work of Dr Frederick W Bancroft of New York, who in his attempts to prevent thrombosis after surgical procedure is careful not to place any tight dressings on his wounds. Dr Bancroft also favors starting up peristalsis early and paying particular attention to the avoidance of dehydration. Furthermore, this surgeon recommended the use of sodium thiosulphate intravenously not only as a preventive measure against coagulation but even after thrombosis has developed. Dr Homans gave the impression that he was not quite so much in favor of active motion during the early stages of a deep phlebitis as Dr O'Neill appeared to be, but rather favored giving a chance for the process to subside during a rest period. He thought the term propagating thrombus was unfortunate because it implied that the process was still one of thrombosis when in reality the propagating thrombus is really a clotting of the blood in the main blood stream. If the process of thrombosis extends to a large vein with an active blood current, at this point the process either stops or else clotting occurs in the main blood stream and this clotting frequently develops into a pedunculated blood clot swinging in the blood stream. When this takes place embolus is sure to eventually develop unless the vein is tied off proximal to the clot. These large clots are the ones that produce fatalities by emboli. Dr Homans also called attention to the length of time a good size embolus can persist at the bifurcation of the pulmonary artery without causing complete obstruction and death. In some of his cases the evidence pointed to the embolus having been at this point for a matter of days or even weeks before finally causing death.

## THE CARNEY HOSPITAL CLINICAL MEETING

The second clinical meeting of the Carney Hospital was held October 7, 1935, at 8 P M. Dr William J Macdonald spoke on "The Diagnosis of Common Skin Diseases." His talk was profusely illustrated with lantern slides. Dr Macdonald emphasized the important rôle played by eczema in the practice of the dermatologist. This disease comprises forty per cent of the work in the average dermatological clinic. He stated that eczema could not be classified as a simple infection. Idiosyncrasies and allergy are the etiological agents behind a great many of these cases. Dr Macdonald illustrated the damage done by face powders, perfumes, jewelry, furs, plants, and food products. He was very emphatic in expressing his belief that it was highly important to have an internist in consultation on a great many dermatological patients.

Dr Louis E Phaneuf spoke on "The Diagnosis and Management of Pelvic Inflammation." He stated that this condition is the most important of the seven large gynecological divisions. Tuberculosis and gonorrhea are the commonest infections in the female genital urinary tract. He divided the general pathology into three subdivisions, the acute, the spreading, and the degenerative. In the first two stages conservative treatment is the ideal. In the third an operation is usually necessary. Fifty per cent of his patients do not come to operation when treated by the standard conservative methods. He also spoke on the vaginitis caused by the *Trichomonas vaginalis* and gave several methods of treatment. He gave examples from his own private practice and showed analytical lantern slides.

## WILLIAM HARVEY SOCIETY

The next meeting of the William Harvey Society will be held Friday, October 25, in the Auditorium of the Beth Israel Hospital, Boston, at 8 00 P M.

### PROGRAM

Speaker Dr Walter C Alvarez, Mayo Clinic.  
Subject "Functional Digestive Disorders"

Chairman Dr Louis F Curran, Professor of Clinical Medicine, Tufts College Medical School.

## SUFFOLK DISTRICT MEDICAL SOCIETY

### PROGRAM OF MEETINGS

October 30, 1935

Stated Meeting Boston Medical Library

"The Interpretation of Problems in Bright's Disease and Related Conditions" Dr Soma Weiss

"The Management of the Problems in Bright's Disease and Related Conditions" Dr Laurence B Ellis

Discussion Dr George Gilbert Smith and Dr Louis E Phaneuf.

December 11, 1935

Joint Meeting with the New England Heart Association at the Boston Medical Library

"Constrictive Disease of the Pericardium Dr Charles Sidney Burwell.  
Discussion Dr Edwin D Churchill and Dr Paul D White

January 29 1936

Joint Meeting with the Boston Medical Library at 8 Fenway

"Observations Around the World Dr Walter B. Cannon

March 18, 1936

Meeting at the Boston Medical Library

"The Laboratory and Clinical Story of Fatigue." Dr Arlie V Bock and Dr David B Dill.

Discussion Dr Donald J McPherson and Dr Augustus Thorndike Jr

April 29 1936

Annual Meeting at the Boston Medical Library  
"The Treatment of Septicaemia. Dr Champ Lyons

"The Plurality of Scarlatinal Streptococcus Toxin" Dr Sanford B Hooker

Discussion Dr Hans Zinsser

The medical profession is cordially invited to attend all of these meetings.

ROBERT L. DENORMANDIE, M.D., *President*

CHARLES C. LUND M.D. *Secretary*

FRANCIS T. HUNTER M.D.,

Boston Medical Library

#### WORCESTER DISTRICT MEDICAL SOCIETY

##### CENSORS MEETING

The next meeting of the Board of Censors for the Worcester District of the Massachusetts Medical Society will be held in the Library Rooms of the Worcester District Medical Library Inc., located at 24 Elm Street, at 4 30 on the afternoon of Thursday November 7 1935. All candidates desiring to be examined at this meeting of the Board of Censors should apply to the Secretary of the District Medical Society at least two weeks before the examination.

ERWIN C MILLER, M.D., *Secretary*

#### CARNEY HOSPITAL CLINICAL MEETING

Monday October 21, 1935 8 P.M.

Diagnosis and Management of Acute Appendicitis Dr C. McK. Fraser

Treatment of Burns. Dr R. H. Aldrich Lantern Slides

Physicians and medical students invited

#### MASSACHUSETTS PSYCHIATRIC SOCIETY

The eleventh annual meeting of the Massachusetts Psychiatric Society will be held at the Parker House on Tuesday October 29 at 6 30 P.M. After a business meeting, which will include the election of officers for the coming year the Society will hear the annual discourse which will be given by George Barton D.Sc., Associate of the Carnegie In-

stitution and Editor of *Isis*. He will speak on Genius with Special Reference to Science and Music.

OSCAR J. RAEDER, M.D., *Secretary*

#### NEW ENGLAND HEART ASSOCIATION

The first meeting of the New England Heart Association will be held Monday October 28 in the Ether Dome of the Massachusetts General Hospital, at 8 15 P.M.

##### PROGRAM

1 Pathological Specimen—Chronic Constrictive Pericarditis. Dr P. D. White.

2. Fat and the Left Pericardial Diaphragmatic Angle. Dr Sylvester McGinn

3 Congenital Heart Disease

A. Unselected Cases for Diagnosis Dr P. D. White

B. Our Experience at the Massachusetts General Hospital in the Past Ten Years as to Accuracy of Diagnosis Dr McGinn.

4 Pulmonary Infarction Complicating Severe Chronic Mitral Valve Disease with Failure Dr H. B. Levine

5 A New Method in the Treatment of Paroxysmal Tachycardia. Dr H. B. Sprague.

6 The Normal Lead IV Dr R. E. Glendy

7 The Abnormal Lead IV Dr A. Grabiel

The members of the New England Heart Association and interested physicians are invited to attend.

JAMES M. FAULKNER, M.D. *Secretary*

#### NEW ENGLAND SOCIETY OF PSYCHIATRY

The New England District of the American Psychiatric Association will meet at the Medfield State Hospital Medfield Massachusetts, Thursday October 24 1935

##### PROGRAM

Buffet lunch will be served at 12 30 P.M.

Business meeting at 1 30 P.M.

Candidates for membership proposed at the last meeting, and approved by the Executive Committee to be presented for election.

Speaker "A Recent Court Experience." L. Vernon Briggs M.D., Boston Mass.

HORACE G. RIPLEY M.D., *President*

HARLAN L. PAINE, M.D. *Secretary-Treasurer*

#### HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held in the Peter Bent Brigham Hospital Amphitheatre (Shattuck Street Entrance) Tuesday evening October 22 at 8 15 P.M.

##### PROGRAM

Presentation of Cases.

Some Experiences During a World Tour By Walter B. Cannon M.D.

MARSHALL N. FULTON, M.D. *Secretary*

## SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, OCTOBER 21, 1935

#### Monday, October 21—

- \*9-10 A.M. Boston Dispensary, 25 Bennet Street,  
Boston Anaphylaxis Clinic Case Presentation  
Dr Joseph Kaplan

#### Tuesday, October 22—

- \*9-10 A.M. Boston Dispensary, 25 Bennet Street,  
Boston 'The So-Called Splenic Anemias Dr  
William Dameshek.  
8 15 P.M. Harvard Medical Society Peter Bent  
Brigham Hospital Amphitheatre (Shattuck Street  
Entrance)

#### Wednesday, October 23—

- \*9-10 A.M. Boston Dispensary, 25 Bennet Street,  
Boston Ward Cases Dr S J Thannhauser  
112 M. Clinico-Pathological Conference Children's  
Hospital

#### Thursday, October 24—

- \*8 30-9 30 A.M. Clinic, Surgical Staff of the Peter  
Bent Brigham Hospital, at the Peter Bent Brigh-  
ham Hospital.  
\*9-10 A.M. Boston Dispensary 25 Bennet Street,  
Boston 'Physiological Significance of Macrocy-  
tosis in Anemia. Dr W B Castle  
\*3 30 P.M. Medical Clinic at the Peter Bent Brigham  
Hospital

#### Friday, October 25—

- \*9-10 A.M. Boston Dispensary, 25 Bennet Street,  
Boston Ward Cases Dr S J Thannhauser  
\*12-1 P.M. Boston University School of Medicine  
Surgical Clinic at the Boston City Hospital, Chee-  
ver Amphitheatre  
8 P.M. William Harvey Society Auditorium, Beth  
Israel Hospital, Boston.

#### Saturday, October 26—

- \*9-10 A.M. Boston Dispensary, 25 Bennet Street,  
Boston Nephritis Clinic Dr S J Thannhauser  
\*10-12 Staff rounds at the Peter Bent Brigham Hos-  
pital.

\*Open to the medical profession.

†Open to Fellows of the Massachusetts Medical Society

October 18—Boston University School of Medicine Sur-  
gical Clinic at the Boston City Hospital See page 781.

October 21—Carney Hospital, Clinical Meeting See  
page 783

October 21 - November 2—1935 Graduate Fortnight of  
the New York Academy of Medicine See page 898 issue  
of May 9

October 22—Harvard Medical Society See page 783

October 24—Medical Clinic at the Peter Bent Brigham  
Hospital See page 781.

October 24—New England Society of Psychiatry See  
page 788

October 25—Boston University School of Medicine Sur-  
gical Clinic at the Boston City Hospital See page 781.

October 25—William Harvey Society See page 782

October 28—New England Heart Association. See  
page 783

October 28 - November 1—The Twenty-Fifth Clinical  
Congress of the American College of Surgeons See page  
1065, issue of May 30

October 29—Massachusetts Psychiatric Society See  
page 783

## DISTRICT MEDICAL SOCIETIES

### ESSEX NORTH DISTRICT MEDICAL SOCIETY

October 23—Quarterly Meeting to be held at 1 P.M.  
at Peabody House, Andover Academy

### SUFFOLK DISTRICT MEDICAL SOCIETY

October 30 - April 29—Schedule of Meetings See page  
782

### WORCESTER DISTRICT MEDICAL SOCIETY

November 7—Censors Meeting See page 783

November 13—Wednesday evening Grafton State Hos-  
pital, North Grafton, Mass Dinner and scientific program.  
Subjects of program to be announced later

December 11—Wednesday evening St. Vincent Hospi-  
tal, Worcester, Mass Dinner and scientific program  
Subjects of program to be announced later

January 8, 1936—Wednesday evening Worcester City  
Hospital, Worcester, Mass Dinner and scientific program  
Subjects of program to be announced later

February 12, 1936—Wednesday evening Worcester State  
Hospital, Worcester, Mass Dinner and scientific program.  
Subjects of program to be announced later

March 11, 1936—Wednesday evening Memorial Hospi-  
tal, Worcester, Mass Dinner and scientific program  
Subjects of program to be announced later

April 8, 1936—Wednesday evening Hahnemann Hospi-  
tal, Worcester, Mass Dinner and scientific program  
Subjects of program to be announced later

May 13, 1936—Wednesday afternoon and evening An-  
nual Meeting of Society Time, place and details of pro-  
gram to be announced in an April issue of the Journal

ERWIN C MILLER, M.D., Secretary

### WORCESTER NORTH DISTRICT MEDICAL SOCIETY

October 23—Quarterly Meeting to be held at the State  
Colony in East Gardner, at 4 30 P.M.

## BOOK REVIEWS

Arthritis and Rheumatoid Conditions Their Nature  
and Treatment. Ralph Pemberton Second Edi-  
tion 455 pp Philadelphia Lea & Febiger \$5.50

This is one of the best of any single treatise on  
arthritis published to date It is composed prac-  
tically of summaries or abstracts from other men's  
works in combination with the author's own observa-  
tions It goes into sufficient detail of the pathology  
of arthritis the history is minimized as it should  
be symptomatology and treatment are well pre-  
sented, because they are presented from an intern-  
ist's point of view of a disease which primarily be-  
longs in the field of internal medicine

In reading the book, two things strike one who is  
really interested in arthritis First, the statement  
that the author's own experience corroborates that of  
Nichols and Richardson in the belief that there may  
be only one arthritis, but that many individuals re-  
act differently and require different forms of treat-  
ment at different stages of the joint involvement.  
Secondly, no mention is made of the value of con-  
tinuous follow up, or survey, of either the author's  
own or other patients In any study of the ar-  
thritic problem, a continuous follow up of the same  
group of patients is of the utmost importance

Whereas Pemberton in this second edition makes  
definite statements regarding the futility of classi-  
fication of the arthritides, one is impressed with the  
fact that the man is attempting to state in a similar  
fashion, but does not do so, that the arthritic is an  
individual who has a definite complaint, i.e., some dis-  
turbance of the articular or periarticular structure,  
which changes as the years go on, or which spon-  
taneously arrests itself at any stage after the onset,  
or with partial or complete disability and deformity,  
or with only such remnants of the disease that  
normal function of the impaired joint is reestablished  
and no evidence of arthritis can be proved

The author has avoided or purposely omitted a  
great many of the rather exaggerated statements  
appearing in books dealing with arthritic conditions

and other joint disturbances from a purely one man point of view either surgical or orthopedic. The book is one that the reviewer believes may be called a "four star book." It is a well rounded general presentation of arthritis of the present time. The bibliography is of particular value because it brings up to date in a most comprehensive manner all the literature on the subject published to date. It is highly recommended to anyone interested in the general problem of arthritis as a book which should be bought and kept for practical use.

**Some Thoughts of a Doctor** Frederick Parkes  
Weber 183 pp London H. K. Lewis & Co., Ltd  
6s net

"Some Thoughts" comes from the facile practiced pen of a man who has written on many subjects lay and professional for thirty years. From his broad clinical experience with many minds and many men he has collected these observations that set one thinking. The book is to be taken in divided doses but the essays are short many of them too abridged from more extensive ones. For a ten minute sitting it is ideal. "Reminiscent of another learned physician Sir Thomas Browne they are the outcome of a charming and generous personality the expression of one who has achieved a real philosophy of life."

**Awaken Your Sleeping Beauty** Lilyan Malmstead  
96 pp New York E. P. Dutton & Co., Inc. \$1.75

This small book of less than 100 pages is written by the originator of a certain type of exercises. It is quite evident that the author believes in them with an almost religious fervor. The awakening of the sleeping beauty of one's body and individual members is by acquiring "erectitude." "Lengthen the line between the chin and waist and you will lengthen your years," says the title page and throughout the book if we follow this advice and bend backward from the waist line we are promised fair bodies and fair minds. We must think erectitude, conceive erectitude, cherish erectitude, express erectitude, glorify erectitude and be glorified by it! "It is the first step to perfect health and is a positive guarantee to keep it." It all sounds very simple and the frontispiece of Miss Malmstead is an excellent advertisement for her system perhaps a better one than the drawings illustrating her exercises.

Erectitude as contrasted with static erectness entails bending backward. The medical man however sees many more ills from exaggerated lumbar lordosis than from too little especially in middle-aged persons. A word of caution might not be amiss, suggesting the wisdom of a tempered enthusiasm on the part of the elderly and obese in carrying out the exercises proposed.

Whatever one may think of the method, the message of the book needs transmission. It is undoubtedly true that most people think too little of their muscles and their carriage and because of this thoughtlessness deny themselves both better

health and greater grace. There is little the doctors can do about Miss Malmstead's system except practice the method themselves if they wish and advise their patients to buy "Awaken Your Sleeping Beauty" for after THE END comes the following sentence: "The system of exercise covered by this book was originated by the author. Notice is hereby given that the author will promptly prosecute anyone who without express authorization from the author teaches or attempts to teach such system."

**Transactions of the American Association of Genito-Urinary Surgeons.** Forty-sixth Annual Meeting held at Hot Springs Va., May 14 15 and 16 1934. Volume XXVII 438 pp Saint Paul and Minneapolis The Bruce Publishing Company

The American Association of Genito-Urinary Surgeons is composed of about eighty of the leaders in genito-urinary surgery in this country—and a few distinguished foreigners—and therefore the transactions of its annual meetings represent the views of these leaders. This volume of 438 pages contains thirty articles by different members (and their collaborators) most of them making genuine contributions to various aspects of genito-urinary surgery. Some papers report brand new work some of it still in the experimental and unproved stage others present rare and interesting cases while still others make their contribution by reviewing or shedding new light on old problems. As in all branches of surgery nowadays there is increasing emphasis on physiological and endocrinological methods of approach and on long time end results, and less emphasis on the purely mechanical and technical aspects. Subjects which particularly attracted the reviewer's interest were the question of the control of prostatic hypertrophy by the administration of hormone, the relation of hyperparathyroidism to the formation of certain urinary stones, the rôle of radiation therapy in the treatment of tumors of the testis and the gonadotropic hormone in the urine of men with such tumors. Ipso facto this volume represents the views of the leaders of American genito-urinary surgery.

**A Record Book for Tuberculosis Patients.** Lawra Brown. New York National Tuberculosis Association. \$1.50

This record book is designed to help patients to keep in close touch with their physicians. I presume under circumstances when for reasons of distance or economy a patient cannot see his physician so often as would otherwise be the case. A typical page consists of a temperature and pulse chart and on the opposite page headings such as "General Symptoms" which include "appetite," "digestion," "strength," etc. and "Localizing Symptoms" under which are "cough" and "expectoration," followed by a few general headings such as "number of hours in bed," "amount of exercise," etc.

For a certain type of patient this little book will undoubtedly be of value for others of the more in

telligent class it is rather too detailed and in many cases quite unnecessary. It closely resembles the "Record Book" used by Dr. Joseph H. Pratt in the Emmanuel Church Tuberculosis Class when the home treatment of tuberculosis was almost the only way in which that disease could be treated. At the present time with what might be called almost a plethora of sanatoria and institutional facilities the scope for such a book as this is limited. The writer of this review uses a form for this identical purpose which is far simpler and which he believes on the whole is better. It is particularly valuable for patients who see him only once a month or thereabouts so that these weekly reports keep him in close touch with the patient. All such means of doing this are steps in the right direction, however, and as such this record book is of value in certain cases.

**A Synopsis of Regional Anatomy** T. B. Johnston  
Third Edition 460 pp Philadelphia Lea & Febiger \$4.50

Previous editions of this valuable textbook of regional anatomy have been favorably reviewed in the *Journal*. In this third edition the general plan of the work has not been modified, but a new section dealing with Osteology has been added. Sections on the brain and spinal cord have been rearranged and in several places rewritten, and the references to the development of various structures have been increased in number and have been inserted in the description of the regions with which they are concerned. The book is preceded by a glossary of the principal alterations of the B. N. A. terminology as approved by the Anatomical Society of Great Britain and Ireland. Although there are only eleven illustrations in the text, they are well selected and seem adequate for the purpose of the book, which is not that of a complete textbook but rather as a manual of review for those who have studied the subject in a larger text and have already performed the usual dissections. Although of British origin, the book is thoroughly and equally well adapted to the use of American students.

**Précis de Thérapeutique et de Pharmacologie**  
Septième Edition A. Richaud et R. Hazard 1257 pp Paris Masson et Cie, éditeurs 100 fr

Richaud and Hazard's publication on pharmacology and therapeutics has for years been a standard text. The seventh edition of their work although a complete revision of the preceding editions, contains all of their completeness and simplicity of form. Embodied are the many new contributions to the above fields. The vitamins, hormones, cholines and vaccines all receive thorough consideration. Exception may perhaps be taken to the relative amounts of space accorded some of the medicaments described. For example, nine pages are devoted to a detailed description of so-called anti-syphilitic mercurials while only three pages are devoted to bismuth which has practically supplanted

ed them in the treatment of syphilis. Tryparsamide receives consideration of only half a page. Lapses of the preceding nature are, however, relatively few. The book on the whole is well done. It is excellently printed, and is subdivided in such a manner that it makes a very fit source of study for the medical student and reference for the physician.

**Leçons de Physiologie Médico Chirurgical** Leon Binet 244 pp Paris Masson et Cie 40 fr

There are presented in this protocol sixteen conferences on the physiologic aspects of various medical and surgical problems of importance. Included in the wide diversity of discussed subjects is a study of induced pneumothorax in tuberculosis, the treatment of acute hemorrhagic pancreatitis and experimental acute nephritis, the pathogenesis and treatment of peptic ulcer, intestinal obstruction, functional exploration of the spleen, the colon bacillus, the arterial atheromata and the agents employed in the treatment of rickets. Although primarily of physiologic importance, the contributions of Professor Binet and his collaborators will be read with profit by the internist and surgeon as well.

**Aids to Ophthalmology** N. Bishop Harman Eighth Edition 242 pp Baltimore William Wood & Company \$1.25

This work constitutes an excellent pocket manual for the student of medicine, for whom a series of similar aids have been written by British authors.

Rare diseases are omitted, and emphasis is given to the more common eye diseases and to their relation to general medicine. The subject matter is well presented, and it carries 203 helpful illustrations. While *Aids to Ophthalmology* cannot be considered complete enough to serve as a book of reference, it does serve a useful purpose as a supplement to case teaching for the student who is first undertaking clinical work.

**Diet Control** A system of eleven hundred diets for the prescription of diabetic, anti-obesity and measured diets in general. George E. Anderson and Paul C. Eschweiler New York City Gallo & Ackerman, Inc.

This work is not a book but consists of a descriptive pamphlet of the principles of treatment for the physician, and a dozen detachable pamphlets of diet prescription for patients. The purpose of the authors in applying diet control in this way is to facilitate yet to keep accurate the selection of foods by patients. In each of the pamphlets of diet prescriptions there is an explanatory introduction of the treatment, and this is followed by lists of measured but not weighed foods that may be selected by the patients at the three meals. The work should be found useful for practitioners who frequently prescribe diets.

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## PSYCHOPATHY AND THE GENERAL PRACTITIONER\*

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TO the practitioner of medicine, cases of mental illness and emotional disorder occurring among those who come to him for assistance constitute one of the gravest and most troublesome problems with which he is obliged to deal because of their protean aspects and complex phenomena. These cases will naturally fall into two large nosological groups, namely, the psychotic, or those cases suffering with the frank mental diseases, and those that come under the general classification of the psychoneurotic.

About the first class, the psychotic, I shall have but little to say, because ordinarily they will present few difficulties in differential diagnosis, and the solution of them, from the viewpoint of the practitioner, is generally immediate commitment or hospitalization. Because of the gross interference with the usual mental habits, the very obvious changes in the common beliefs, personality expressions and mannerisms of the patient, the physician will rarely have much difficulty in convincing the members of his family that a serious condition is present. The cooperation of the family with the plan to hospitalize the patient usually will be easily obtained, and there should be little delay in its execution.

It is the latter group, made up of the various psychoneuroses, the baffling borderline cases and the innumerable emotional states and undefined, subtle maladaptations which disturb the lives and invade the homes of so many individuals, that will give the practitioner his greatest concern, tax his patience almost to the point of exasperation, challenge his resourcefulness to its maximum, and frequently require a high degree of sophistication and intuition for their solution. It is to this class that we shall devote our attention in this discussion.

Man's early mental life consisted almost entirely of efforts directed toward an understanding of the elemental forces of nature, and their effects upon his physical existence. As his intelligence increased and he reached the stage in his development where he found it no longer necessary to devote the major part of his time to the pursuit of life-saving activities, he must

have become aware of the fact that an inner being had been developing within himself, and for the first time he began to visualize an inner permanent, identifying quality, apart from his outside world. He began to experience the amazements of consciousness. We can very well imagine that in due course of time, he began to have ruminations relative to the various attributes of the conscious state, and to ponder and theorize upon its nature.

As the severity of life conditions softened, and man's interests broadened, he turned to the exploration of the neighboring country, and thus made contacts with other groups. This led to commerce. These activities brought riches, which in turn brought leisure, time in which the struggle for bare existence was temporarily suspended or anticipated, and in which opportunities for contemplation and introspection were presented.

We can imagine that the mystery of his personality occupied the mind of man to a greater and greater degree, and finally he began to discuss it with his fellows. Attempts at interpretation and explanation must have been largely colored by mysticism and the supernatural, but as experience broadened, his concepts became orientated and crystallized, and finally he developed the discipline of associative thought. The individual then began to be able to profit by his previous experience. Later the method of thinking called "Science" began to operate, and to be applied to various categories and conditions, of course without success of solution, because his problems were not yet susceptible of definite formulation. Centuries later, philosophy developed and finally became resolved into its fundamental elements and out of these formulations the Art of Medicine originated.

As late as 470 B.C., when Sparta and Athens had joined forces and definitely turned back the advance of Oriental conquest and culture, and were able to give themselves up to the peaceful pursuit of philosophical speculation, their philosophy was confined almost exclusively to the physical aspects of life.

It was at about this point in the development of the world of ideas, that Hippocrates flourished, and it was at this time that he gave to Medicine its first indelible scientific impression. From out of the welter of medical superstition,

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theoretical assumptions, and the numerous philosophies concurrent with his time, he sifted out what he thought to be the factual material, and established the first synthesis of rational knowledge relative to the diseases and disorders of mankind

Later Socrates, 469-389 B C, turned his investigative searchlight within questioning, doubting, analyzing, not only the physical life of man, but especially his inner mental life, and as a result of his labors, gave to the world the compelling formulation, "Gnothe Seauton," "Know Thyself." This was a new and revolutionary attitude. It came to fruition during the Athenian period in the form of an encyclopedic interest in about every quality of man, including his psychic self and his dream life.

Plato anticipated Freud's interpretation of man's unconscious, the mechanism of repression, and of his dream life, as illustrated by the following quotation from his work "Certain of the unnecessary pleasures and instincts are deemed to be unlawful, every man appears to have them, but in some persons they are subjected to the control of law and reason, and the better desires prevailing over them they are either wholly suppressed, or reduced in number, while in other persons these desires are stronger and more abundant. I mean particularly those desires which are awake when the reasoning and taming and ruling power of the personality is asleep, the wild beast in our nature, gorged with meat and drink, starts up and walks about naked, and surfeits at his will, and there is no conceivable folly or crime, however shameless or unnatural—not excepting incest and parricide—of which such a nature may not be guilty. But when a man's pulse is healthy and temperate, and he goes to sleep cool and rational, having indulged his appetites neither too much nor too little, but just enough to lay them to sleep, he is then least likely to be the sport of fanciful and lawless visions. In all of us even in good men, there is such a latent wild beast nature which peeps out in sleep."

After the fall of Athens, 404 B C, there was a period during which Oriental fatalism and determinism flourished. During the period from 336-270 B C, the philosophy of resignation of the Stoics and the efforts of the Epicureans to nullify the painful in the psychic and physical lives of man dominated the philosophic trends of thought.

Later came the Romans, the first of the pragmatists, and then the Christian ideal founded wholly upon philosophical faith, in contradistinction to the wavering flame of scientific method, of searching for facts that had just been ignited by the Greeks.

By the year 1096 A.D., the Crusades had begun, and the monastic attitude dominated the world of ideas. During the eleventh, twelfth

and thirteenth centuries, the attitudes and interests of the majority of the peoples of the civilized world gradually, but completely, changed from those of the preceding centuries. With a fine ascetic disregard for the world, and the philosophies of materialism and the flesh, they were searching for solutions to the problems of the spirit, and in the salvation of their souls. The scientific method and the art of medicine went into a long period of scholastic lethargy.

The point I wish to make is, that for centuries, man had moved in and out of long periods of contemplation of either his physical self, his mental life or his spiritual awareness. Never had there been any broad propelling attempt to bring these three intrinsic fundamentals of man together, and to visualize him as a synthetic, biological entity. Each characteristic was isolated from the others in thought-proof compartments, and man, for the most part, looked upon each as having a separate existence and an independent function. There had been no concept of an integrated, interdependent relationship, or of a "total personality."

Spinoza, in the seventeenth century, made a definite attempt to destroy the distinction between an independent body and an independent mind and to eliminate this attitude of biological fragmentation. He attempted to create a "body-mind" relationship. The attitudes of the eighteenth and nineteenth centuries, slowly added impetus to the growing belief in the unity of man, but it was not until the early years of the twentieth century, when Sherrington published his monumental and revolutionary work, "The Integrative Action of the Nervous System," and Adolf Meyer established his epoch-making concept of psychobiological integration of the personality, that any real advance was made toward an understanding of the basic fundamentals of the personality or of the dynamics of mental disorders. Sherrington's efforts directed toward synthetic structuralization of nervous function, and the dynamic-genetic concepts of Meyer, together, materially clarified the situation, and for the first time in medical thought there was a definite discipline in our ideas of psychopathy and a rational basis for an understanding of their mechanics. The implications of integration gave a new philosophical insight into the origin and meaning of mental disorders. We had been looking at them too long from a pragmatic attitude alone.

For years man had thought of disease and disorder as occurring either within his mind or within his body. The interrelation between the mental and the physical had not been appreciated, and not until Sherrington and Meyer published their works, was there any real suggestion of psychosomatic correlation. We now recognize and appreciate the fact that it is this

integrative function of the nervous system that makes adaptation to life possible. Interferences with this integration make maladaptations to life equally possible, and it is through and by this integrated whole that they express themselves. It is likewise responsible for the mystery and the baffling incongruity of the symptomatology seen in many of the neuroses.

From the above, we conclude that there is in the central nervous system a centralization of the function of living, and of the life forces, due to a harmonious coördinated, regulated co-operation of all its parts. At this point a brief review of our knowledge of these parts may assist in a further understanding of the discussion of certain clinical aspects of psychopathy which is to follow.

For convenience, we separate the nervous system into three major divisions, namely the brain, the spinal cord and the nerves. The latter are divided into the sensory neurons, the motor neurons, and the sympathetics. The function of the sensory neurons is to bring to the awareness of the individual, in the form of sensations, perceptions of his environment, as well as information relative to the state of his inner self. It is only through the sensory mechanism that man knows what is going on about him, or that he becomes aware of changes occurring within his own physical and psychic self.

The motor neurons, through the musculature, permit expression of man's will and desire in the form of conduct, behavior or action. They also serve various glandular structures. The sympathetics form the connecting link between the inner organic life of the individual and the higher, psychic functions of the central nervous system. They are closely related to the fundamental, archaic instinctive life of the personality, and represent an inheritance from the time when the early animal types had no thinking machine with which to adapt themselves to the circumstances of their environment.

The function of the spinal cord is similar to that of a great cable which provides specific pathways for the transmission of the sensory neurons coming in from the various end-organs, and going up to the brain, and for paths for the motor neurons coming down from the brain, and going out to the muscles, organs and glands. The sympathetics are also carried up and down within the cord, and within it, also are various reflex arcs which make for certain automatic acts outside of consciousness.

The functions of the brain are as follows: first the reception and transmission of nerve impulses, as in the reception of sensory messages, and the formation of perceptions which are, in turn, transmitted to the motor centers as thinking and to the hypothalamus as emotion or feeling and secondly the storing up of these

messages in consciousness. No one of these three components is lost. Every sensation, every thought or idea, every emotion or feeling is stored up permanently in consciousness in the form of individual experience, and they are grouped together according to the law of association.

We are in the habit of speaking of various levels of nervous function, as for instance the psychological level, which is represented by thinking and the psychic life, and located in the cortex, and the vegetative, or physiological level centered in the medulla, and represented by the more automatic functions of circulation, respiration and digestion. While these vegetative centres are located within the medulla, they are connected with the higher functions by neurons, and are being modified by psychic influences which flow to them in a constant stream from the cortical centres. In other words, between the higher and lower structural centres, and the various functional levels, associative neurons join all the numerous activities into a harmonious, well-coördinated, synthetic interrelationship, which functions for the good of the organism as a whole.

Now through all these structures, from the cortex down to the medulla, and through all the functional levels from the psychological down to the physiological, there are two great antagonistic currents constantly playing, the one tending to initiate maintain and express action, the other tending to stop retard and repress action. Of their fundamental nature, we are in ignorance, they may be electrical. We know them only by their works. Without them, there would be no controlled life, with them, an efficient expression of the flow of energy within the nervous system is made possible. These two opposing influences are excitation and inhibition. In the vegetative system, we witness their effect in the excitant action of the sympathetics and the inhibitory action of the vagus on the heart rate. In the psychic sphere, we see the excitation of the instincts meeting the inhibitory forces of conscience.

It is the antagonistic character of these two principles that is responsible for the production of psychic conflict in man, and furnishes the basis for the origin and development of his maladaptations. An inharmonious relationship between the two lower levels of the personality as represented by the habit patterns and the instinctive emotions, and the two higher levels, as represented by intelligence and conscience always furnishes the causative background of the psychoneuroses. When this conflict is expressed through the effect of the emotions upon the sympathetic nervous system and the hypothalamus, the symptomatology becomes dominated by functional disorders, with the produc-



tion of unusual sensory disturbances in the organs, glands, joints, muscles, circulation, etc. When it is expressed through the cortical structures and functions, it takes the form of unusual psychic expressions as in obsessional thoughts and ruminations, phobias, compulsions, impulsions, fixed ideas and anxiety states. It is only to the former class that we shall devote our attention in this paper. We shall not discuss those cases which express themselves through the latter routes.

In view of all this, we must no longer think in terms of diseased organs within a man, but remember that we are treating a person as a whole in time-contact with the world about him. We are not treating an individual isolated from his environment or from his cultural, moral, economic and social past, but we are treating a person surrounded by many conditions and factors, and immersed in many influences, endogenous as well as exogenous, that tend to modify and determine the character of the total objective picture. We cannot separate an organically ill man from his habit patterns, his unconscious instinctive tendencies or his repressed conflicts, and therefore, when we attempt to treat a person with a diseased or disordered heart, for example, we must approach both the heart and the man together as a total situation, and in view of the effects that the above life factors have upon it. Again it is the integrative, dynamic, genetic aspects of the nervous system as a whole that make this attitude necessary and valuable. As Doctor Frederick Tilney has said: "In the main, we have made disease our chief interest. As a matter of fact, life is the principal theme, to which disease is but a corollary. The purely pragmatic attitude toward medicine is not without its defects. It fails to encourage an approach to the salient problems concerning the significance of life, it omits, as theoretical, the considerations of development and adaptation. Although it lends facility to professional administration it does not establish the philosophical attitude upon which the advance as well as the practice of medicine ultimately depend."

It has been estimated that between fifty and seventy-five per cent of all cases of illness coming before the physician for assistance fall into the class of functional disorders of the nervous system. I have been informed by reliable persons that last year one of our large surgical clinics of the higher type turned back to referring physicians, for psychiatric investigation, fifty-six per cent of all cases sent there for abdominal operations. Investigation had failed to disclose the necessity for the surgical interference for which the cases had been originally referred. In our own work at the Riggs Foundation, each year we see a large number

of cases which have gone through the gamut of surgical exploration, radical removal of organs, or internal investigations and treatment, with no subsequent amelioration of the sensory symptoms for which the procedures were instituted.

We receive many cases which have been diagnosed as organic, which prove to be, upon further study, hysterical conversions, or substitute reactions for repressed emotional states, and which are cured by the application of the proper psychotherapeutic methods. On the contrary, we also receive cases which have been diagnosed as hysterical, which prove to be organic. Many cases of postepidemic encephalitis fall into this class.

When we begin to investigate illness in the light of the above principles, we frequently discover startling correlations and amazing incongruities in human behavior, especially in those cases where adequate histories and skillful examinations are utilized as the basis for our interpretations. If I can leave but one valuable thought with you as the result of this hour, I hope it may be that you have been impressed with the necessity for making accurate and complete histories, and skillful and painstaking examinations time consuming as they are. Carelessness in these two factors is responsible for many errors in diagnosis.

You are going to come in contact with many patients who come to you in your office, in clinic or in hospital, complaining of various pains, discomforts and disorders in different parts of their bodies, where complete examinations and accurate laboratory test, disclose no organic pathology whatever. Many times you will meet confusion, doubt and despair in attempting to arrive at a proper evaluation of the situation at hand. Frequently, it will take every particle of honesty you possess to treat these cases. Even after a consideration of all the facts at your disposal, often, diagnosis will be impossible. If you have learned to include in your routine examinations and histories, not only an account of the frank physical symptomatology, but in addition, facts relative to the life situations and environmental influences in which the person lives, something about his usual emotional reactions, his desires, hopes and ambitions, his discontents, his defeats and his inner habit patterns of reaction to responsibility, disappointment, frustration and failure, frequently, you will be surprised to discover causes for what otherwise would seem bizarre and inconsistent physical symptoms. You will bring about occasionally, what seem to be miraculous cures if you will but include in your histories, and give full value to the facts or psychic insult, as well as of physical trauma, to psychopathology as well as to physical pathology.

Just what should be our attitude and procedure, for example, in the following case that has lately come to my attention? Here is a man of forty years. He possesses an unusual degree of intelligence, he is well educated and has high cultural qualities. Apparently there is no reason why he should not be as happy as most of us. He has a nice family, a charming wife and an assured income, and has no special discontent with his social situation. Several months ago he began to suffer with what he described as "spells", in which he suddenly finds his heart pounding, his breath coming in gasps, his pulse rate rapidly mounting to 120 per minute and his body breaking out in drenching perspiration. At the same time he is consumed with what he expresses, as a "silly and unfounded paralyzing fear of impending disaster", and for days following the attacks, he is confined to his home completely incapacitated because of the actual physical discomforts associated with respiration and circulation, and because of a fear of a return of the so-called "spells". Repeated clinical examinations by reputable internists have failed to disclose any pathological conditions of any kind. Now what shall be our attitude? Shall we give him a prescription for a placebo of attractive appearance and fine flavor as a substitute for a cocktail before meals, or shall we tell him that there is nothing the matter with him, and that his attacks are "all imagination" and that he "must snap out of it", or "forget it"? Or shall we suggest that he take a long journey, or a sea trip hoping that some kind genie will solve his problem for him before he returns? Or shall we take an intelligent, humane, scientific attitude toward this unhappy man and search for causes in fields other than in the purely organic? Not in the "body" alone, but in the "body mind" machine, not simply in the physical realm, but in the psychic as well.

An investigation into the facts at our command in this case discloses some interesting data. We noted that his attacks began some months ago. In looking into the experiences of this man just prior to the onset of the attacks, we find that he had had no physical illness in fact he reported that he had been feeling unusually well at the time. Nothing of any importance had happened to interfere with his domestic or social relationships. He had done nothing about which to be especially ashamed or sorry. There had been no reduction in income. On the contrary, he had just been promoted in the organization in which he worked. In his own mind, he had simply been taken suddenly ill with a physical disease, and no one had been able to discover its cause.

In going farther into the facts of his commercial life, however, we discover that his attacks first came on within one week after he had received this promotion. Could this have had

anything to do with the onset? He thought not. "How could such a happy event?", he said, "have anything to do with the production of the symptom picture" which we have described?

This man had served for several years as an efficient assistant to one of the department chiefs. He was well liked, accommodating, conscientious, cooperative and willing, and he possessed a wide fund of knowledge about the mechanics of the department in which he had worked. His chief was a domineering, efficient person, however, who made a practice of planning and directing most of the details himself. He was unable to delegate authority, or to take his assistant into his full confidence and therefore this able assistant had been trained in everything having to do with his work, except that of planning, exercising authority and assuming responsibility. When his chief died suddenly, and he found himself promoted because of seniority, to his position where he was obliged to assume all the responsibility for planning and directing, his personality suddenly demonstrated his inadequacy to carry this type of load. Unconscious emotional conflicts developed within himself because of the threat to his ego implied by the assumption of the responsibilities of his new position. Consciously man cannot admit failure easily, and this man, therefore, repressed his fear of failure from his awareness. Unconscious processes then took up the problem and acted as though they had a will of their own in that they seemed to have the power to get the individual out of the situation and at the same time save his personal pride. In this man, the emotional component of the complex, through its influences upon the sympathetics, set up a disturbance in the automatic functions on the physiological level, and produced the somatic symptom picture as above. As a result of what appeared to him to be entirely a physical illness, he was removed from the painful situation and he left with no impairment of his self respect and with no conscious realization of his inadequacy.

Now is this the whole story? No. It is not quite so simple as that. The promotion to the position of responsibility was simply the precipitating cause of the disorder. It simply reactivated and set in motion certain factors that were already in the personality make-up of the man at the time. The real source of his trouble lay deep within his personality structure in the form of habit patterns which were formed as a result of the environmental pressures, disciplines, admonitions and criticisms from those whom he loved or feared, before he reached the age of discrimination or judgment. Simply by the flight and pressure of time, they had been automatically pushed away into the unawareness, with the immature, nonlogical emotional values formed in childhood still attached to them. Other pertinent facts included the influences of a father who had always criticized the

tion of unusual sensory disturbances in the organs, glands, joints, muscles, circulation, etc. When it is expressed through the cortical structures and functions, it takes the form of unusual psychic expressions as in obsessional thoughts and ruminations, phobias, compulsions, impulsions, fixed ideas and anxiety states. It is only to the former class that we shall devote our attention in this paper. We shall not discuss those cases which express themselves through the latter routes.

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of cases which have gone through the gamut of surgical exploration, radical removal of organs, or internal investigations and treatment, with no subsequent amelioration of the sensory symptoms for which the procedures were instituted.

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working, suddenly appeared in the office with an engagement ring upon her finger, and with the news that our patient's fiancé had given it to her.

It was on the day following the above reported episode that the onset of the fatigue syndrome appeared. The threat to this woman's ego was simply too great for her to tolerate. Her unconscious instinctive mechanisms got to work, interrupted the smooth running of the autonomic system and produced the sensory symptoms, the real origin of which had not been discovered. The ultimate purpose of the whole movement was to get the young woman out of the intolerable emotional situation of being a daily witness to the happiness of her former fiancé and her more successful rival. The associations attached to her work, her office and her former relationships became too painful to accept, consciously. It was then that the unconscious mechanisms began to operate to remove her from the painful situation.

In an analysis of a thousand cases of so-called neurasthenia, it will be found that the outstanding symptom in at least eighty per cent of the cases, is an overwhelming sense of fatigue. Now this sense of fatigue is not real fatigue. Can we say that it is imagination? Not at all. What, then, justifies us in saying that it is not real fatigue? We all know that real fatigue is one of the most delicious sensations of the body. It produces a restful sense of relaxation, repose and peace. This sense of fatigue seen in the neuroses on the other hand does not produce rest and relaxation, it brings on a continual restlessness in which the person is tense and unable to rest, relax or sleep. In the former condition, rest results in a feeling of restoration of energy, in the latter, attempts at rest produce still greater sensations of fatigue and restlessness.

Neurasthenics are not suffering with real exhaustion, and they do not need rest or rest cures, as we ordinarily understand the term. Neither are they suffering with any organic changes within the nerve structures. In that state of mind known as the nervous breakdown, there is no actual structural breakdown in the nerves themselves. Rest only makes the individual even more sensitive to the sensory disturbances with which he is suffering. He needs change, perhaps, but he does not need rest. What he needs most is insight into the real, subjective dynamics of the symptoms, a better understanding of his personality and a better objective philosophy of life upon which to live.

This young woman for example, gradually recovered as she developed, over a period of several months, a real understanding of the subjective origin, nature and meaning of her symptoms and when she began to live upon a well planned intelligent scheme of objective living

Frank recognition of the dynamics of her unconscious habit patterns and her personality defects, and an honest attempt to eradicate or modify them through a direct, voluntary attempt to keep her thoughts and acts relevant to a new objective, brought to her finally a degree of health wholly unimagined in her former mode of living. But see the terrific price she paid for her new knowledge. What an indictment that this woman was permitted to go through the painful diagnostic surveys, the need less surgical explorations and the economic loss of time, simply because no one took the time or trouble to inquire into the emotional circumstances of her life and the habit patterns of her personality?

There is yet another interesting group of cases which falls into the class of sexual neuroses. The literature of modern medicine is filled with their descriptions. The following case taken from our own records illustrates certain of the polymorphic expressions of this type of difficulty.

A man of thirty-eight years, a graduate of one of the best eastern universities and of an excellent law school, comes for advice about a physical syndrome which invariably appears when he goes through a love affair. Three times in his life he had fallen in love and became engaged and each time when the engagement was announced or plans were made for marriage he was obliged to withdraw from the situation because of the development of a prolonged "nervous breakdown" in which the outstanding symptoms were anxiety, with muscular weakness, dizziness, lack of concentration, nocturnal emissions, indecisions, terrifying dreams, headaches and anorexia.

After the third affair of this nature he began to suspect that the physical symptoms might have some correlation with the emotional condition concurrent with the episodes. Investigation into the facts of the case proved him to be correct in his assumptions. This man's father was a judge of a high court and also sat as an elector in the House of Bishops of a prominent denomination. He boasted about his "ideas" on the correct methods of bringing up children. For years his three sons were not permitted to leave the house after the evening meal. They were allowed but few opportunities to come in contact with the normal activities of boys and girls of their own ages except in those forms of entertainment occurring within the church society and under the strict supervision of correct chaperonage. They were made exceptionally dependent upon their mother in all things, and especially in their human relationships. The father frequently lectured to them about the "social sins" as he called them, and painted his descriptions of the sexual diseases in lurid colors. He told them with great seri-

ousness that the young man who had carnal knowledge of woman before wedlock was eternally damned in the eyes of the moral world. He explained that no one but a moral leper would dare kiss or touch the person of a woman except she be his wife. He built up such a pure, moral picture of woman and such a disgusting immoral picture of sex that not one of the three sons could bring himself to break through the unconscious forbiddenness which this ignorant man built up in their immature minds, and go into marriage. I am not complaining so much of the fact that this man told his boys something of sex as I am of how he did it. His motives were sound, but his technique was unforgivably stupid and its consequences almost permanent.

In his adult difficulties this patient was unable to break away from the non-logical habit patterns of thought that had been made for him by the hyper-moral and overemotional attitudes of his father, because they had been pushed so far away into his unawareness by the pressure of time that they performed, automatically, the non-conscious function of prohibiting him from making any prolonged or close relationships with a person of the opposite sex.

In each love affair the sexual stimulation brought about by the contacts with a woman released these old associations from the unawareness and influenced his conduct in such a way as to prohibit him from continuing the relationship. The censorship implied in the father-made attitudes which had not been brought to full practical maturation in the adult conscious world of reality produced in him prohibitions, inhibitions and incapacities in his later life. His anxiety represented the old, immature fear of parental disapproval and disfavor, and the physical symptoms reproduced the picture which he had retained from his father's description of "the wages of sin." The practical results consisted of the development of an inability upon the part of the patient to continue his relationships with women beyond the point of formal social contacts.

We see also many cases in which the unresolved ideas relative to the auto-erotic practices of childhood and adolescence prevent both men and women from entering the marriage state because of the neurotic fear that they have injured their sexual organs. Many of these misinformed individuals feel that they would be unable to carry on a normal sex life implied in marriage, and become impotent or frigid, and never marry.

Finally, there is another group of cases the importance of which is rapidly growing in the minds of the medical profession. Ordinarily when we think of diseased processes we think in terms of disordered structure and function.

We have difficulty in thinking of one without the association of the other, and when situations arise in which both are involved, we have been in the habit of expecting the disorder in structure to precede the disorder in function. In the class which we are now considering it is known that the change in function precedes the change in morphology, and that long-continued excitation of the structures by anomalies in function ultimately produces serious pathological changes in structure. Moschcowitz, in the *New England Journal of Medicine* for April 4, 1935, lists these conditions as follows: (1) Essential hypertension, (2) "Graves' syndrome", (3) Gastric and duodenal ulcer, (4) Cardio-spasm, (5) Spastic or irritable colon and mucous colitis. Probably from the purely pathological aspect these five types are more or less related through changes in the blood and muscle supply caused by long-continued vasomotor malfunction.

Long ago Dr. Walter B. Cannon in his book, "Bodily Changes in Pain, Hunger, Fear and Rage", showed us the consistent visceral changes that accompany emotional reactions, and proved that affective states have a very definite effect upon the chemical balance of the blood and the endocrine glands. Pavlov's experiments with the conditioned reflexes have demonstrated beyond doubt that situations outside of the body touching upon the archaic autonomic mechanisms have definite influences upon the operation of the secretions and glandular structures. The work of Dr. Walter C. Alvarez at the Mayo Clinic gives ample evidence that life situations of certain types have definite effects upon the physiological functions. The work of Draper and McGraw has demonstrated that there may be psychic patterns of personality synchronic with the development of gall bladder disease and gastric ulcer. Maurice Fremont-Smith, Lawrence K. Lunt, Austen Riggs, Woodyatt, Nellis B. Foster, C. C. Wholey, Lauren Smith and many other writers of authority have given us undisputed evidence of their experiences in reporting cases wherein emotional conflicts, unresolved immature habit-patterns and blocked instinctive strivings have expressed themselves as obstruction of the bowel, sexual impotence, heart dysfunction, digestive interferences, muscular weakness, circulatory troubles, pain habits, high blood pressure, etc. The following case illustrates certain of these relationships.

Mr. I., aged fifty. Ten years ago suffered with what was diagnosed as gastric ulcer. Recovery was complete and the patient was free from symptoms for ten years. In 1929, at the time of the industrial and financial emergency, his South American export business failed and his holdings of stocks and bonds became depleted. He was obliged to discharge his large corps of servants, sell his palatial home, and move into a modest apartment, where his wife was obliged to do all the work. She did not take kindly to this great change in her life. She was suddenly

reduced from a position of great ease and luxury to one of hard labor, from a position of social prominence to one of almost total obscurity and her adaptive abilities failed her. As time went on she lost her equanimity and became irritable and intolerant. She nagged her husband to the point of exasperation, blamed him for the loss of his business and called him a fool and a knave. As time went on she became so unpleasant he spent most of his time away from home, and then she accused him of infidelity. After several months of this sort of thing he began to lose his appetite and sleep, and became unable to concentrate upon any matter of business. One day while at dinner, after a particularly disturbing scene with his wife he developed a sudden and sharp pain in the epigastrium, vomited his meal and went into a state of collapse. That night he had a large copious stool of clear mucus. The local physician made a diagnosis of gastric ulcer and acute colitis, and at once began to treat the patient for this condition. After several weeks of illness and without any appreciable improvement the man was sent to a hospital. Here no evidence of ulcer could be discovered in spite of the fact that all the subjective symptomatology continued. Finally he was turned over to a psychiatric group for study and recommendation. For days the gastric pain and mucous colitis continued. The patient was unable to retain much food and the mucous stools finally became filled with blood. Still no evidence of organic pathology could be discovered. Psychotherapy was continued and finally the man began to improve. As the causes for the emotional situation were gradually removed and as the patient gradually developed insight into the real nature of his troubles he slowly began to recover. After many weeks of continued treatment he left the hospital weighing some forty pounds more than upon admission and in an excellent condition of mental and physical health.

Cases of this type are exceedingly common. We believe that at least ninety per cent of all cases of mucous colitis are of psychogenic origin. Cannon was able to produce intestinal stasis in cats at will simply by throwing them into violent states of fear or anger. Many of us know the distressing feeling of precordial pain in situations calling forth the deep emotions of grief. The rise in blood pressure and the quickened pulse in fear are matters of universal experience.

The empty, "all gone" feeling in the pit of the stomach during violent anger is too common to need discussion. The sudden vertigo, with unconsciousness, in the hypersensitive person is an experience in the lives of many people. During the World War men frequently got up in the morning to find their thyroid glands enlarged to alarming proportions because of the fear aroused by the news of an impending advance or attack. We all know of the hysterical paralysis of the emotional conversions and the changes in the dermal circulation due to affective states. Those of you who read the unexpurgated edition of "All Quiet on The Western Front" will remember the example of uncontrolled bowel movement in the new recruits.

Now all these conditions demonstrate the fact that it is the emotional conditions and situations that precede changes in function, and it is the long-continued, persistent changes in function that may, and often do, lead to changes in structure. In writing of certain difficulties in the knee joint Dr. Austen Fox Riggs says, "Furthermore, from the beginning the function is still further curtailed by the fear that anything but the gentlest use of the joint may cause damage. If this condition persists for any length of time, a secondary physical change takes place in the joint itself."

So, in your work as medical men, do not get into the demoralizing habit of depending entirely upon what your instruments of precision and the laboratory reports tell you. Remember that you are dealing with a total personality, all of whose factors cannot be measured with mathematical absolutism. One must develop the habit of feeling into the emotional and psychic factors as well as into the physiological facts. Treat the total man, not the disease. Learn to look upon man as more than simply a physical machine.

You will have many psychological points of view and various philosophical postulates upon which to make your interpretations, but do not put exclusive dependence upon any one school. Remember we have some ten or fifteen primary instinctive tendencies and any one of them may be at the bottom of the maladaptive conflicts. Bear in mind that there is one school of psychological thought that has no textbook and no exclusive leader. It is the school of meticulous care and common sense.

## DIATHERMY IN LOBAR PNEUMONIA\*

## Preliminary Report

BY WINTHROP WETHERBEE, JR., M.D.,† JOHN A. FOLEY, M.D.,† AND JOSEPH RESNIK, M.D.†

## INTRODUCTION

**D**URING the past decade or thereabouts there have been numerous reports in the literature dealing with the use of diathermy in the treatment of lobar pneumonia. The various observers have shown considerable difference of opinion as to the value of this measure, but are almost unanimous in their belief that it is valuable symptomatically, and that it is not harmful when properly used.

Stewart<sup>1</sup>, perhaps the staunchest advocate of this method of treatment, has reported a series of over a thousand cases, with a mortality of 11.9 per cent as opposed to the 28 per cent mortality commonly observed in hospital cases of pneumonia treated by other methods. Harbin<sup>2</sup> mentions a series of sixty cases, with a 12 per cent mortality. Lihen<sup>3</sup> believes that diathermy is sufficiently valuable to be indicated in all cases, except aspiration pneumonias, or lobar pneumonias with complicating pulmonary abscess, closed empyema, or cardiac decompensation.

Other workers have been only slightly less enthusiastic. Robinson<sup>4</sup>, while he does not find the duration of the illness shortened to any extent, observes relief of pain, increased tendency to rest and sleep, less need for sedatives, and a general improvement sufficient to justify its use. Simon<sup>5</sup> finds no specific response to diathermy, but sufficient general increase in the comfort of the patient to make it a valuable symptomatic measure. All agree that under the direction of a competent physician it is an absolutely safe procedure.

Because of these favorable reports, it was decided to use diathermy in the treatment of lobar pneumonia on the Fifth Medical Service of the Boston City Hospital during the winter of 1934-35.

## SELECTION OF PATIENTS

All of the patients with lobar pneumonia were given the standard treatment, including serum and/or oxygen when indicated. (With the exception of one case, the latter was given by means of the oxygen tent rather than by nasal catheter.) In addition, one half of the series were given diathermy. The candidates for diathermy were not selected, but were alternate

cases.† The stage of the disease, the extent of lung involvement, the type of organism, and the general condition of the patient were not considered, and an attempt was made to render the selection as nearly as possible one of strictly controlled cases. One or two patients who were moribund on admission and died within a few hours, were omitted from each of the groups in this report.

As soon as a patient was admitted and the diagnosis of lobar pneumonia made, the Department of Physiotherapy was notified, and if the patient was a candidate for diathermy it was started promptly, in some cases within a few minutes, and in every case within a few hours.

No patient was included in either group of this series, in whom the clinical diagnosis of lobar pneumonia was not corroborated by x-ray.‡

## TECHNIQUE AND EFFECTS OF TREATMENT

Diathermy is a method of generating heat in deep-seated tissues by passing through them high frequency currents. The heat employed is not obtained, as such, from a source outside the body of the patient but is generated in the tissues proper, as a result of the electro-magnetic energy which oscillates through them at a very high rate of frequency.<sup>13</sup>

Of late, the terms short-wave diathermy and ultra-short-wave diathermy have come into prominence. The former refers to wave-lengths of approximately 30 to 12 meters while the latter comprises of the range, 12 to 2½ meters. In terms of frequency the present-day apparatus produces currents of ten million to one hundred million oscillations per second.<sup>14</sup>

For these currents Drs. Schleich and Reiter have claimed selectivity and specificity. By selectivity is meant that high frequency currents of given wave-lengths will cause optimum heating effects of corresponding body tissues, while specificity implies that these currents produce, in addition to heat production, specific biologic effects on the tissues analogous to inflammation, combating sepsis.<sup>15 16</sup>

†There were a few exceptions to this as for instance when a patient was admitted just before a week end or a holiday and it would not have been possible to start the diathermy as promptly as in the other cases. These patients were then used as controls and the next two or three in succession were included in the diathermy series until the two groups were even again. For all practical purposes however we may regard the selection as one of alternate cases.

‡A single exception to this was the patient E. L. In the control group who had her crisis on the second day in the hospital, the chest plate was not taken until three days after this time, and was read as negative. We felt that the history and physical signs in this case were sufficient to establish the diagnosis and that an x-ray taken earlier would have confirmed it.

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	Patient and Hospital Number	Age	Sex	Color	Date of Onset	Date of Adm.	Cond. on Adm.
1	T G 768006	20	M	White	10-3	10-4	Poor
2	C B 69924	35	M	White	1-9	1* 1*	Poor
3	J J S 771424	52	M	White	12 '6	12 "	Poor
4	J J 771566	27	F	White	12 23	1- 29	Fair
5	F D 771774	50	M	White	12 30	1* 31	Poor
6	E. M 772909	31	F	Col	1 7	1 11	Fair
7	C. B. 773394	53	F	Col	1 12	1 15	Fair
8.	F C 774150	50	M	White	1 18	1 22	Poor
9	R. B 774699	52	F	White	1 25	1 28	Good
10	H. E 775787	40	M	White	2 1	2 5	Fair
11.	C. M. 776597	39	F	White	2 2	2 5	Poor
12	B McD 776046	32	F	White	2-5	2 9	Poor
13.	L. Q 776066	53	M	White	2-5	2 9	Poor
14	J H. 776346	45	F	White	2 11	* 12	Poor
15	M C 777824	28	F	White	2 23	2 24	Poor
16	E. L. 783188	17	F	White	4-15	4-18	Good
17	M. McC 78769	46	F	White	3-3	3-7	Poor
18	J O'B 782817	39	M	White	4-9	4 15	Good



Duration of Fever	Termination	Remarks	
Death	Recovery	Patient had bronchiectasis	1
8 days	Death	Patient desperately ill on admission, and did not respond to treatment	2
6 days	Recovery (Lysis)	Discharged well 1 21	3
—	Recovery (Lysis)	Prolonged convalescence Discharged 3-18	4
4 days	Recovery (Lysis)	Discharged well 2 24	5
9 days	Recovery (Lysis)	Patient had a marked secondary anemia Discharged well 3 3	6
3 days	Recovery (Crisis)	Crisis on third day in hospital Normal convalescence Discharged 2 6	7
3 days	Recovery (Crisis)	Patient had had a "cold" for three weeks prior to admission, and date of onset of pneumonia could not be determined	8
4 days	Recovery (Lysis)	Discharged 3 22	9
—	Recovery	Patient developed arthralgia and urticaria after receiving serum Discharged well 4 6	10
3 days	Death	Leucopenia Patient very ill on admission, and did not rally on third day in hospital Pronounced	11
4 days	Recovery (Crisis)	Uneventful recovery Discharged well 4 29	12
2 days	Recovery (Crisis)	Discharged well 5 3	13
3 days	Recovery (Crisis)	Discharged well 5 2	14
8 days	Recovery (Crisis)	Patient did not raise any sputum Patient developed rubella during convalescence Discharged well 5-10	15
5 days	Recovery (Crisis)	Uneventful convalescence	16
—	Recovery (Lysis)	Normal convalescence	17
7 days	Recovery (Crisis)	Crisis on second night in hospital, rapid and uncomplicated recovery	18

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In our series we employed orthodox diathermy obtained from high frequency of one million oscillations per second, giving a wave-length of approximately three hundred meters. Under these circumstances whatever changes occurred in the conditions of the pneumonia patients, in all probability were brought about by the generation of heat resulting from the application of diathermy and not from selectivity or specificity.

That heat causes dilatation of blood vessels with resulting local hyperemia can be readily observed on the surface of the body when any form of heat is applied to it. It is, therefore, not unreasonable to expect similar changes in deep seated tissues which are heated by diathermy, namely, the consolidated portions of the lungs in pneumonia. By the same token expansion of the air spaces in the lungs occurs with resulting augmented oxygenation.

A portable high frequency machine was carried on a truck to the wards where treatment was administered. This truck was equipped with a rotary converter of one kilowatt to change the ward D. C. to A. C. The electrodes used were comprised of pliable block tin, about 20 gauge. They were covered with soap lather and applied anteroposteriorly with the smaller electrode nearest to the consolidated area. The dosage was sixty to one hundred milliamperes per square inch of contact area of the smaller electrode.<sup>17, 18</sup> Thus in the average case one thousand to fifteen hundred milliamperes were used. The duration of the treatment was one-half hour and was repeated twice, daily. The average number of treatments per patient was eight, giving a total of four hours of diathermy. It is apparent that from the standpoint of time the sacrifice made is not exorbitant compared with the beneficial results derived from this measure.

In this discussion we are concerned neither with laboratory findings nor the underlying theories as much as we are interested in the actual clinical findings. The latter were gratifying.

In all but two cases of the diathermy group the treatment induced marked perspiration. Obviously this is a form of elimination, relieving the load of other organs concerned in this process. The patients while under treatment volunteered the information that the tension or pressure in the chest was lessened during the séance. The breathing was less labored and deeper, probably due to the relaxation and relief from pain brought about by the heat.

In general, comfort to a certain degree seems to have been secured.

When presence of fluid in the chest was detected pointing to empyema we did not deem it advisable to continue with diathermy.<sup>19</sup> Instead

ultraviolet radiation was resorted to as a method of building up the resistance of the body to the infection.<sup>20</sup> The latter was given with a quartz mercury lamp in four exposures, namely, from waist-line up and waist line down anteriorly and posteriorly.

Although we discontinued the use of ordinary diathermy when empyema was encountered we are inclined to believe that it is worth trying the shorter wave-length diathermy for which, as explained, selectivity is claimed. Dr. Schliephake<sup>15</sup> reported that similar conditions, in his experience, responded favorably to short wave therapy.

#### ANALYSIS OF RESULTS

	Diathermy Group	Control Group
Occurrence of empyema	Three cases (16.6 per cent)	Four cases (22.2 per cent)
Number of patients who received serum	Seven (38.8 per cent)	Four (22.2 per cent)
Number of patients who received oxygen	Five (27.7 per cent)	Eight (44.4 per cent)
Number of patients who received both serum and oxygen	Four (22.2 per cent)	Three (16.6 per cent)
Termination by crisis	Eight (44.4 per cent)	Seven (38.8 per cent)
Termination by lysis*	Six (33.3 per cent)	One (5.5 per cent)
Average duration of fever in uncomplicated cases†	5.7 days	6.0 days
Number of deaths	Two	Six
Mortality	11.1 per cent	33.3 per cent

Although the effects of diathermy in our series agreed in the main with those noted by other observers a striking exception occurred, in that while Stewart<sup>1</sup> found that the fever terminated by lysis in 87 per cent of his patients, our percentage was very much lower (33.3).

\*This does not include fever prior to admission, but its duration in the hospital.

Further data is supplied in tables 1 and 2

#### COMMENT

In a paper published thirty four years ago, Sears and Larrabee<sup>6</sup> of this hospital reported the mortality of a series of over nine hundred consecutive cases of lobar pneumonia as 35.9 per cent. Excluding those patients who were moribund on admission the mortality was 29.1 per cent.

In 1934, Stewart<sup>1</sup> stated that the mortality from lobar pneumonia in hospital practice is 28 per cent. With this approximate figure there is general agreement at the present time.<sup>21, 22</sup>

Thus, despite the ever-increasing use of serum, and the advent of other newer methods of treatment, such as the oxygen tent, the death-rate from lobar pneumonia is essentially what it was a generation ago. Over a quarter of the patients admitted to a general hospital with this disease do not recover.

We come, therefore, more and more to the realization that in this disease symptomatic treatment is more important than specific treatment. In so doing, we go back to the conception of self-limited diseases voiced exactly one hundred years ago by Jacob Bigelow in a notable address delivered before the Massachusetts Medical Society<sup>11</sup>.

Lobar pneumonia is a self-limited disease. If during its course we can promote rest and relaxation, if we can make the patient comfortable, ease the pain, relieve the dyspnea, lessen the apprehension, or if, in other words, we can help carry the patient along until such time as the illness has run its course, we shall have done the most valuable thing we can do in any self-limited disease. We feel that if the mortality of lobar pneumonia is ever lowered, it will be as a result of treatment directed along these lines rather than as a result of any more specific treatment.

We do not imply that serum, for instance, has no value, even in our present small series of cases, several patients seemed to improve markedly after receiving it. The fact remains, however, that in any large series of cases, the mortality is about what it was before serum was used. There is beyond question a growing feeling that specific therapy is not so valuable as it appeared to be at first<sup>12</sup>.

From our present series it is hardly possible to draw any definite conclusions. The number of cases is so small that statistics especially must be regarded with suspicion, and we feel that our results are suggestive rather than conclusive.

The mortality for the entire series is 22.2 per cent, not far from the figure that to date has appeared to be an irreducible minimum. It so happens that the mortality in the diathermy group is one-third that of the control group. Because of this, and because of the very definite subjective improvement in the patients treated by this method, we feel justified in continuing with this form of treatment until a sufficiently large series of cases, with controls, has been accumulated, and more definite conclusions may be drawn.

#### SUMMARY

A series of thirty-six consecutive cases of lobar pneumonia were given the standard treat-

ment for this disease, including serum and/or oxygen when indicated. In addition, one half of the patients, alternately chosen, were given physiotherapy in the form of diathermy.

The mortality for the entire series was 22.2 per cent, that of the diathermy group 11.1 per cent, and that of the control group 33.3 per cent.

The cases are presented in some detail, and the effects of diathermy noted.

#### CONCLUSIONS

The use of diathermy is a valuable measure in the symptomatic treatment of lobar pneumonia.

It adds greatly to the comfort of the patient.

It appears to lower the mortality, although the present series of cases is too small to permit drawing any definite conclusions in this respect.

Further use of diathermy is indicated in this disease.

**ACKNOWLEDGMENT** We wish to express our thanks to Miss Ruth Holmes, R.N., and to other members of the technical staff of the Physiotherapy Department of the Boston City Hospital, whose cooperation did much to make this study possible.

#### REFERENCES

- 1 Stewart H. E. Diathermy in the treatment of pneumonia. *Brit J Phys Med* 8: 133 (Jan) 1934.
- 2 Harbin R. M. Diathermy in abortive treatment of pneumonia. *J M. A. Georgia* 23: 45 (Feb) 1934.
- 3 Liffen A. A. Diathermy and other physical agents in the treatment of pneumonia and its sequelae. *Arch Physical Therapy* 11: 155 (April) 1930.
- 4 Robinson C. A. Diathermy treatment of puerperal septicaemia. *Brit J Radiol* 3: 341 (Aug) 1930.
- 5 Simon G. Diathermy in the treatment of pneumonia. *Brit J Radiol* 4: 197 (May) 1931.
- 6 Sears G. G. and Larrabee R. C. An analysis of nine hundred and forty-nine cases of pneumonia. *Medical and Surgical Reports of The Boston City Hospital Twelfth Series* 1901.
- 7 Cecil R. L. A Text-Book of Medicine. Third Edition. Philadelphia W. B. Saunders Co. 1933 p. 36.
- 8 Cole Rufus. Acute lobar pneumonia. *Nelson Loose Leaf Medicine* 1: 247.
- 9 Osler William and McCrae Thomas. The Principles and Practices of Medicine. Eleventh Edition. New York and London D. Appleton-Century Co. 1930 p. 130.
- 10 Beckman, H. Treatment in General Practice. Second Edition. Philadelphia W. B. Saunders Co. 1934 p. 130.
- 11 Bigelow Jacob A. Discourse on Self-Limited Diseases. Nathan Hale. Boston Massachusetts Medical Society 1835.
- 12 Brooks H. The cause of death in pneumonia. Discussion. *J A M A* 103: 1192 (Oct. 20) 1934.
- 13 Wolf Heinrich F. Textbook of Physical Therapy. New York and London D. Appleton-Century Co. 1933.
- 14 Kovács Richard. Electrotherapy and Light Therapy. Second Edition. Philadelphia Lea & Febiger 1935.
- 15 Schillephake Erwin (Glessen). Ultra-short electric waves: a new development in diathermy. *Brit. J Phys Med* 8: 69 (Sept.) 1933.
- 16 Reiter T. Some investigations of the properties of short waves. *Brit. J Phys Med* 8: 119 (Dec.) 1933.
- 17 Granger Frank B. Physical-Therapeutic Technic. First Edition. Philadelphia W. B. Saunders Co. 1929.
- 18 Stewart Harry E. Physiotherapy Theory and Clinical Application. Second Edition. New York Paul B. Hoeber Inc. 1929.
- 19 Humphries Francis Howard. Artificial Sunlight and Its Therapeutic Uses. Oxford Med. Publication. 1927.
- 20 Hall Percy. Ultra-Violet Rays in the Treatment and Cure of Disease. St. Louis C. V. Mosby Co. 1928.

## SPECIFIC AND NONSPECIFIC ARTHRITIS\*

(With Special Reference to Trauma)

BY BENJAMIN H. ARCHER, M.D.†

NUMEROUS attempts have been made to classify chronic arthritis. None have met with general acceptance. In part, this has been due to a lack of uniformity in nomenclature, and in part to gaps in our knowledge of the underlying cause.

For many years the pathologic condition and roentgenographic appearance of the joints have served as a basis for distinguishing the various types of arthritis. More recently the trend has been toward an etiologic classification<sup>1</sup>.

Etiologically, chronic joint disease may be divided into two categories. In the first, the primary cause of the arthritis is known. In the second, the exciting agent of the disease is yet to be determined.

## SPECIFIC ARTHRITIS

Exemplifying the first group are those cases of arthritis associated with specific infectious agents such as the gonococcus, the tubercle bacillus or the spirochaete pallidum. In addition there are certain specific diseases which produce a chronic arthritis in which infection is not the primary cause. Syringomyelia, hemophilia, ochronosis and gout are examples of this group.

In syringomyelia the arthritis is probably due to a neurotrophic disturbance of the joints. The arthritis of gout and ochronosis result from the deposition of metabolic irritants in the joint cartilages. The joint changes of hemophilia are caused by the effusion of blood into the articular cavities.

In brief, it is quite clear that there are certain infectious and noninfectious diseases with known primary irritants that may result in chronic arthritis. To this type of case it seems proper to apply the term chronic specific arthritis. Furthermore, the group as a whole may be sharply defined, etiologically, from those instances of chronic arthritis in which the primary cause is unknown. The latter may be described as chronic nonspecific arthritis<sup>2</sup>.

## NONSPECIFIC ARTHRITIS

This would seem to be a good generic term. It serves to focus our attention on the fact that the primary cause of this type of joint disease is unknown. What is more, as our knowledge increases, it may be possible to separate various

groups from this category and place them under the heading of chronic specific arthritis.

Pathologically, the joint lesions of nonspecific arthritis, like those of the specific form, fall into two groups. The terminology adopted by Nichols and Richardson<sup>3</sup> has much to commend it, and will be used throughout this article.

These authors divide the joint lesions of all forms of chronic arthritis into proliferative and degenerative types<sup>4</sup>. The first is characterized by primary proliferative changes in the synovial membrane and the perichondrium, the second by primary rarefaction and fibrillation of the central part of the articular cartilage.

It is important to remember that Nichols and Richardson in their classic monograph<sup>5</sup> emphasized the fact that their classification was purely a pathologic one and did not correspond to different etiological agents.

There is a striking similarity between the pathologic lesions of specific and nonspecific arthritis. This has led many investigators to suspect that both forms of chronic joint disease might be due to the same type of primary agents. With this in mind, intensive investigations have been carried out to find a specific bacterial agent, some neurotrophic disturbance or some abnormal concentration of metabolites in the blood, to explain the causation of non-specific arthritis. As yet, there is no conclusive evidence at hand that any of these factors play a primary rôle in the etiology of this form of the disease<sup>6</sup>.

Within recent years trauma has been reëmphasized as a primary cause of the degenerative type of nonspecific arthritis, and it is with this etiologic agent that we are specially concerned in this article.

## TRAUMA

The relationship of trauma to chronic arthritis has been noted by many investigators. Nichols and Richardson<sup>7</sup> state that trauma may be one of the causes of either proliferative or degenerative arthritis. Leriche<sup>8</sup> describes "traumatic vasomotor synovitis". Leriche and Policard<sup>9</sup> believe that many injuries of the joints are followed by serious vasomotor disturbances of the fibrous tissue which may induce a proliferative arthritis. Biedinger<sup>10</sup>, as early as 1908, reported splitting of the cartilage and thickening of the synovial membrane in cases of monarticular arthritis following trauma. He concluded that traumatic splitting of the cartilage is the most frequent injury of the knee joint, and

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that while many cases heal spontaneously, in a certain percentage an arthritis develops Ludloff<sup>8</sup>, Axhausen<sup>9</sup>, Lawen<sup>10</sup>, Kulowski<sup>11</sup>, König<sup>12</sup> and Key<sup>13</sup> have substantiated Budinger's conclusions

All of these authors have discussed acute trauma of external origin, and have described the relationship of this irritant to the pathogenesis of the monarticular forms of arthritis

The relationship of repeated trauma of intrinsic origin to the monarticular and polyarticular forms of chronic arthritis has been studied by other observers

Miller<sup>14</sup> and Keefer<sup>15</sup> cite numerous examples of monarticular osteoarthritis due to repeated trauma Heiss<sup>16</sup> has demonstrated the presence of this condition in Olympic athletes Radiographic evidence of osteoarthritis was found in twenty-three of 159 men examined In the football players the osteophytes were found principally in the knee, in boxers in the elbow or wrists, and in javelin and discus throwers in the elbow or shoulders The primary cause of the arthritis in all these cases would appear to be repeated intraarticular trauma due to the excessive use of one or more joints

Putti<sup>17</sup> believes that regardless of what the primary cause of multiple osteoarthritis may be, there always enters into its pathogenesis the factor of trauma, not the direct type, but that of the chronic type of moderate degree of intensity which occurs under various circumstances Goldthwait, Painter and Osgood<sup>18</sup> state it is certainly true that continued strain or injury lead to the development of the hypertrophic type of nontuberculous joint disease (osteoarthritis) Henderson and Hench<sup>19</sup> are of the opinion that chronic forms of trauma result from the intrinsic causes of obesity and faulty posture and affect only the weight-bearing joints Keefer and Myers<sup>20</sup> believe that the anatomic changes of osteoarthritis can be explained on a basis of injury to the cartilage and bone which follows the "wear and tear" upon joint structures They stress the factors of senescence, occupational strain, and static abnormalities, as predisposing to the pathogenesis of the disease Bauer<sup>18</sup> is in essential agreement with Keefer and Myers, and states, that degenerative osteoarthritis is the result of the "wear and tear" of increasing age and repeated trauma Smith-Petersen<sup>21</sup>, among others, has shown histologically the effect of multiple minimal traumata on joint surfaces It was found that the microscopic changes were those of a degenerative arthritis

From this brief review of the literature, one is apt to conclude that repeated trauma is a competent producing cause of the degenerative form of nonspecific arthritis I believe this to be true, but I also hold that repeated trauma may produce proliferative arthritis What is more, I believe that repeated trauma is not the sole

cause of degenerative arthritis, there may be other causes, such as infection, metabolic irritants, vascular and neurotrophic disturbances In the specific form of chronic arthritis this is quite obviously true, particularly in gout, syringomyelia, and congenital syphilis In the nonspecific group, further investigation may reveal such irritants

However, the importance of repeated intraarticular trauma as a factor in the causation of chronic arthritis of all types needs to be emphasized

Repeated intraarticular trauma may be defined as continual abnormal pressure or friction upon the articular surfaces or synovial membrane of a joint Normally there is pressure and friction upon these tissues Pressure is due to the apposition of articular surfaces when at rest, and friction arises on motion Under normal conditions, the cushioning effect of cartilage and the lubricating character of the synovial fluid seem to absorb the effect of friction on joint surfaces Abnormal pressure or friction may result from any cause which disturbs the anatomic relationship of the joint surfaces or its enveloping membrane It may also arise from excessive or abnormal use of a joint

The chief predisposing causes of intraarticular trauma may be enumerated as follows

- 1 Fractures of long bones near joints with faulty alignment of the fragments
- 2 Intraarticular fractures and unreduced dislocations
- 3 Foreign bodies in the joints
- 4 Occupational or athletic stress and strain
- 5 Constitutional causes, i.e., overweight, postural abnormalities, orthopedic disabilities and senescence

In view of the number of causes that may produce repeated intraarticular trauma, there seems to be no valid reason for stressing senescence<sup>22</sup> Senescence, as such, is not the cause of degenerative arthritis It is repeated intraarticular trauma extending over a long period of years that is one of the primary agents of the joint changes seen in elderly people Senescence is only a predisposing cause like overweight, orthopedic disabilities or postural abnormalities The common denominator of all these constitutional causes of degenerative arthritis is repeated intraarticular trauma

The mechanical theory of the causation of degenerative changes in the central part of the articular cartilage can be based on the fact that when fractured at right angles to its surface, articular cartilage presents a very definite striation (Fisher) It is quite reasonable to believe that abnormal pressure or friction at one point of the articular surface may cause in time a solution of continuity at that point Repeated pressure or friction if prolonged at that point may result in a vertical splitting or cracking of the cartilage below the surface This produces

so-called fibrillation or crevassing of the cartilage. The same process may occur at various points of the joint surfaces. This solution in continuity of the normal contour of the articular cartilage can result from abnormal pressure suddenly applied, as in acute external trauma, or may follow repeated small traumata intra-articular in origin. Weight bearing and joint motion may then provide the force which eventually cracks the cartilage. The nature of hyaline cartilage with its semisolid consistency lends itself to this type of pathological reaction.

It is quite likely that any irritant which is able to disrupt the continuity of the surface of the central area of the articular cartilage may initiate degenerative pathological changes in this tissue. In addition to the mechanical causes which have already been enumerated it is highly probable that any factor which diminishes the lubrication of the joint surfaces through interference with the production of mucus may also lead to intra-articular trauma and erosion of joint surfaces.

It is important to remember that repeated intra-articular trauma may result in proliferative as well as degenerative changes in the joints. This is clearly evident in the action of foreign bodies on synovial membrane and articular cartilage. It is a well known fact that a ruptured semilunar cartilage of the knee, in time produces erosion of joint surfaces and degenerative osteoarthritis.<sup>23</sup> It needs to be emphasized that a foreign body in the same joint may result in a proliferative arthritis.

This has been demonstrated in osteochondritis dissecans.<sup>24</sup> In this disease, an aseptic necrosis of the articular cartilage results in the presence of a foreign osseocartilaginous body in the knee-joint. Because of repeated intra-articular trauma, the synovial membrane proliferates and a nonspecific arthritis follows.

Conway<sup>25</sup> operated upon six such cases and reported that the changes in the synovia varied from a simple edema of the synovial papillae to a pronounced hypertrophy of the whole membrane. In one case, of long duration, he noted in addition to the proliferative changes, evidence of a degenerative arthritis.

Quite definitely, then, it may be stated that the same primary agent, repeated intra-articular trauma, may result in either a proliferative or a degenerative arthritis depending upon whether the synovial membrane or the articular cartilage is principally affected by this irritant. What is more, if the irritation is sufficiently prolonged inspection of the lesion may disclose both types of pathologic change in the same joint.

A survey of the literature and my own observations lead me to the following conclusions in regard to intra-articular trauma.

- 1 Repeated intra-articular trauma is a common potent producing cause of some cases of chronic nonspecific arthritis.

- 2 Repeated intra-articular trauma may result in proliferative or degenerative pathologic changes in a joint, depending upon whether the synovial membrane or the articular cartilage is primarily affected by this irritant.
- 3 This form of trauma helps to explain the pathogenesis of degenerative arthritis in gout, ochronosis and hemophilia. It also explains the evolution of proliferative arthritis in osteochondritis dissecans.
- 4 Constitutional conditions may predispose to intra-articular trauma.
- 5 Occupational or athletic activity in which a single joint is used to an abnormal extent, sets up intra-articular trauma, and the result may be a degenerative arthritis at any age.
- 6 Acute external trauma that injures a joint may be a predisposing cause of repeated intra-articular trauma. The initial injury, which acute trauma may cause to the central part of the cartilage or to the synovial membrane, may in turn produce repeated intra-articular trauma. The latter may then become the primary agent of a chronic arthritis of the joint affected.
- 7 Any factor which diminishes the lubricating power of the synovial fluid predisposes to intra-articular trauma, by increasing the friction and pressure of joint surfaces.
- 8 Repeated intra-articular trauma is a primary cause of some cases of chronic nonspecific arthritis. It is a secondary factor in all types of chronic arthritis specific and nonspecific.
- 9 No matter what the primary cause of an individual case of chronic arthritis may be, repeated intra-articular trauma tends to perpetuate the disease.
- 10 Even when the primary cause of a case of chronic arthritis is removed, the repeated intra-articular trauma which results from the derangement of the joint structure continues to act and may perpetuate the disease.

One cannot deny the importance of trauma in the causation and pathogenesis of chronic arthritis. Nevertheless, one must not overemphasize the rôle that this factor plays in the etiology of chronic joint disease.

Recently Bauer<sup>26</sup> has stated that degenerative osteoarthritis is the result of repeated trauma and senility. Keefer<sup>27</sup> maintains that all instances of degenerative osteoarthritis are the result of repeated trauma.

One immediately thinks of the degenerative joint lesions of syringomyelia and syphilitic osteochondritis as militating against this assumption.<sup>28</sup> What is more, degenerative osteoarthritis has been produced experimentally by the ligation of the blood supply to the patella.<sup>29</sup>

It is difficult to reconcile such evidence with the view that repeated trauma is the sole cause of osteoarthritis. Then again, as already noted, repeated intraarticular trauma may result in a proliferative arthritis. This irritant is therefore not a specific cause for a specific type of pathologic change in the joints. Finally the characteristic lesion of degenerative osteoarthritis, the Heberden's node, cannot be explained on the basis of this theory.

It is quite obvious that the knuckle-joints and the proximal phalangeal joints are flexed and extended more frequently than the distal phalangeal joints. Indeed, it is well to recall, that because of the anatomic arrangement of the tendons of the fingers, most people cannot flex or extend the distal phalangeal joints without flexing and extending the proximal phalangeal joints.<sup>27</sup> It follows, then, that both of these joints are subjected to the same degree of repeated intraarticular trauma. Yet Heberden's nodes are a rarity in the proximal phalangeal joints and occur almost exclusively in the distal phalangeal joints.<sup>28</sup> Apparently some other factor or factors, besides trauma, must be operative, to explain the distribution of this lesion.

Though repeated intraarticular trauma is apparently not the sole factor in the etiology of all cases of degenerative arthritis, and indeed may be a primary cause of some instances of proliferative arthritis, the important fact which must be borne in mind is that this irritant may be a secondary factor in every case of chronic joint disease.

#### CONCLUSIONS

1 Etiologically chronic joint disease may be divided into the specific and nonspecific forms of arthritis.

2 Intraarticular trauma may result from a number of diverse mechanical causes, i.e., fractures and dislocations, occupational or athletic activity, foreign bodies in the joints, and constitutional conditions.

3 Repeated intraarticular trauma may be the primary cause of some cases of chronic arthritis. It is a secondary factor in every case of chronic joint disease.

4 No matter what the primary cause of a case of chronic arthritis may be, repeated intraarticular trauma through friction or pressure tends to perpetuate the disease.

#### REFERENCES

- 1 (a) Allison Nathaniel and Ghormley R K. *Diagnosis in Joint Disease*. New York: William Wood & Co. 1931.

- (b) Bauer W. What should a patient with arthritis eat? *J A M A* 104: 1 (Jan.) 1935.
- (c) Archer B H. Diagnosis and treatment of acute and chronic arthritis. Read before the Lincoln Hospital Alumni Assoc Feb 18 1935. Submitted for publication.
- 2 Archer B H. Chronic nonspecific arthritis. *J A. M. A.* 102: 1449 (May 5) 1934.
- 3 Nichols E H and Richardson, F L. Arthritis deformans. *J M Research* 21: 149 (Sept.) 1909.
- 4 Synonyms for proliferative arthritis are atrophic and rheumatoid arthritis. Hypertrophic and osteo arthritis are terms used interchangeably with degenerative arthritis.
- 5 Leriche R. The problem of osteo articular diseases of vasomotor origin hydrarthrosis and traumatic arthritis. genesis and treatment. *J Bone & Joint Surg* 10: 492 (July) 1928.
- 6 Leriche R et Pollicard A. De quelques notions physiologiques utiles a connaître pour la compréhension de la pathologie osseuse. *Presse Méd* 36: 1382 (Oct. 10) 1928.
- 7 Büdinger K. Über traumatische Knorpelrisse im Kniegelenk. *Deutsche Ztschr f Chir* 92: 610 1908.
- 8 Ludloff. Zur Pathologie des Kniegelenkes. *Verhand d deutsch Gesellsch f Chir* 39: 223 (April) 1910.
- 9 Axhausen G. Zur Pathogenese der Arthritis deformans. *Arch f Orthop* 20: 1 1922.
- 10 Låwen A. Knorpelresektion bei fissuraler Knorpel-degeneration der Patella—eine Frühoperation der Arthritis deformans. *Beitr z Klin Chir* 134: 265 1925.
- 11 Kulowski J. Chondromalacia of the patella. *J A M A* 100: 1837 (June 10) 1933.
- 12 König F. Arthritis deformans und Chirurgie. *München Med Wchnschr* 75: 32 (Jan.) 1928.
- 13 Key J A. Contusion of cartilage as an etiological factor in chronic arthritis. *Surg Gynec & Obst.* 58: 166 (Feb) 1934.
- 14 Miller J L. Present status of the classification pathology and etiology of chronic rheumatic disease. *Am J Med Sc* 182: 167 (Aug.) 1931.
- 15 Keefer C S. The pathogenesis and diagnosis of degenerative arthritis. *Med Clin North America* 18: 947 (Jan) 1935.
- 16 Heiss F. Röntgenologische Gelenkuntersuchungen an Olympiätkämpfern. *Klin Wchnschr* 8: 648 (April) 1929.
- 17 Putti V. Artrite vertebrale e trauma. *La Reforma med.* 46: 999 (June 23) 1930.
- 18 Goldthwait J E, Painter C F and Osgood R B. *Diseases of the Bones and Joints*. Boston: D C Heath & Co. P 633 1909.
- 19 Henderson, M S and Hench P S. Types and treatment of chronic arthritis. *Min Med* 12: 202 (April) 1929.
- 20 (a) Keefer C S and Myers W K. The incidence and pathogenesis of degenerative arthritis. *J A. M. A* 102: 811 (March 17) 1934.
- (b) Keefer C S, Parker F Jr, Myers W K and Irwin, R L. Relationship between anatomic changes in knee joint with advancing age and degenerative arthritis. *Arch Int Med* 53: 325 (March) 1934.
21. Smith-Petersen M N. Traumatic arthritis. histologic changes in hyaline cartilage. *Arch Surg* 18: 1216 (April) 1929.
- 22 Cecil R L. The medical treatment of chronic arthritis. *J A M A.* 103: 1583 (Nov. 24) 1934.
- 23 (a) Fisher A. G. T. *Chronic (Non Tuberculous) Arthritis. Pathology and Principles of Modern Treatment*. London: H K Lewis & Co. P 92 1929.
- (b) Key J A. Traumatic arthritis and the mechanical factors in hypertrophic arthritis. *J Lab & Clin. Med.* 15: 1145 (Aug.) 1930.
- 24 (a) Conway F M. Osteochondritis dissecans. Intra-articular osseocartilaginous loose bodies. clinical study based upon 10 personally observed cases. *Ann Surg* 99: 410 (March) 1934.
- (b) Flemister D B. The causes of and changes in loose bodies arising from the articular surface of the joint. *J Bone & Joint Surg* 6: 278 (April) 1924. See additional references in these articles.
- 25 (a) Knaggs R. Lawford. *The Inflammatory and Toxic Diseases of Bone*. New York: William Wood & Co. pp 93 and 120 1926.
- (b) Fisher A. G. T. (23a) pp 104 106.
- 26 (a) Pemberton Ralph. *Arthritis and Rheumatoid Conditions Their Nature and Treatment*. Philadelphia: Lea & Febiger. p 163 1929.
- (b) Goldhaft, A D, Wright L M. and Pemberton Ralph. The influence of age in the experimental production of hypertrophic arthritis. *Ann Int. Med* 6: 1591 (June) 1933.
- 27 Gray H. *Anatomy of the Human Body*. Philadelphia: Lea & Febiger. pp 448 450 1930.
- 28 Archer B H. Clinical aspects of chronic arthritis. *M Clin North America* 12: 659 (Nov.) 1928.

GONADOTROPIC HORMONE (PROLAN) IN RELATION  
TO CARCINOMA OF THE CERVIX\*

BY JAMES A. HALSTED, M.D.†

THE discovery in 1926 by P. E. Smith and Zondek and Aschheim, independently that pituitary implants would activate the ovaries of immature rodents led to the demonstration of a substance in the urine of pregnant women which at first seemed to act similarly. This substance is the basis for the universally used test for pregnancy. Since this discovery the urine has been tested for it in a wide variety of conditions, among them cancer.<sup>2</sup>

Recently it has been clearly demonstrated by detailed biological tests that the pituitary hormone and pregnancy urine hormone are different substances.<sup>3,4</sup> Since they are both ovary stimulators it is well to speak of them collectively as gonadotropic substances and to differentiate them as the anterior pituitary hormone and the anterior pituitary like hormone (A. P. L.—Collip). In all probability the hormone found in pregnancy urine (A. P. L.) is made by chorionic tissue. The same hormone is found in the urine of patients with hydatidiform mole and chorio-epithelioma.

In these three conditions large amounts of A. P. L. are excreted so that even if unconcentrated urine is injected into immature rodents ovarian changes will result, consisting of ripening of Graafian follicles (Prolan A effect Zondek) and corpus luteum formation (Prolan B effect). Zondek first found gonadotropic substance in the urine in teratoma of the testicle, an embryonic tumor, and Ferguson<sup>5</sup> has shown that measurement of the hormone in the urine is of distinct aid in the management of these cases. Here the amount excreted is relatively small compared with the other conditions just mentioned, so that in many cases only by concentrating the hormone with alcohol can it be detected. This is Zondek's method for testing for gonadotropic substances in conditions other than pregnancy and chorio-epithelioma.

Anterior pituitary hormone is rarely found in this laboratory in the urine of "normal" women.<sup>7</sup> A positive test by Zondek's method thus constitutes an increased amount. The commonest cause of increased excretion is ovarian deficiency. Thus it is the rule to find it after removal of the ovaries, after the natural menopause has begun<sup>8</sup> and as Osterreicher<sup>9</sup> has

shown, in many old women after the menopause is over. This is due to hyperfunction of the pituitary consequent to removal of the influence of the ovarian hormone. This explanation is supported by the experimental observations of Fichera<sup>10</sup> who noted an enlargement of the pituitary gland of rats after gonadectomy, and of Engle<sup>11</sup> who demonstrated an increased content of gonadotropic hormone in the pituitaries of castrated rats.

Zondek has tested for anterior pituitary hormone in the urine by the alcohol precipitation method in a large number of patients with various kinds of tumors and in 1930 reported the results of tests in fifty five cases of genital carcinoma in women.<sup>1</sup> Forty of these cases were carcinoma of the cervix. He obtained positive tests in thirty three and thence stated that 82 per cent of cases of carcinoma of the cervix were associated with positive tests. Because of the implication occasioned by this report that a positive test might be of significance in the diagnosis of carcinoma of the cervix, it was thought worthwhile to attempt to repeat his work.

Inasmuch as a positive test is to be expected in women with ovarian deficiency, patients with carcinoma of the cervix were selected who were under the menopause age and who had not been treated with radium or x ray. Difficulty was experienced in finding a large number of such patients because most cases coming under observation had been treated previously or were beyond the menopause. Fifteen were studied during the course of the investigation, all of whom had normal menstrual histories prior to the onset of the disease. The diagnoses were all confirmed by histological section. One test for gonadotropic hormone was performed on each. The method used was essentially Zondek's method, mice being used as the test animals. Details of the test as performed in this laboratory are given by Albright, Halsted, and Cloney.<sup>7</sup>

## RESULTS

(See table.) Of the fifteen patients studied four or 26.6 per cent had positive tests. Two of these were forty five and forty seven years old and may have had relative ovarian deficiency in spite of normal periods. Occasionally a positive test has been obtained in this laboratory at the approach of the menopause before the periods have ceased. Eleven patients had negative tests. The table gives the pertinent data on each patient.

\*The biological tests reported in this investigation were performed in the Biological Laboratory of the Massachusetts General Hospital under the direction of Dr. Fuller Albright. The expense was defrayed by a grant from the Delamar Mobile Research Fund.

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RESULTS OF TESTS FOR GONADOTROPIC HORMONE (PROLAN)  
IN 15 PATIENTS WITH CARCINOMA OF THE CERVIX

Case No	Age	Duration of Disease	Menstrual History Before Disease Began		Gonadotropic Hormone Test
1 C F	36	3 months	Regular and normal		Negative
2 L R	44	3 months	Regular until 2 years ago	Since then	Negative
			irregular and profuse		
3 L C	27	3 years	Regular and normal		Negative
4 M deL	34	6 months	Normal until 1 year ago	Since then	Negative
			frequent and profuse		
5 C C	27	4 months	Regular and normal		Negative
6 M S	49	?	Regular and normal		Negative
7 D C	27	?	Regular and normal		Negative
8 D C	34	?	Regular and normal		Negative
9 F B	39	1 year	Regular and normal		Negative
10 L C	39	6 months	Regular and normal		Negative
11 I L	44	? 2 years	Regular and normal		Negative
12 A D	34	18 months	Regular and normal		Positive
13 M W	35	5 months	Regular and normal		Positive
14 G P	45	10 months	Regular and normal		Positive
15 C R	47	1 month	Regular and normal		Positive

Tests were performed on a number of patients with gynecological disorders suspected of being cancer which after operation turned out not to be. The negative tests were in two cases of endocervicitis, one of metropathia hemorrhagica and one of leiomyosarcoma. The positive tests were in one case each of chorio-epithelioma, endocervicitis, and cystic corpus luteum.

## DISCUSSION

Zondek obtained positive tests in 82 per cent of his cases, and Saphir<sup>2</sup> in 80 per cent of five malignant tumors and 50 per cent of six benign tumors studied, whereas in this investigation positive tests were obtained in 26 per cent. However, on analyzing the data given for Zondek's cases one finds that many of his patients had either had previous radiation therapy, Wertheim operations (panhysterectomy with removal of both ovaries) or were at least fifty years old. Exact analysis of his data is impossible from the information given, but it is apparent that he obtained positive tests in only about half of his cases not suffering from ovarian deficiency. Saphir, unfortunately, does not mention the ages or menstrual histories of his patients.

Although one does not obtain positive tests in 26 per cent of normal women this relatively small percentage cannot be said to be of any significance in the diagnosis of carcinoma of the female genital tract. Whether it has any significance at all remains to be seen. Kurzrok<sup>12</sup> has demonstrated an increase of anterior pituitary hormone in the urine of ten women at the time of ovulation and believes it may be possible to determine the ovulation date by application of this test. Riley, Brickner and Kurzrok<sup>13</sup> obtained positive tests quite regularly before the headaches of patients with migraine. Smith and Rock<sup>14</sup> obtained positive tests in 45 per cent of cases of functional uterine bleeding. With the development of more refined methods for meas-

uring the hormone in small amounts, it is probable that it will be found in more or less excess in a variety of conditions. It cannot be too strongly emphasized that methods for measuring gonadotropic hormone are most inadequate at the present time. The substance is apparently an unstable compound difficult to extract quantitatively and very divergent results have been obtained by equally competent workers. Only when very large amounts are being excreted, as in pregnancy and chorionic tumors, can much significance be attached to the result of a test.

## SUMMARY

1 A brief account has been given of the various conditions which are known to be associated with an excess production of gonadotropic hormone (Prolan).

2 Although Zondek reported that 82 per cent of cases of carcinoma of the cervix had positive tests for gonadotropic hormone (meaning an increased amount) analysis of his cases shows that many of his patients had evidence of ovarian deficiency, in which condition a positive test is to be expected.

3 Twenty-six and six tenths per cent of fifteen patients studied in this clinic with carcinoma of the cervix and with normal menstrual periods prior to the onset of the disease had positive tests. This incidence which is, perhaps, greater than one would expect if there were not a relationship between cancer of the cervix and this hormone, still is not sufficient to be of diagnostic significance.

## REFERENCES

- 1 Zondek, B. Über die Hormone des Hypophysenvorderlappens. III. Follikelreifungshormon (Prolan A) und Tumoren. Klin. Wchnschr 81: 679 1930.
- 2 Saphir W. Anterior pituitary hormone and tumor growth. Endocrinology 18: 191 1934.
- 3 Evans H. M. and Simpson M. E. A comparison of the ovarian changes produced in immature animals by implants of hypophyseal tissue and hormone from the urine of pregnant women. Am J Physiol 89: 381 1929.
- 4 Fluhmann C. F. The nature of ovary stimulating hormones. Am J Obst. and Gynec 28: 668 1934.

5. Hamburger C. Studies on gonadotropic hormones from the hypophysis and chorionic tissue with special reference to their differences. Acta path et microbiol. Scandinav Suppl. 17. Copenhagen, Levin and Munksgaard, 1925.
6. Ferguson, R. B. Quantitative behavior of prolactin A in teratoma testis. Am. J. Cancer 18: 59 1932
7. Albright, F., Halsted J. A., and Clowey E. Studies on ovarian dysfunction. I. The hormonal "measuring sticks" available for clinical use and values obtained on normal individuals. New Eng J Med 518: 195 (Jan. 21) 1935
8. Zondek, B.: Über die Hormone des Hypophysen vorderen Lappens. II. Polikellreifungshormon (Prolan A)—Klinische Versuche—Kastration. Klin. Wchnschr 81: 223 1936
9. Osterweicher W.: Vermehrte Ausscheidung von Hypophysen vorderen Lappenhormon (Prolan) im Harn in der Eisprungperiode bzw. im Serum. Klin. Wchnschr 11: 514 1932
10. Fichera, G. Sur l'hypertrophie de la grande pituitaire consécutive à la castration. Arch. ital de biol. 43: 405 1905
11. Engle L. T.: The effect of daily transplants of the anterior lobe from gonadectomized rats on immature test animals. Am. J. Physiol. 84: 191 1924
12. Kurrok, R., Kirkman, J. J., and Croelman, M. Studies relating to the time of human ovulation. Am. J. Obst. and Gynec. 23: 219 1934
13. Riley H. A., Bricker R. M. and Kurrok, R. Abnormal excretion of theelin and prolactin in patients suffering from migraine. Bull. Neurol. Inst. New York. 3: 53 (June) 1932
14. Smith G. V. S. and Rock, J. Dysfunctional uterine bleed ing. Surg. Gynec. Obst. 57: 190 1932

## MEDICAL PROGRESS

### PROGRESS IN HEMATOLOGY\*

(Late 1933 and 1934)

BY WILLIAM DAMESHEK, M.D.†

**A**DVANCE in hematology continues to be made along many fronts as interest in diseases of the blood forming organs continues unabated. Many more workers are busy in this field, and the harvest of interesting and often important findings continues to be a rich one. Stress continues to be placed upon the physiological aspects of the various disease syndromes rather than upon the more purely morphological criteria which were the concern of the older hematologists. The most important advances have been in the field of etiology. The causes of pernicious anemia, chronic hypochromic anemia, congenital hemolytic anemia, and of agranulocytosis have been more clearly defined. No outstanding advance in therapy has been made, but then one cannot expect a liver announcement every year. The award of the Nobel prize in medicine to three Americans G. H. Whipple, G. R. Minot, and W. P. Murphy for their epoch making work with liver emphasizes again the emmence of American hematology. The work of the Italian hematologists deserves more widespread attention than it has been given in this country, and the reviewer has been struck by the many comprehensive and excellently illustrated articles which have come out of the Italian clinics. The most notable text on hematology has appeared from Central Europe. It is the "Handbuch der allgemeinen Hämatologie" (Urban and Schwarzenberg, Berlin and Vienna, 1933) edited by Hans Hirschfeld and Anton Hittmair and written by a large corps of specialists. Like many other ponderous German tomes, it is made up of two volumes and each volume is further divided into two halves (each of about 800 pages).

From the Medical Service and Department of Pathology Beth Israel Hospital, Boston. Each of the materials has been utilized in a review article of Hematology for the Cyclopaedia of Medicine and the author wishes to thank the publishers, V. A. Davis Co. Philadelphia, for permission to republish certain sections.

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In last year's review (1929-1933), the approach was a general one with an attempt to present the subject of hematology in a broad way so that the reader might obtain a bird's-eye view of the field of hematology as it existed at the end of 1933. In the present review, more attention will be given to individual articles, although certain subjects will be stressed, i.e. anemia, agranulocytosis, glandular fever, and polycythemia.

#### THE BLOOD-FORMING ORGANS

The cells which circulate in the blood arise from three widely scattered centers of active cellular growth which have come to be called "organs." These are the bone-marrow, the lymphoid tissue and the reticulo-endothelial system.

**A. The Bone Marrow** This, the most important of the blood forming organs, is receiving increased attention as the result of recent studies. The sternal bone marrow biopsy is receiving interested consideration. The sternum is easily entered by means of a hand trephine, a small plug of bone being obtained for sectioning and smears made on slides. Differential counts of the marrow in the sections have often proved of great diagnostic value. In the reviewer's hands, this procedure has proved of great value in the diagnosis of the often puzzling cases presenting chronic anemia, leukopenia, and thrombocytopenia, and has demonstrated that this triad of hematological signs is frequently due to aleukemic leukemia (q.v.).

#### **B. The Lymphoid Tissue**

**C. The Reticulo-Endothelial System** Great numbers of articles continue to be written about this important group of phagocytic cells which is scattered throughout the body but is found principally in the liver, the spleen, the lymph nodes, and the bone-marrow. The reviewer has already cited the many activities of this "system" (New Eng J Med 210 531, 1934) the phagocytosis of foreign particles, the

destruction of old red blood cells, the storage of fat, the formation of foreign body giant cells, the production of immune bodies, and the formation of the third type of white blood cells, the monocyte

#### THE BLOOD CELLS

**Terminology** For the red blood cells, terminology remains but little affected (cf *New Eng J Med* loc cit) The white blood cells have suffered some changes in terminology Generally agreed upon are the following

**Bone-Marrow Cells** Myeloblast, Myelocyte, Metamyelocyte, Mature Polymorphonuclear cell The metamyelocytes have been subdivided into "young" and "band" forms

**Lymphoid Cells** Lymphoblast, Lymphocytes, large and small The "plasma" cell is a form of lymphocyte

**Reticulo-Endothelial Cells** Histiocyte, Monocyte The word "monocyte" has come into general use and replaces the old term "transitional cell" as well as the ambiguous one of "large mononuclear cell"

The Polymorphonuclear Cells (Granulocytes) Schilling, following the lead of Arneth, subdivided the polymorphonuclear cells into myelocytes, young forms, band forms, and segmented (mature) forms The value of this subdivision in the study of infectious disease has been adequately demonstrated in hosts of papers As an example of carrying the method out to its logical conclusion may be cited the paper of Crocker and Valentine (*J Lab & Clin Med* 20 172, 1934) These authors have added a large number of new indices, the value of some of them being questionable The introduction of mathematics into such a variable tissue as the blood does not have strict scientific backing, and although it is possible to sit in a laboratory and prognosticate with a fair degree of accuracy what is going on in a given case of infectious disease, it is sometimes of infinitely greater value to examine the patient This should not detract, however, from any serious attempt to tabulate frequently exact findings in a given case of infectious disease and to interpret progress from them The reviewer merely cautions against too literal an interpretation of hematological data in infectious disease since these data should simply be regarded as symptoms or signs in a complex which, in its entirety, represents a diagnostic or prognostic interpretation

The Lymphocytes Wiseman (*J A M A* 103 1524, 1934) discusses the origin, physiology, and morphology of the lymphocyte He states that the lymphocyte has a "definitive" life cycle similar in all respects to that of the polymorphonuclear cell and the erythrocyte (This is not new, hematological treatises for many years have differentiated primitive lymphocytes, large or immature lymphocytes often with dark blue cytoplasm, and small

lymphocytes with pyknotic nuclei) Wiseman points out that increased activity of lymphoid tissue is accompanied in the blood stream by increased numbers of lymphocytes with increased concentration of basophilic substance in the cytoplasm (Cf the findings in "glandular fever" q v) It is axiomatic that hyperplasia of any of the three blood-forming organs is reflected to greater or less degree in the peripheral blood Arneth and now Wiseman suggest studying the lymphocytes for variations in immaturity, the reviewer has found careful studies of this type of value in glandular fever and lymphatic leukemia

**The Monocytes** The importance of the monocyte has loomed large in recent literature, chiefly because of its association with the reticulo-endothelial system, from which it is derived

Wiseman in the above cited paper discusses the origin of the monocyte and its relationship to the "clasmatoocyte" and demonstrates how knowledge regarding this cell has gradually been built up, particularly from the study of monocytic leukemia The monocyte and the clasmatoocyte are in all probability related cells, says Wiseman, since they appear together in experimental tuberculosis, and in the blood stream in monocytic leukemia Levi and Penati in an extremely careful and complete piece of work (*Arch per le Sc med*, 58 773, 1934) discuss the fundamental experimental and clinical data bearing on the origin of the monocytes They produced experimental reticulo-endothelial reactions by the injection in animals of electro-negative colloids and studied the resultant blood-picture Experimental monocytosis was also produced with the bacterium monocytogenes, various vaccines, and experimental tuberculosis These authors point out that a reticulo-endothelial reaction in the tissues and monocytosis in the blood are not always correlated, and that it is possible to obtain a high grade of monocytosis without any hyperplasia of this system They feel it is less difficult to derive the monocytes from the bone-marrow hemocytoblasts In their second paper, Penati and Levi discuss clinical monocytosis and monocytopenia, infectious "mononucleosis", and monocytic leukemia in great detail, together with the bearing of these conditions upon the various theories regarding the origin of the monocytes They conclude that the monocytes are derived from hemocytoblasts (usually myeloid, at times lymphoid in origin), and that the doctrine which derives these cells from the reticulo-endothelial system is not sufficiently documented (Hemocytoblasts of the Ferrata type and histiocytes are in all probability synonymous terms The sum-total of hemocytoblasts [histiocytes] found in the bone-marrow, spleen, liver, and lymph-nodes may be called the "reticulo-endothelial system"

There is in reality no strict divergence in views between the theory that the monocytes are derived from the cells of the reticulo-endothelial system and that which states that they originate from hemocytoblasts.)

**Red Blood Cells** The *reticulocytes*, immature red blood cells, have continued to be of first importance in the study of the anemias particularly from the therapeutic standpoint. Osgood and Wilhelm (*J Lab & Clin Med* 19 1129, 1934) state that the reticulocyte methods ordinarily in use give results which are too low. These investigators mix a small quantity of blood with brilliant cresyl blue in a test tube and then make smears. The normal percentage of reticulocytes by this method is frequently 2-4 per cent. Dameshek (*W Virginia M J* 30 193, 1934) showed that the reticulocyte response in hypochromic anemia following the use of inorganic iron varied directly with the extent of reduction in hemoglobin. At a hemoglobin level of 20 per cent, the maximal reticulocyte response with the use of an optimal dose of iron was 10-15 per cent. Minot (*Tr 4 Am Physicians* 49 287, 1934) indicated the value of the "double reticulocyte response" in the study of the therapeutic potency of various extracts of liver. Dameshek and Castle (*J 1 M A* 103 802, 1934) used this method in as saying the potency of various commercial extracts of liver for parenteral use in pernicious anemia. First one extract was injected and daily reticulocyte counts obtained, after a ten day period of observation, another extract was given in the same dosage. If a second reticulocyte response occurred the second extract was considered to be definitely more potent than the first.

The sedimentation rate of the red blood cells continues to be widely utilized. Cherry (*J Lab & Clin Med* 20 257, 1934) after a careful analysis of the various factors which influence the sedimentation rate, comes to some very sensible conclusions, to which the reviewer subscribes. Cherry states that "to rely upon this test, without other laboratory data, is unwise."

From a clinical point of view the sedimentation test alone is confusing because individuals react biochemically to disease in different ways, thereby producing variations in rate in the same pathologic state. As a prognostic aid it is of slight help. The leukocyte count or filament—non filament study in conjunction with the clinical picture is of much greater aid than the sedimentation rate." So many articles are written which are enthusiastic about the outstanding value of the test in this field or that, that it is refreshing to read a critical article which places the test in its proper category—simply another symptom or sign (often misleading like other symptoms and signs) indicating an abnormal bodily state.

Stainsby (*M Clin N Amer* 18 911, 1934) in writing of the value of the sedimentation test discusses its value in the neuroses. It is some times difficult to make up one's mind whether the patient's complaints are on a "functional" basis or composed of more solid stuff. With an elevated rate, considerable effort should be made to determine the underlying morbid process. Stainsby adds, however, that a normal rate does not rule out organic disease. He points out the value of the procedure in following the course of rheumatoid arthritis and in indicating the end of the active process in rheumatic fever and pulmonary tuberculosis.

#### ANEMIA

**Etiology** Some of the most important advances in our knowledge of anemia have been made in the understanding of the underlying etiological factors which are concerned. The bone-marrow, in which are formed all of the red blood cells, must be provided with a sufficient quantity of "liver substance" as Castle (*Ann Int Med* 7 2, 1933) has pointed out. This depends upon (1) a diet adequate in vitamin B<sub>2</sub>, protein, and iron, (2) a well functioning gastric mucosa in which protein-splitting and iron dissolving enzymes are present, and (3) a normally absorbing bowel.

**The Diet.** The importance of the diet, particularly its vitamin B content, previously stressed by Castle and Rhoads, was confirmed by Lucy Wills (*Lancet* 1 1172, 1934) in her studies of the "tropical macrocytic anemia" and the "pernicious anemia of pregnancy" seen in India. The most striking work indicating the correlation of the diet, particularly that containing vitamin B<sub>2</sub> with development of macrocytic anemia has been performed by Rhoads and Miller (*J Exper Med* 58 585, 1933) on dogs. These investigators by feeding dogs a diet inadequate in vitamin B<sub>2</sub> were able to produce glossitis, stomatitis, gastrointestinal disturbances such as diarrhea, severe macrocytic anemia, and a megaloblastic hyperplasia of the bone marrow typical of that of human pernicious anemia. This disorder, if not too severe, responded to vitamin B<sub>2</sub> containing preparations but not to parenteral liver extract, indicating a different type of absorption mechanism in the dog as compared with the human being.

Davidson and Leitch (*Nutrition Abstr & Rev* 3 901, 1934) take up in great detail the importance of a sufficient quantity of iron in the dietary, not only in human beings but in animals as well. They determined that "first-class animal protein" and green vegetables are deficient in the diets of the poorer classes and that these inadequacies may result in an iron deficient anemia. The same mechanism holds

true in the nutritional or milk anemia of infancy, as pointed out by Josephs (*Bull Johns Hopkins Hosp* 55 259, 1934) This author demonstrated by careful metabolic studies that the "birth-stores" of iron derived from the mother were probably sufficient to last to the end of the sixth month under normal conditions. However, with a continued low iron diet, such as is found in an exclusive milk diet and possibly on account of other factors, microcytic hypochromic anemia due to iron deficiency would develop.

**The Stomach** Castle's epoch-making contributions which indicated so strikingly how intimately the condition of the gastric mucosa was related to the normal hematopoietic function have been abundantly confirmed. Strauss (*J A M A* 103 1, 1934) reviewed the entire concept in an article on the rôle of the gastrointestinal tract in conditioning deficiency disease. Deficiency diseases, he brings out, are not only those in which a substance like vitamin B<sub>2</sub> is lacking from the dietary, but may develop when the substance enters the body but fails to reach the essential organs concerned. Pernicious anemia is a "conditioned" deficiency disease because the deficiency is caused not by a defective diet but usually by the absence from the gastric juice of a specific heat-labile factor (Castle's enzyme or "intrinsic substance") (It must be remembered that many cases of pernicious anemia have a strong dietary factor as well as a gastric factor and the disease probably does not develop in these instances until the diet becomes poor). Usually the cause for this loss of the specific enzyme from the stomach in a case of pernicious anemia is not clear but some cases develop following gastrectomy, polyposis of the stomach, and diffuse gastric carcinoma. Madelaine R. Brown (*New Eng J Med* 210 473, 1934) investigated 151 autopsies of cases of undoubted pernicious anemia and found that eighty-two had gross lesions affecting the gastrointestinal tract. Forty-one of forty-two histological studies of the stomach showed chronic gastritis with or without a loss of glandular epithelium, and in thirty-seven the acidophilic cells had disappeared. She therefore concluded that achylia gastrica in pernicious anemia is due to a loss of acidophilic cells. Fouts, Helmer, and Zerfas (*Am J M Sc* 187 36, 1934) investigated the concept enunciated by Morris and his associates that pernicious anemia was due to the absence of a "hormone" from the gastric juice. They concluded on the basis of experiments with gastric juice kept at different temperatures for varying lengths of time, and from other experiments in which the various gastric enzymes were separated by ultrafiltration (*Am J M Sc* 188 184, 1934) that the reason for the ability of Morris's gastric juice concentrate to induce a remission in cases of pernicious anemia was on account of the inter-

action which took place between Castle's enzyme and the globulin of the gastric juice (Castle has previously shown that normal gastric juice alone is not sufficient to stimulate hematopoiesis, but that an interaction between gastric juice and protein or vitamin B<sub>2</sub> was necessary). It has thus been adequately demonstrated that the normal gastric juice contains an enzyme, which is not rennin or pepsin, the function of which is to interact with protein or vitamin B<sub>2</sub> containing foods. The resultant substance after absorption by the bowel stimulates or nourishes the bone-marrow so that normal red blood cell formation takes place.

It must not be supposed that the "intrinsic substance" of Castle is the only factor of importance in the gastric juice. The reviewer has suggested that the lack of hydrochloric acid in cases of chronic "primary" hypochromic anemia might be of causal importance in the disease. Mettler, Kellogg and Rinehart (*Am J M Sc* 186 694, 1933) in their study of ten cases came to the same conclusions, i.e., that the gastric dysfunction leads to failure in utilization of organic iron. This is also well brought out by the Italian investigators Allodi, Penati, and Quaglia (*Minerva Med* 25 489, 1934). It is likely that the hydrochloric acid of the gastric juice aids in the preliminary solution and digestion of organic iron. Its continued absence, possibly in the presence of other factors (dietary, hemorrhagic, etc.) leads gradually to an iron deficient state, i.e., hypochromic anemia.

**The Intestines** That a normally functioning bowel is essential in the absorption of the hematopoietic stimulants formed in the stomach had already been postulated by Castle (*Ann Int Med* 7 2, 1933). Strauss points out (*J A M A* 103 1, 1934) that macrocytic anemia is distinguishable from pernicious anemia may develop in the presence of various types of intestinal lesions such as celiac disease, idiopathic steatorrhea, and chronic stricture of the bowel. Hare (*Brit M J* 2 162, 1934) concluded that ulcerative colitis may bring about various types of anemia, whether macrocytic, microcytic, or a combination of both. That the gastric lesion in pernicious anemia may not be the only one present was commented upon by Madelaine Brown (*New Eng J Med* 210 473, 1934) who found that lesions of the intestines with enteritis were frequently present. It may thus be seen that anemia may develop (1) as the result of a diet deficient in (a) protein, (b) iron, (c) vitamin B, (2) as the result of some gastric defect, (3) as the result of some intestinal lesion. The latter two mechanisms are important in the development of the "conditioned" deficiency diseases among which pernicious anemia, primary hypochromic anemia, and pellagra are prominent.

#### OTHER FACTORS

**The Liver** Recent investigations have demonstrated that the liver is important in normal

hematopoiesis. This had been suspected since Whipple, Minot and Murphy's epoch making investigations of the efficacy of liver in the treatment of anemia. Wintrobe and Shumacker (*Bull Johns Hopkins Hosp* 52 387, 1933) on the basis of three cases of macrocytic anemia associated with disease of the liver suggested that the liver stores and possibly elaborates to some extent the hematopoietic principle produced by the interaction of the intrinsic and extrinsic factors of Castle. Other authors such as Van Deyn (*Arch Int Med* 52 839 1933) and Heath (*Folia Haemat* 51 391, 1934) have taken up this attractive hypothesis. Heath states that the anemia in cases of hepatic cirrhosis is probably explainable on the basis of a loss on the part of the liver of the capacity of providing sufficient of the needed material for normal red cell formation. Goldhamer, Isaacs, and Sturgis (*Am. J. M. Sc* 188 193 1934) make an important contribution to this problem. By making extracts of human liver derived respectively from a fetus, an inadequately treated case of pernicious anemia, an adequately treated case, a case of cirrhosis of the liver and a case of acute yellow atrophy of the liver and then giving them parenterally to patients with pernicious anemia, these investigators were able to demonstrate that the liver is probably a storage reservoir for "active principle." The anemia of cirrhosis of the liver may be due these authors state, to failure of normal hematopoiesis to take place. These speculations, although attractive, probably do not give the entire explanation. It is likely that severe liver damage may be a factor in certain cases of anemia, but it is also probable that other factors must be present as well, such as an inadequate diet and an impaired gastrointestinal tract.

The importance of pregnancy as a factor in the development of anemia has been studied by Strauss (*J. A. M. A* 102 281 1934) who postulates that the fetus removes from the mother a definite store of "active principle" and of iron. In the presence of achlorhydria, the mother may be said to be vulnerable and unable to keep pace with this continued loss of substance to the fetus, and anemia may develop. Dieckmann and Wegner (*Arch Int Med* 53 188 345, 1934) have studied the blood of a group of normal pregnant women with great care and have demonstrated that anemia of a mild type develops in most of them, the anemia being most marked between the twenty sixth and the thirty fifth week.

The constitutional or hereditary factor probably plays some part, principally in pernicious anemia, possibly as well in primary hypochromic anemia. This was recently emphasized by Friedlander (*Am. J. M. Sc* 187 634, 1934) who studied 500 cases of pernicious anemia. This disease, which is largely confined to the white race in temperate zones, is present particularly in "those

individuals endowed with a diathesis characterized by a fair complexion, light hair, blue eyes, and achlorhydria."

#### METHODS OF STUDY

**Hemoglobin** The reviewer has already noted the tendency in recent years to record hemoglobin in grams per 100 cc of blood rather than in per cent of normal. What is supposed to be normal has varied from method to method, it may be 13.8 by one method and 17.2 Gm per 100 cc by another. The Tallqvist and Dare methods have been found unacceptable by the reviewer and by Dieckmann and Wagner (*Arch Int Med* 53 188 1934), the latter investigators also found the Sahli method unreliable, although if it is done with due care and if the tubes and standards are calibrated against the Van Slyke oxygen capacity method, it will be found to be satisfactory for clinical use. The Newcomer method although seemingly more accurate may be unreliable at low readings. Dieckmann and Wagner have found the Haldane-Palmer carboxyhemoglobin method most satisfactory. The reviewer is becoming more and more convinced that determination of the hemoglobin indirectly by determination of the blood iron should have far wider use (cf Peters and Van Slyke, the Wong iron method). Sachs, Levine and Appels (*Arch Int Med* 52 366, 1933) found that the average iron content of whole blood of 100 normal men was 50.01 mgs per 100 cc., that of women definitely less. The iron content is roughly 0.3 per cent of the total hemoglobin.

**Mean Corpuscular Volume.** Wintrobe (*Am. J. M. Sc* 185 58 1933 and *Arch. Int. Med* 54 256, 1934), Heath (*New Eng. J. Med* 209 173 1933) and many others have demonstrated that determination of the average volume of the red blood cell is an important diagnostic procedure, particularly in the diagnosis of the macrocytic anemias. The mean corpuscular volume is determined by first obtaining the volume of packed red blood cells per unit of blood. This may conveniently be done by centrifuging the blood in a Wintrobe 1 cc. hematocrit tube (the blood is prevented from clotting by the use of dry sodium oxalate) and observing the volume of packed red blood cells. This figure per 1,000 cc of blood (normally 460) is divided by the erythrocyte count in millions, the resultant figure being the mean or average corpuscular volume in cubic micra. Examples (1) Hematocrit (volume of packed red cells per 100 cc. of blood) 46, R.B.C 5.0 millions,

$$M.C.V. = \frac{46 \times 10}{5.0} = 92$$
 (2) Hematocrit 40 R.B.C 3.0 millions, 
$$M.C.V. = \frac{40 \times 10}{3.0} = 133$$
 Wintrobe gives the following figures normal or normocytic 84-92 macrocytic, greater than 94, microcytic, less than 80 cubic micra

**Red Blood Cell Diameter** Janet M. Vaughan and Helen M. Goddard (*Lancet* 1 513, 1934) compared the results obtained by mean corpuscular determinations with those obtained by determining the average cell diameters and concluded that volume can be regarded as a measure of cell size in pernicious anemia and in primary hypochromic anemia but that there were occasional discrepancies as in congenital hemolytic anemia when the red cells are unusually thick and in certain other cases. The reviewer has found both methods to be of value, although the determination of the corpuscular volume is less time-consuming and laborious. The occasional discrepancies should be checked by careful examination of the stained blood smear.

#### CLASSIFICATION

The tendency in recent years has been to escape from the greatly involved often meaningless classifications of the past and to substitute for them a simple classification based on cell size or volume. Wintrobe (*Arch Int Med* 54 256, 1934) is one of the foremost exponents of this view, to which the reviewer heartily subscribes. Roughly, all cases of anemia may be classified as macrocytic, normocytic, and microcytic. The macrocytic (large cell) anemias Wintrobe brings out, are characterized by an increase in the average red blood cell diameter to 8.0-8.5 micra and an increase in the mean corpuscular volume to above 94 cubic micra. The normocytic anemias have a normal red cell diameter (7.0-7.5 micra) and a normal average red cell volume (80-94). The microcytic anemias, which are usually hypochromic as well, are characterized by small average cell diameter (6.0-6.5 micra) and a low average red cell diameter (less than 80 cubic micra). The most common of the macrocytic anemias is "pernicious anemia", but many other types are present associated usually with a deficiency in Castle's antianemic principle (see Etiology). Normocytic anemia is usually associated with decreased bone marrow function (aplasia, hypoplasia). Microcytic anemia is associated with a deficiency in iron from the body and is seen particularly in chronic blood loss and in the chronic hypochromic anemia of middle-aged women with achlorhydria.

The above terms should be qualified by indicating the possible etiological factors present thus:

Macrocytic anemia poor dietary, achlorhydria, diarrhea

Normocytic anemia benzol

Microcytic anemia achlorhydria, pregnancy

#### PERNICIOUS ANEMIA

Some of the most important advances in the past few years have been made from the stand-

point of etiology (q v). The concept is gradually becoming established, as enunciated by Castle (*Ann Int Med* 7 2, 1933) that pernicious anemia is not in reality a separate disease, but rather the end-result of many diverse factors, whether dietary, gastric, intestinal, or hepatic in origin. The end-result is a megaloblastic marrow with the resultant presence in the peripheral blood of macrocytes. It is important therefore in every case of suspected pernicious anemia to study very carefully the gastrointestinal tract and the diet.

**Diagnosis** It has struck many students of the disease that outspoken cases are on the decrease and that most instances are relatively mild so far as the anemia goes, although the neurological symptoms may dominate the picture. McGhie (*Canad M A J* 30 274, 1934) makes a plea for early diagnosis and stresses such symptoms as anorexia, sore tongue, paresthesias, and difficulty in locomotion, together with such signs as glossitis, diminished vibratory sensation, and increased reflexes. Neuasthenia, arthritis, some gastrointestinal disorder are all apt to be diagnosed unless one takes pains to do very careful hematological work in these patients. Early examples of "combined system disease", which is in reality part and parcel of the greater syndrome of pernicious anemia, are often associated with what at first glance is an almost normal blood picture. However, careful investigation will usually show the following: slight reduction in red blood cells (3.5 to 4.0 millions), high color and volume index, increased mean corpuscular volume, low white blood cell count, macrocytes with an increase in the average diameter of the red cells, presence of "pernicious anemia neutrophils", slight increase in icterus index and in bilirubin content of the blood, and complete achlorhydria. Wintrobe has pointed out (*Arch Int Med* 54 256, 1934) that the mean corpuscular volume is of utmost importance in diagnosis. The color index, depending as it does upon an accurate hemoglobin determination and an accurate erythrocyte count, is very frequently in error, but the corpuscular volume is easily obtained when the hematocrit determination and the red cell count are known. In making a diagnosis it is futile to wait until severe anemia is present and nucleated red blood cells are present in the smear. In the presence of (1) the findings indicating macrocytosis, (2) glossitis, (3) achlorhydria after histamine, and (4) neurological changes usually of posterior and lateral column involvement, the diagnosis of pernicious anemia is justified. The reviewer has frequently pointed out that certain cases of aleukemic leukosis will simulate very closely all of the hematological features of pernicious anemia. With the presence of splenomegaly, and particularly when therapeutic response to liver extract does not take place, this possibility

should be suspected. It is important above all else in any case presenting neurological lesions particularly those of the extremities to rule out pernicious anemia, since treatment in the latter event may be so effective.

**Treatment.** Advance in the therapy of pernicious anemia continues unabated. Dameshek and Castle (*J A M A* 103 802, 1934) state that liver from the cow, the pig, the horse, even the codfish has been utilized and has been given in the form of a powder for oral use and in solution for parenteral administration. These authors state that parenterally given (intramuscular) solution of liver extract has been demonstrated to be 30 to 100 times as effective as orally administered extract. Thus the material derived from 100 Gm of liver (if fully potent) when given intramuscularly is equivalent to 3,000 to 10,000 Gm of material given orally. There is, to be sure, some loss in potency in too great a "refinement" of extract, particularly when it is "concentrated" in small bulk. However, even with this loss of potency a large amount of effective material is introduced when 3 cc of solution containing the material derived from 100 Gm. of liver extract is given intramuscularly. This is particularly valuable when the central nervous system is involved, and has completely modified the prognosis for these cases. Striking responses are often obtained with the persistent and extremely frequent use of the "concentrated" products of liver extract. When faced with a case of this type, it is the custom of the reviewer to inject daily doses of the material derived from 100 cc. of extract in the deltoid or gluteal muscles until definite improvement begins. This is followed by doses given every two days, then every three days, and when the patient is ambulatory, once weekly or even every two weeks. Some patients require weekly doses, others bi weekly doses in order to continue hematologically normal (50 million rbc) and neurologically relatively free of symptoms. Complete cure of the neurological symptoms is to be expected only in the mild cases showing parasthesias and slight to moderate loss in vibratory sense. In those patients presenting spasticity and ataxia 50 to 75 per cent improvement in gait and in strength can be expected, although the reflex changes will persist almost unchanged. Those cases with posterior column involvement alone usually do better than those with lateral column involvement as well. Striking, even unbelievable improvement sometimes occurs and is indeed a contrast even to the results obtained with oral liver therapy. Goldhamer, Bethel Isaacs and Sturgis (*J A M A* 103 1663, 1934) and Grinker and Kandel (*Arch Int Med* 54 861, 1934) are, however, pessimistic regarding the effects of therapy.

The exact therapeutic effect of vitamin B containing products is still uncertain. Davidson (*Brit M J* 2 481, 1933) reviewed the therapeutic effects of yeast products in different types

of anemia and concluded that some hematopoietic principle was present, although in small concentration. Lassen and Lassen (*Am J M Sc* 188 461, 1934) cite the conclusion of Strauss and Castle that the extrinsic factor "may now be defined as a substance closely related to vitamin B<sub>2</sub>, if not vitamin B<sub>2</sub> itself" (Castle, in an editorial note in the same article, states that he is fully prepared, however, to relinquish this suggestion.) These authors concluded on the basis of careful experimental work that the extrinsic factor searched for by Castle is not identical with vitamin B<sub>2</sub>, nor with B<sub>1</sub> and presumably not with any other fraction of the vitamin B complex." It is difficult to explain the often striking results obtained in cases of pernicious anemia with "marmite" (an autolyzed yeast product), unless other substances, as Lucy Wills and Naisch state (*Lancet* 1 1286, 1933), are present in this crude commercial product. Miller and Rhoads (*New Eng J Med* 211 921, 1934) state that "conclusive proof of the identity or lack of identity of the dietary anti-anemia factor and vitamin B<sub>2</sub>(G) clearly must be deferred until isolation of the vitamin in a pure form has been effected." This is a rather conservative conclusion since these authors demonstrated that a rice-polishings concentrate after incubation with normal gastric juice gave a clear-cut reticulocyte and erythrocyte response in a case of pernicious anemia.

#### PRIMARY HYPOCHROMIC ANEMIA (IDIOPATHIC HYPOCHROMIC ANEMIA, ACHYLIC CHLORANEMIA, ACHLORHYDRIC ANEMIA, HYPOFERRIC ANEMIA, CHRONIC HYPOFERRISM)

Various authors have confirmed the original findings of Kessel, Remann, and Weiner, Dameshek, Witts, Davies, and others regarding the presence of a so-called "primary" anemia with a "secondary" type of blood picture (i.e., low color index, achromia of the red cells, etc.). Mettler, Kellogg, and Rinehart (*Am J M Sc* 186 694, 1933) found that the food intake was frequently deficient in iron and that the gastric contents were almost always completely achlorhydric. Dameshek (*J A M A* 100 540 1933) pointed out that the disease was in all probability a chronic iron deficiency state and that these symptoms of early greying of the hair, wrinkling of the skin, sores about the mouth, atrophy of the tongue, brittleness and flattening of the finger nails were probably "trophic" disturbances dependent upon a lack of iron in the bodily cells. A careful study of the disease was made by the Italian investigators Allodi, Penati and Quaglia (*Minerva Med* 25 489 1934) who confirmed the above clinical findings and also expressed the view that the pathogenesis of the disorder was in great part linked up with a deficient function of the stomach. Recent studies have convinced the reviewer that most cases are associated with multiple etiological factors (as noted in chapter on Etiology). The diet is free



quently deficient, the gastric juice is defective, and often an added factor of bleeding (menorrhagia, from hemorrhoids, etc.) is present. Multiple pregnancies are also important in the pathogenesis of the disorder.

**Treatment** The treatment of the condition, whatever the cause, is relatively simple. The body may be said to be in a state of iron starvation and large quantities of iron are necessary. Dameshek (*W Virginia M J* 30 193, 1934) determined the optimal dosages of iron for various preparations to be as follows: *ferric ammonium citrate* 30 to 60 Gm daily (given either in the form of 0.5 Gm capsules, in 25 per cent solution or as the scale salt itself in 2 Gm dosage dissolved in milk), *reduced iron* 30 Gm daily (given in 0.5 to 1.0 Gm capsules), *ferrous chloride-ferrous glutamate* 4 Gm daily. In using these large doses of iron, it is wise to begin with a relatively small dose and accustom the patient's gastrointestinal tract to its presence, when this is done, the dose can gradually be raised to the optimal dosage. Recently, *ferrous salts* have been advocated as being superior in absorptive power and necessitating smaller doses of material. The reviewer has compared a ferrous compound with reduced iron and ferric and ammonium citrate and has found it to be at least as effective (*ibid*). Fullerton (*Edinburgh M J* 41 99, 1934) used ferrous sulphate and found that a small dose of the dried salt (0.8 Gm) was as effective in hemoglobin regeneration as 60 Gm of ferric ammonium citrate. The reviewer has pointed out in the above publications that most cases of hypochromic anemia will respond when adequate dosage of iron is given, but that an occasional case which is refractory responds when copper in the form of copper sulphate 0.006 Gm is added to the daily iron ration. It is probably inadvisable to use copper except in the occasional refractory case, since chronic copper poisoning with possible hemochromatosis may result.

Organic compounds of iron are probably of little or no value, certainly as compared with the inorganic preparations. This is brought out in the experiments of Elvehjem, Hart, and Sherman (*J Biol Chem* 103 61, 1933). Patek and Minot (*Am J M Sc* 188 206, 1934) made the interesting observation that concentrated bile pigment alone might increase the hemoglobin or might facilitate the absorption or utilization of iron. One patient, unable to obtain a normal hemoglobin level with large doses of iron, showed an increase in hemoglobin concentration when bile pigment was administered in addition to the iron.

#### OTHER TYPES OF ANEMIA

**Aplastic Anemia** Thompson, Richter and Edsall (*Am J M Sc* 187 77, 1934) found, on analyzing a group of cases of aplastic anemia

that many discrepancies were present between the textbook description of the classical case and their cases as observed at the bedside. (This is probably true for many conditions.) They found that evidences of regeneration were frequently present. (On the other hand, careful analysis of their cases will show that certain of them were in all likelihood examples of aleukemic leukosis [qv]). The reviewer (*New Eng J Med* 210 687, 1934) stated that although certain idiopathic cases of aplastic anemia are still encountered, the great majority present a more or less well-defined history of contact with a chemical such as benzol, arsenic, arsphenamine, neo-arsphenamine, radium, radioactive substances, mesothorium in watch-dial workers, x-rays, and gold. He reported a case following the use of large amounts of gold sodium thiosulphate in the treatment of lupus erythematosus. There has been no advance in therapy in this disease, the custom being to give numerous transfusions until further evidence of blood regeneration appears lacking. Gottheb (*Ann Int Med* 7 895, 1934) recommends trial of splenectomy and cites a case in which a remission occurred lasting for two months.

**Congenital Hemolytic Anemia** The most striking advance in this disease has been the discovery that the fundamental abnormality is an increased tendency of the red blood cells to assume a spherical shape. Naegeli, in the last (1931) edition of his textbook and Haden (*Am J M Sc* 188 441, 1934) designate this tendency as spherocytosis. This abnormality was discovered by comparing the average red blood cell diameter which is always less than normal (microcytosis) with the average corpuscular volume, which may be normal or even increased. This can only be due to an increased thickness of the red cells, which Haden and Naegeli feel is an inborn error in the disease, as much of an anatomical variation as the "tower" skull and other physical abnormalities often present. Haden found that the increased fragility (the amount of dilution necessary to produce hemolysis) varied directly with the degree of spherocytosis or altered shape of the cells, and stated that "the cells in this disease may be regarded as nearer the hemolysis point by reason of their shape." He concludes that "the one fundamental variation from normal is the microspherocytosis. The anemia, jaundice, splenomegaly, reticulocytosis, and increased fragility are all secondary to the globular form of the erythrocyte."

As regards treatment, Reifenshtein and Allen (*J A M A* 103. 1668, 1934) recommend, on the basis of three cases, the use of parenteral liver extract, particularly in the mild case of the disorder. Their three cases all showed definite clinical improvement. Other observers dis-

agree with this concept, however, maintaining that not only may hemoclastic crises appear but that the gall bladder and liver may become irretrievably damaged before splenectomy is finally done.

Ovalocytosis, Sicklelema, Sickle Cell Anemia. Pollock and Dameshek (*Am J M Sc* 188 822, 1934) in describing elongation of the red blood cells in a Jewish family, review the often confusing terms which have arisen about this curious disorder. "Ovalocytosis" is said to be present when 10 per cent or more of the red cells are oval in shape. Elongation is the next degree of abnormality. When sickled red cells are present without anemia "sicklelema" is said to be present. An anemia in which sickled cells predominate is called "sickle cell anemia". Oval shaped and elongated red blood cells have now been frequently reported in members of the white race, although sickle-cell anemia has so far been described only in the colored. Pollock and Dameshek state that "it is probable that oval elongated, and sickled red cells and sickle-cell anemia represent various gradations in the same general abnormality of red blood cells". The disorder is fundamentally an hereditary one, and probably of no significance unless severe anemia is present. Diggs, Ahmann and Bibb (*Ann Int Med* 7 769, 1933-34) demonstrated that a tendency of the red cells to sickle was observed in 83 per cent of 239 Negroes when sealed moist preparations of blood were examined. These authors found that the ratio of sickle-cell anemia to the sickle cell trait is about one to forty and that the trait itself has no significance. Corrigan and Schiller (*New Eng J Med* 210 410, 1934) noted the presence in their autopsied cases of sickle-cell anemia, the ineffectiveness of liver, liver extract both by mouth and parenterally, desiccated hog's stomach, bone-marrow extract, iron and transfusions.

#### "SPLENIC ANEMIA", BANTI'S DISEASE, ETC

In most cases of continued enlargement of the spleen, leukopenia is a prominent feature and there is usually a distinct anemia together with some reduction in the blood platelets. Larabee (*Am J M Sc* 188 745 1934) suggested the term "chronic congestive splenomegaly" for this group of cases and pointed out their similarities despite the wide difference in etiological agents. Cirrhosis of the liver, syphilitic splenomegaly, chronic malaria, residual splenomegaly following various infections all may produce the same clinical state which, by the uncritical, is often called "splenic anemia" or Banti's disease. Whether there is such an entity as Banti's disease is open to question (Most cases of alleged Banti's disease have in the reviewer's experience been finally diagnosed as chronic myelosis). Increase in the pressure

in any part of the portal circuit may result in splenomegaly, gastrointestinal hemorrhages, etc. The mechanisms of the leukopenia and slight anemia have not been worked out, although Larabee suggested a possible diminution in "active principle" because of involvement of the liver.

Splenectomy will reduce the pressure in the portal circulation and thus reduce the dangers of hematemesis and ascites. Storti (*Haematologica* 15 107, 1934) and other Italian workers have recently advocated the use of ligation of the splenic artery as a simple and easier technique than splenectomy.

#### POLYCYTHEMIA

Etiology. Two main types are recognized the idiopathic (polycythemia vera) and the secondary. The mechanisms involved in the secondary type are well brought out in a case reported by Waring and Yegge (*Ann Int Med* 7 190, 1933). This patient had long standing bronchial asthma and emphysema which undoubtedly produced anoxemia and cyanosis and was followed by polycythemia. The patient was working at a high altitude and this factor alone was sufficient to cause some degree of polycythemia. Possibly the pulmonary artery might have become sclerosed as the result of increase in the pressure within the lesser circuit. All of these factors tended to cause a greatly increased burden upon the heart. These authors discuss "Ayerza's disease", the conception of which has greatly changed since Ayerza described his "black cardiacs" in 1901. Caster, Capdehourat, and Repetto (*Arch méd chir de l'app respir* 8 385, 1933) discuss the mechanisms in the development of this disease entity of chronic severe cyanosis and polycythemia. Although they do not minimize the importance of pulmonary artery arteriosclerosis as a factor, they stress the more fundamental factor of various types of chronic bronchopulmonary disorders which produce cyanosis. The individual affected, if his marrow is normal, reacts with polycythemia, a compensatory mechanism. Arteriosclerosis of the pulmonary artery, they feel, is secondary to the chronic bronchopulmonary disease. Heart disease need not necessarily be present. These authors feel that the reason the syndrome is not seen more frequently is that many older individuals with bronchopulmonary disease do not have a sufficiently reactive marrow.

The cause or causes of the so-called true polycythemia have not yet been discovered. Morris (*J A M A* 101 200, 1933) came out with an attractively simple hypothesis that the erythremia might be the result of hypersecretion of "addisin" (the so-called gastric hormone) or of hypersusceptibility of the marrow to it. He attempted to contrast pernicious anemia (due to a deficiency in "addisin") with polycythemia ("hyperaddisinism"). Unfortunately, these hypotheses have not stood the test of even a single year of investigation (cf.

also under Etiology of Anemia) Reznikoff, Foot, Bethea, and DuBois (*The Amer Physicians* 49 273, 1934) demonstrated that the blood-vessels of the marrow in cases of the idiopathic type of polycythemia showed unusual changes of the intima and media. These circulatory changes might be the initial factor which caused a great increase in the anoxemia of the marrow with resultant polycythemia. This author also pointed out that the disease was much more common among the Jewish population of New York City than in other groups and suggested an hereditary factor. Spodara and Forkner (*Arch Int Med* 52 593, 1933) brought out the hereditary factor in their study of a large family of polycythemic individuals. The reviewer discovered this family trait in the affected family when one of the authors of the above paper was a medical student making classroom red blood cell counts. Boyd (*Am J M Sc* 187 589, 1934) describes a case characterized by polycythemia, duodenal ulcer, coronary thrombosis, and ascites and discusses the possibility that the ulcer might have had some bearing on the production of polycythemia, he feels, however, that the polycythemia was probably instrumental in causing the duodenal ulceration. Baserga (*Polychimico* 41 17, 1934) pointed out that polycythemia is occasionally associated with primary disease of the central nervous system particularly in the diencephalo-hypophyseal region (acromegaly, encephalitis lethargica) and reported a case in which polycythemia was present in a case of pituitary neoplasm. It is possible that a red cell regulating mechanism is situated in the hypothalamic-pituitary portion of the brain.

**Diagnosis** Most cases of polycythemia vera probably go unrecognized and are diagnosed as heart disease, angina pectoris, cerebral disease, peripheral vascular disease, etc. The reviewer has had occasion many times to comment on this fact. The infrequency with which routine erythrocyte counts are done and the inaccuracy of the Tallqvist hemoglobin test account to great extent for this state of affairs, which cannot be corrected unless one thinks of the possibility that the disease might be present and does a red cell count. One should consider the possibility in a patient with a dusky cyanotic appearance presenting vague symptoms which are frequently cerebral in type, at times circulatory. Sloan (*Arch Neurol & Psychiat* 30 154, 1933) states that the disease has predominantly a nervous and mental symptomatology. This may be easily understood since the blood volume is increased, the cerebral vessels distended, the circulation slowed, and the viscosity of the blood increased. Schiff and Simon (*Ann méd psychol* 91 616, 1933) describe a case characterized by cataplexia chorea, and mental confusion. Bieling (*Med Klin* 29 1410, 1933) describes a severe case of Ménière's syndrome due to polycythemia.

It is important for the practicing physician to be on the lookout for these cases, because much may be done with appropriate treatment.

**Treatment** There has been no improvement in the fundamental treatment of polycythemia. Falconer (*Ann Int Med* 7 172, 1933-34) suggests the use of venesection as an adjuvant to the use of phenylhydrazine hydrochloride. The reviewer has repeatedly used this method and finds it of value. If the erythrocyte count is eight to ten million per cu mm, it is probably best to begin by removing from 500 to 1,000 cc of blood and to begin phenylhydrazine therapy only when the red cell count is about 6.5 million. This procedure avoids excessive hemolysis and possible thrombotic complications which might ensue if large doses of phenylhydrazine were given immediately. Phenylhydrazine hydrochloride may be given either in capsules of 0.030 Gm ( $\frac{1}{2}$  grain) or dissolved in aqueous solution (1 dram =  $\frac{1}{2}$  grain). The original dosage is usually 0.090 to 150 Gm daily, which is diminished to a maintenance dose of about 0.030 Gm daily depending upon the individual patient. It is difficult to gauge the exact dosage, which must be individually adjusted. Vaguez and Mouquin (*Presse méd* 42 1065, 1934) discuss the treatment of the disease with phenylhydrazine. They begin with a dosage of 0.050 to 100 Gm and suspend medication in any event when the patient has taken a total of three Gm. They discuss the possible complications such as thrombosis and the rare examples of permanent cure. Falconer (*J A M A* 101 1633, 1933) report a case in which a remission has been present for eleven years following treatment with phenylhydrazine. Stone, Harris, and Bodansky (*J A M A* 101 495, 1933) are convinced that acetylphenylhydrazine is less toxic and provides a greater margin of safety in cases of overdosage, in two cases these authors were able to maintain a normal red cell count with only 100 mgs weekly. The status of the various methods of treatment, including that by x-ray treatment over the bones, is discussed in a review of the subject in the *American Journal of the Medical Sciences* (187 716, 1934). Phenylhydrazine easily holds first rank.

#### LEUKOSIS (LEUKEMIA)

**Classification** There are three types of white blood cells: (1) the granulocytes, (2) the lymphocytes, and (3) the monocytes. These owe their presence in the blood stream to three separate sources: (1) the bone-marrow, (2) the lymphoid tissue, and (3) the reticulo-endothelial system. Leukemia might be better termed "leukosis" since it represents pathologically a generalized proliferation of the various types of white blood cells. Since three types of white blood cells and three separate blood-forming organs are present, three types of leukosis are possible: myelosis, lymphadenosis, and reticulosis.

The existence of monocytic leukemia, a third type of leukosis originating in the reticulo-endothelial system, has been abundantly confirmed. V Levine (*Folia Haemat* 52 305, 1934) who reports nine cases, found that the disease was relatively common. The disease is called reticulo-endotheliosis by several authors Gittins (*Arch Dis Childhood* 8 367, 1933) gives an excellent review of the subject together with a classification of the various types of reticulo-endothelial proliferations. He groups them as (A) Reactive (to blood destruction, sepsis, chemical abnormalities, (B) Focal Neoplastic (Reticuloma, etc.), and (C) Leukotic (Reticulo-endothelial leukosis or monocytic leukemia, leukemic and aleukemic). Foord, Parsons, and Butt (*J A M A* 101 1859, 1933) who report four cases of "leukemic reticulo-endotheliosis" also follow much the same type of classification. Calender (*Am J Path* 10 443, 1934) in his review of the classification of the various types of leukocytic proliferation uses the term "Reticulo-endotheliosis, Leukemic". Most of these classifications, particularly those relating to reticulo-endothelial proliferations, are similar to those which have been published in European articles. The most comprehensive of these is that of Baserga.

The leukoses may be considered to be generalized proliferations of one of the white cell forming tissues. This proliferation may be associated with large numbers of circulating leukocytes or even with great diminution in their number "Aleukemic leukemia", being a paradoxical term, is best replaced by using the terms aleukemic myelosis, lymphadenosis, and reticulosis. The fundamental pathological process is identical in both the aleukemic and the leukemic forms.

**Etiology** The great majority of observers have finally agreed, after years of bickering, that the leukoses represent generalized neoplastic proliferations of one of the white blood cell forming tissues. This concept has recently received confirmation in the experimental laboratory at the hands of Furth, Seibold, and Rathbone (*Am J Cancer* 19 521, 1933) and of Büngeler (Editorial *J A M A* 102 1086, 1934). Both of these groups of investigators were able to induce leukosis in mice. The leukemic and sarcomatous lesions were frequently present together in the same mouse and transitions between one and the other state could often be seen. These lesions leukemic or sarcomatous, corresponded chemically and biologically to those of malignant tumors. Furth (*J Exper Med* 58 253, 1934) was also able to induce leukosis in chickens by means of the injection of material free from viable cells. The "acute" leukoses, although resembling so closely severe infectious processes, should be re-

garded as highly malignant lesions composed of exceedingly primitive mesenchymal cells.

**Diagnosis** Among the most frequently misdiagnosed conditions in hematologic practice are the aleukemic leukoses. Balbridge and Fowler (*Arch Int Med* 52 852, 1933) state that five per cent of their cases of diffuse myelosis were permanently aleukemic. Their statement that "most physicians seem to regard aleukemic myelosis as an obscure form of hematopoietic disease which can be diagnosed only at necropsy" is heartily endorsed by the reviewer.

The acute leukoses when aleukemic are peculiarly enough to be differentiated from agranulocytosis. Many cases of so-called agranulocytosis are in all probability examples of acute leukosis. This view was stated by Dameshek (*J A M A* 102 950, 1934) who cited some of the diagnostic features, chief among which was the progressive anemia and reduction in platelets present in the leukotic process. Jackson (*Am J M Sc* 188 604, 1934) also cites these features and makes this epigrammatic statement "Leukemia is still leukemia whether the white count be 50 or 50 000 per cu mm." He stresses the value of the bone-marrow biopsy. Strumia (*Am J M Sc* 187 826, 1934) points out the transitions which may develop from extreme leukopenia to extreme leukemia in cases of leukosis. He goes too far it appears, in attempting to link up the two conditions as being pathogenetically similar. The elevation in basal metabolic rate which frequently occurs in the chronic types of leukosis may be so striking at times as to suggest the possibility of hyperthyroidism. Dameshek, Berlin, and Blumgart (*New Eng J Med* 210 723 1934) comment upon this possibility and its possible implications. (See under Treatment.)

The diagnosis of the type of leukemia is relatively simple in the chronic varieties of the disease, but becomes difficult in the fulminating acute varieties when a primitive type of blood cell formation is taking place and extremely young cells are present in the circulation. Forkner (*Arch Int Med* 53 1, 1934) takes up the diagnostic points by which the primitive cells (myeloblasts, lymphoblasts, monoblasts) may be diagnosed in a given case. In common with other authors, he states that the supravital technic is of particular value in the differentiation of the monocytic strain of cells, although in certain cases it is only by a combination of all the available methods of study (including that of oxidase staining) that an acceptable opinion concerning the cell type may be established. It is his opinion that the clinical picture of diffuse marked swelling of the mucous membranes, particularly of the gingivae usually associated with ulceration and necrosis is characteristic of acute monocytic leukemia.

and usually absent in the other types. To this opinion the reviewer can only partially subscribe since the lymphatic type frequently gives very striking gingival and buccal lesions.

The heterophile antibody test, introduced in the diagnosis of benign lymphadenosis ("infectious mononucleosis") *qv*, has been utilized by Bernstein (*J Clin Investigation* 13 677, 1934) in the diagnosis of leukemia. This author found that heterophile agglutinins in the blood sera of twenty-one patients with leukemia were confined to low titers (less than 1 to 4) in twenty instances, whereas in most of the conditions simulating leukemia, heterophile agglutinins were found over a wider distribution of titer, up to one to sixteen. Bernstein brings out that the mechanism whereby antibodies are formed is disturbed in leukemia.

**Treatment** The treatment of the leukoses continues to be unsatisfactory, although a patient with the chronic form may frequently be tided along for a number of years. Craver (*M Clin North America* 18 703, 1934) gives in detail the plan of treatment for chronic myelosis in use at the Memorial Hospital, New York. Equal daily doses of x-rays are given over the spleen to total a mild erythema dose (about 600 roentgens). The cycle of treatment is finished in about a week and no further treatment for from three months to a year is necessary. The bones are also irradiated, the proximal ends of the long bones, the spine and the sternum being selected. Craver also cites his experience with arsenic (Fowler's solution) and believes it to be of value between cycles of x-ray treatment. (It is also of value when proper x-ray treatment is not readily obtainable.) He uses more guarded doses than those suggested by Forkner in 1930 and begins with three minims three times daily, raising the dosage by one minim per dose daily until the patient is taking about ten minims three times daily. (When x-rays are not being used, this dosage may be inadequate. It should be controlled by frequent leukocyte counts.) Portmann (*J A M A* 102 178, 1934) states that chronic myelosis is ultimately a generalized disease, and that certain organs are affected in greater degree than others. Treatment by x-rays should therefore be individualized and should always be administered to the vertebrae, the ribs, and the sternum, at times the long bones. In the treatment of chronic lymphadenosis (lymphatic leukemia) Craver discusses very carefully the procedure of treatment by x-ray, depending in great part upon the regions involved, the leukocyte count, the patient's condition, and the metabolic rate. Cycles of treatment are given over the affected lymph-nodes and possibly over the mediastinal and retroperitoneal areas, if the patient's condition permits.

Because of the extreme elevation in basal metabolic rate which is so striking a manifestation of certain cases of chronic leukosis, particularly of the lymphoid type, Dameshek, Berlin, and Blumgart (*New Eng J Med* 210 723, 1934) conceived the idea that thyroidectomy might be of benefit. These authors point out that many of the symptoms of the disease (increased sweating, tachycardia, reaction to cold, etc.) may be part of the hypermetabolism rather than due directly to the leukotic process. In one case of aleukemic lymphadenosis with a metabolic rate of +65 per cent, there was striking relief of all the symptoms followed by complete regression of all the lymph-nodes and the spleen. The blood-picture became normal. This remission has persisted for one and a half years. These authors state that the procedure is worthy of further trial in similar cases.

There has been no advance in the treatment of the acute leukoses.

#### TUMORS OF WHITE BLOOD CELLS

**Classification** Callender (*Am J Path* 10 443, 1934), the Registrar of the American Registry of Pathology, gives the following "semi-official" classification of tumors of the white blood cells: lymphosarcoma, myelosarcoma, and reticulum cell sarcoma. These may be leukemic and aleukemic. Hodgkin's disease is grouped among the reticulum cell proliferations. The reviewer has used much the same classification although he has subdivided the neoplasms a little further, chiefly according to the degree of cellular maturity. Thus, the generic terms for tumors of the lymphoid, myeloid, and reticulum cells (histiocytes) are myeloblastoma, lymphoblastoma, and histiocytoma. Lymphoblastoma is subdivided into lymphosarcoma (highly malignant) and lymphoma (relatively benign). Myeloblastoma (commonly called chloroma) is subdivided into myelosarcoma and myeloma ("Multiple myeloma" is a lymphoid tumor composed of plasma cells and should be called plasmoma). Histiocytoma is subdivided into reticulum cell sarcoma and reticulo(endothelio)ma. Any of these forms, particularly of the more malignant types may, by metastasizing into the blood stream, produce the picture of leukosis.

**Diagnosis** The differential diagnosis of enlarged lymph-nodes is frequently very difficult. Held and Goldbloom (*M Clin North America* 18 633, 1934) discuss a few of the differentiating points, but the reviewer has often found it difficult to distinguish between a pyogenic, tuberculous, carcinomatous, and lymphosarcomatous process by inspection and palpation. The diagnostic procedures which should be done in a given case are, besides physical examination, leukocyte counts, differential count of the white cells, tuberculin test, x-ray of the chest, possibly basal metabolic rate determination. In a

questionable instance, and even when the diagnosis appears obvious it is imperative to perform a biopsy of one of the affected nodes. This procedure is of more value than all the possible physical examinations and laboratory tests one may do.

Treatment. Craver (*M. Clin. North America* 18: 703, 1934) reviews very carefully and very sanely the therapy of the malignant lymphomas of the white cells. He states that the fundamental plan of treatment is determined by asking the question as to whether the disease is localized and therefore offers some hope of cure, or whether it has spread so far beyond its source that treatment must be only palliative. Leucutia (*Am. J. M. Sc.* 188: 612, 1934) says that radiation therapy must be considered the method *par excellence* in the treatment of lymphosarcoma. Thorough radiation therapy increases the expectation of life in all forms of lymphosarcoma from two and one-half to three and one-half years and leads to cure in at least ten per cent to fifteen per cent of the cases. (This is not the reviewer's experience, he is much more pessimistic.) Leucutia believes that it is essential to radiate the entire lymphatic system, regardless of whether the disease is localized or generalized. This causes "depletion of the blood" and requires careful management. He states that this drastic procedure leads at times to complete eradication of the disease, the outlook for the individual patient varying with the primitiveness of the cell and the extent of involvement at the time of treatment. Anemia, cachexia, and fever usually render prognosis unfavorable.

#### HODGKIN'S DISEASE

The tendency in recent years has been to group Hodgkin's disease among the proliferative lesions arising from the reticulo endothelial (monocytic) cells. Callender (*ibid.*) follows this grouping and it has been used by the reviewer (*Folia. Haemat.* 49: 64, 1933). The disorder may be localized or generalized. If generalized involving the lymph nodes, spleen, liver and bone marrow, it may be said to be leukotic, and the reviewer described a case of this sort as "aleukemic reticulosis" (*Folia. Haemat.* loc. cit.). The most comprehensive review of the disease which has appeared in recent years is that of Wallhauser (*Arch. Path.* 16: 522 and 672, 1933). This author takes up in great detail the many investigations which have been made in the attempt to show that the disease is of infectious (particularly tuberculous) origin. He does not appear to be enthusiastic about this possibility, and this feeling is shared by most investigators namely that Hodgkin's disease is not of infectious origin, but definitely neoplastic in type. Diagnosis cannot be made by the blood picture, which varies tremendously according to the stage and type of the disease. It is true that

the blood picture shows more or less characteristic changes (providing one knows the diagnosis beforehand). Biopsy must be resorted to and its importance cannot be overemphasized. Ogilvie and van Rooyen (*J. A. M. A.* 102: 1842, 1934) report on the Gordon test which consists in injecting into the brains of rabbits some of the lymphoid material suspended in saline (after it has remained in the ice box for about a week). If the test is positive for Hodgkin's disease, the rabbits develop severe ataxia, incoordination, paralysis of the hind legs, and death. These authors found the test of value in two clinical cases. It needs further trial before its exact value can be demonstrated. The treatment of Hodgkin's disease is by persistent x-ray therapy, and this is commented upon by Craver, Leucutia and Wallhauser (all cited above). Leucutia (*Am. J. M. Sc.* 188: 612, 1934) states that radiation therapy increases the expectancy of life, and produces five and ten year survivals in about one third of the cases. This author uses very drastic treatment covering the entire lymphoid system.

#### BENIGN INFECTIOUS LYMPHADENOSIS (INFECTIOUS MONONUCLEOSIS, GLANDULAR FEVER)

Nomenclature. The term "infectious mononucleosis", suggested in 1922 by Sprunt and Evans and Longcope, is an unfortunate one since the cells concerned are not monocytes but lymphocytes, again how can a mononucleosis be infectious? Pfeiffer in 1885 described a group of cases in children which he called glandular fever, and this seems by far the better term since it is non-committal and clinically descriptive. Benign infectious lymphadenosis, although rather unwieldy, describes accurately the pathological process which is that of intense proliferation of lymphoid cells, a proliferation, however, which is benign (i.e., not leukemic or sarcomatous) and infectious in origin.

Etiology. The infectious nature of the disease is well known. Penati (*Minerva Med.* 25: 414, 1934) in his comprehensive article analyzes the various experiments which have been performed in an attempt to determine a specific etiological agent. The most promising results, he states, are those of Ange Nyfeldt who isolated a bacterium from the blood stream identical morphologically and culturally with that isolated by Murray, Webb and Swann from a highly contagious disease of rabbits associated with monocytosis. Nyfeldt called this organism *Bacterium monocytogenes hominis*.

Many authors have commented upon the frequency of the disorder in medical students, nurses, physicians, and members of physicians' families. Schulz (*München med. Wchnschr.* 80: 1809, 1933) had the unusual opportunity of observing an epidemic of the disease and was thus able to draw some inference regarding the incubation period, which he concluded was one week or less.

**Pathology** The pathology of the disease has been but little studied since it is so benign a disorder and complications are so few. Penati (loc cit) describes the intense lymphoblastic hyperplasia which is exceedingly difficult to differentiate from the lymphoblastic proliferation of lymphosarcoma or of malignant lymphadenosis (leukemia).

**Symptoms** Schultz (loc cit) was able to study thirty-five cases in an epidemic of the disease. Great fatigue and moodiness, particularly in children, usher in the disease and are soon followed by conjunctivitis, at times epistaxis, at times vomiting. Headache develops and becomes quite severe at times. The lymph nodes become enlarged and are the characteristic feature of the disorder. Schultz states they are frequently overlooked by the physician, and to this the reviewer emphatically subscribes. The nodes are frequently tender. The spleen is usually enlarged.

**Blood Picture** All recent observers are agreed that the blood picture is that of a well-marked lymphocytosis with the presence of all types of abnormal lymphocytes. Stuart, Burgess, Lawson, and Wellman (*Arch Int Med* 54 199, 1934) describe carefully the cytologic changes and state that all gradations in type between the small normal lymphocyte and the lymphoblast are seen. Most striking features are the vacuolated cytoplasm, often with irregular projections from the surface of the cell, the nucleus is frequently indented. The presence of all types of immature lymphocytes is properly stressed by these authors who were also able to observe amitotic division of the lymphocytes in the peripheral blood. Penati (loc cit) describes the lymphocytes and their many types very carefully, in other papers this author together with Levi (*Haematologica* 16 261, 1935) describes the lymphocytes and monocytes in the experimental infectious lymphadenosis of rabbits. It is the reviewer's opinion that the large lymphocytes of glandular fever may easily be differentiated from monocytes if the various characteristics of cytoplasm, granules in the cytoplasm, types of nucleus, character of nuclear chromatin, etc., are all kept in mind. The large lymphocyte has a sky-blue, pale-blue, or deep blue cytoplasm which is clear with only a few large granules, if any, the nucleus is only about one-half the size of the cell, round usually, and is made up of heavy chromatin blocks. The monocyte is gray-blue in color with many fine granules in the cytoplasm, the nucleus is large in comparison to the size of the cell, usually indented, and composed of a fine chromatin mesh. Further differentiation may be made from supravital studies (q v).

**Diagnosis** Most of the cases, being mild, escape recognition through failure of the attending physician to palpate carefully for enlarged

lymph nodes. The recognition of the disease among physicians and their associates is possibly due to the fact that a blood smear is frequently made. The blood picture is the most important diagnostic feature. The extreme lymphocytosis with so many immature lymphocytes suggests acute lymphatic leukemia, but this is ruled out by the course, the absence of anemia and reduction in blood platelets. Recently a new and interesting diagnostic test has been introduced. Described originally by Paul and Bunnell in 1932, the heterophile agglutination test has received abundant confirmation. Bernstein (*J Clin Investigation* 13 419, 1934) describes the technique and points out the diagnostic importance of agglutination of sheep's cells by the patient's serum in high titers. The details of the technique from an immunologist's standpoint have been investigated by Stuart in a paper by Stuart, Burgess, Lawson, and Wellman (*Arch Int Med* 54 199, 1934). Stuart states that the presence of agglutinins for sheep erythrocytes in human blood was until recently of only academic interest. In glandular fever, these agglutinins become greatly increased so that positive agglutination may occur in as high a dilution as one to 5120.

A suspension of sheep's cells is added to successive dilutions of the patient's blood serum and after incubation for a few hours or after standing in the ice box overnight, the results are read. Stuart states that "with substantiating clinical and cytologic pictures, serums agglutinating in dilutions of 1:320 or more may well be considered positive." Van Ravenswaay (*New Eng J Med* 211 1001, 1934) considers the test positive when complete agglutination occurs at a dilution of 1:32, but other authors (Bunnell, Bernstein) consider even 1:8 and 1:16 as positive results. Rosenthal and Wenkebach (*Klin Wchnsch* 12 499, 1933) state that those cases showing the clinical and hematological features of "infectious mononucleosis" but with a negative agglutination test are examples of "glandular fever" and to be differentiated from true "infectious mononucleosis." To this view the reviewer does not subscribe, possibly the agglutination test does not always give the correct information. It must be remembered, as van Ravenswaay points out, that the test is non-specific like the Weil-Felix test in typhus fever, which too may frequently be negative despite the typical features of the disease being present. It is comforting in a case which suggests acute lymphatic leukemia to obtain a positive agglutination test in high titer. Bernstein (*J Clin Investigation* 13 677, 1934) points out that in leukemia the titers are exceedingly low. The cause for the increased tendency on the part of the blood serum in the disease to agglutinate sheep's red cells has not as yet been worked out.

## AGRANULOCYTOSIS (GRANULOCYTOPENIA, GRANULOPENIA, MALIGNANT NEUTROPENIA)

**Etiology** Much speculation has taken place regarding the sudden prominence of agranulocytosis as a clinical entity. Until recently its etiology was a mystery. Kracke and Parker (*J Lab & Clin Med* 19 799, 1934) list the following agents which had been at one time or another suspected: live bacteria, dead bacteria, hormonal products, radiation, and chemicals. None of these agents had been consistently implicated. Almost simultaneously, however, a group of articles appeared in which the etiology of the disease could be quite clearly traced to the use of a drug or drugs. Watkins in a short note (*Proc Staff Meet Mayo Clin* 8 713, 1933) implicated the barbiturates. Madison and Squier (*J A. M. A.* 102 755, 1934) were able to show quite conclusively in fourteen cases that amidopyrine and drugs containing amidopyrine had been used prior to the attack of agranulocytosis in all of their cases; they were able to reproduce the disease in two instances by giving the drug experimentally. Hoffman, Butt, and Hickey (*J A. M. A.* 102 1213, 1934) in re-investigating their fourteen cases of agranulocytosis demonstrated that all of them but one had taken amidopyrine prior to development of the disease; one had taken dimetophenol. Rawls (*Am J M Sc* 187 837, 1934) Holten, Nielsen, and Transbol (*Ugeskr f læger* 96 155, 1934), Benjamin and Biederman (*J A. M. A.* 103 161, 1934) and others reported clear-cut instances of the disease following the ingestion of amidopyrine. Aspirin and the barbiturates appeared to be of no etiological importance, although Dameshek and Gargill (*New Eng J Med* 10 440, 1934), Bohn (*J A. M. A.* 103 249, 1934) and Silver (*J A. M. A.* 103 1058, 1934) showed that dimetophenol—the drug so widely heralded in the treatment of obesity—had almost certainly brought about the disease in their cases. Kracke and Parker (*J Lab & Clin Med* 19 799, 1934) in analyzing chemically the various drugs which had been implicated (neo arspenamine, arspenamine, acetanilid, phenacetine, and amidopyrine) showed that they were all distinguished by the presence of a benzene ring with an  $\text{NH}_2$  (amino) linkage, they therefore called the offending chemicals the ‘benzamine drugs’. These authors postulated that the oxidation products of these drugs affected the bone marrow causing the disease (*Am J Clin Path* 4 453, 1934). The rapid onset of granulocytopenia following a small dose of amidopyrine suggested to Benjamin and Biederman (*J A. M. A.* 103 161, 1934) that a hypersensitivity to the drug was present. This is of course borne out by the small number of actual cases of the disease in contrast to the millions of adminis-

trations of amidopyrine and other drugs, as noted by Reznikoff in the Special Report of the Council on Pharmacy and Chemistry (*J A. M. A.* 102 2183, 1934). The exact mechanism of this possible hypersensitivity has not yet been worked out. It can be stated definitely at present that amidopyrine is a potentially dangerous drug and that a certain few patients are unusually sensitive to even small doses of the drug. The unusually large number of sedatives containing amidopyrine in combination should make one exceedingly cautious in their use. Jackson (*Am J M Sc* 188 482, 1934) points out that the evidence for the incrimination of the above drugs is not altogether conclusive and multiple factors may be present.

**Pathology** There is as yet no unanimity of opinion regarding the essential bone marrow pathology of the disease despite the number of autopsies which have been performed. The most careful of recent studies have been made by Jaffé (*Arch Path* 16 611, 1933) who agrees with Fitz Hugh and Krumbhaar (1932) that the most probable condition which exists is that of ‘maturation arrest’, i.e., a condition in which mature polymorphonuclear cells in the marrow are not formed, although large numbers of primitive cells (myeloblasts and myelocytes) are present. Struma (*Am J M Sc* 187 826, 1934) points out the same thing, although he appears to go too far in attempting to bring leukemia into the same essential disease pattern as agranulocytosis, the difference he says being ‘a release which occurs in acute leukemias but not in agranulocytosis.’

**Diagnosis** Many uncritical observers diagnose as agranulocytosis almost any condition in which severe leukopenia is present. Doan (*J A. M. A.* 101 2075, 1933) brings out that only twenty per cent of the cases referred to his clinic with leukopenia are instances of true agranulocytosis. Dameshek (*J A. M. A. Correspondence* 102 950, 1934) points out many cases of so-called agranulocytosis are in all probability examples of leukemic leukosis. This has been voiced by Jackson (*Am J M Sc* 188 604, 1934). The disease may be considered to be a ‘selective’ one involving only the bone marrow leukocytes, the red cells and the platelets not being affected. In any case in which anemia is striking or the hemorrhagic tendency pronounced the likelihood that one is dealing with agranulocytosis is remote. Pronounced constitutional symptoms in the presence of slight mucous membrane or throat signs together with severe leukopenia (the red cells and platelets being essentially normal), are enough to make one suspect the presence of agranulocytosis. In most cases the count is below 2,000 per cu. mm. (usually below 1,000 per cu. mm.) and the polymorphonuclear cells are conspicuous by their absence.

**Treatment** Up to the present time the following methods of treatment for the disease



have been advocated nonspecific therapy, transfusion of blood, "stimulating" doses of x-ray, nucleic acid derivatives (pentose nucleotides, adenine sulphate), "leukocytic cream", and liver extract Reznikoff (*J. Clin Investigation* 12: 45, 1933) obtained good results with the use of adenine sulphate in eleven of fifteen cases. The drug is obtained from the Eastman Kodak Company in 5 Gm lots. It is dissolved in 1 Gm doses in 50 to 100 cc of sterile salt solution with the use of heat (even boiling) and given slowly intravenously in daily or twice daily injections, reactions are rare. Dameshek (*New Eng J Med* 209: 1054, 1933 and *J A M A* 102: 950, 1934) reports on its successful use without reactions in seven successive cases. Jackson's pentose nucleotides ("Pentnucleotide NNR") have been used by many authors with good success. It is given in 10-20 cc doses intramuscularly twice daily, 40 cc may be given, and the intravenous route may be used. Dameshek (*New Eng J Med* 209: 1054, 1933) reports severe reactions with this drug and many authors are skeptical of the possible beneficial results. Reich and Reich (*Am J M Sc* 187: 71, 1934) because they failed to produce bone marrow stimulation or increased maturation in rats with the drug concluded that the "results cast some doubt on the value of pentnucleotide in the treatment of agranulocytosis". It may be remarked that it is not always possible to carry over in toto to human beings results obtained from rats. Strumia (*Am J M Sc* 187: 527, 1934) introduced "leukocytic cream" which represents the disintegration products of leukocytes obtained by centrifuging 150 cc of whole citrated blood in cream separating bottles. The leukocytic "cream" thus obtained under aseptic precautions is injected intramuscularly daily in divided doses. Whether this method has any advantage over those of Reznikoff or Jackson remains to be seen. Brugsch and Lautsch (*München med Wchnsch* 80: 1014, 1933) and v Bonsdorff (*Klin Wchnsch* 13: 1079, 1934) have used liver extract intramuscularly with good results. It is thus seen that the nucleic acid derivatives and liver extract given parenterally are probably of value, although because of poor results obtained some observers doubt this. The question of transfusion is a moot one, the reviewer has failed to note any benefit from its use. The outlook for recovery appears to vary with the observers. In the reviewer's own recent series of cases (unpublished) nine of twelve recovered. Early diagnosis and massive dosage with the above nucleic acid derivatives appear to be of greatest importance.

#### THE HEMORRHAGIC DISORDERS

**Classification** Most observers are agreed that in the main there are two types of hemorrhagic disorders: purpura and hemophilia. Various types of purpura, however, are present, differing greatly in the essential mechanisms con-

cerned. Some types of purpura are associated with a low blood platelet count (thrombocytopenic) and others with normal counts, the blood-vessel wall being presumably affected (non-thrombocytopenic).

Kugelmass (*J A M A* 102: 204, 287, 1934) in a comprehensive paper on the hemorrhagic states in childhood proposes a classification based upon differentiating those cases presenting inherent defects in the blood-clotting mechanism itself and those in which the vascular endothelium is defective. He further subdivides the cases as follows:

#### A Cases with defective blood-clotting mechanism

- 1 Deficient prothrombin in new born → hemorrhagic disease of the new born
- 2 Diminished platelets → thrombocytopenic purpura
- 3 Deficiency of fibrinogen as in severe disease of the liver → increased clotting time
- 4 Congenital defects of platelets, etc → hereditary diseases such as hemophilia, thrombasthenia, etc

#### B Cases with defective vascular endothelium

Malnutrition, scurvy  
Allergy  
Chronic infections—chemical poisons  
Hereditary defects of capillary structures

Farber (*Am J M Sc* 188: 815, 1934) classifies the hereditary hemorrhagic disorders as follows:

- Hemophilia—prolonged clotting time, platelet count normal
- Thrombopenic purpura—prolonged bleeding time, platelet count low
- Thrombasthenic purpura—prolonged bleeding time, platelet count normal
- Hereditary hemorrhagic telangiectasis (a vascular defect)—normal bleeding and clotting time, normal platelet count

Farber was unable to put into this group a family of bleeders which he observed in which certain features in common with hemophilia, certain with purpura, were present.

The reviewer is inclined to agree with Kugelmass in dividing the hemorrhagic disorders into two main types: (1) those with an inherent defect of one of the blood-clotting factors, and (2) those in which the blood-clotting factors are normal but the vascular endothelium is defective. Clinically, however, two types of hemorrhagic manifestations are present: (1) the purpuric, and (2) the type distinguished by poor clotting of blood.

**Etiology** Kugelmass (loc cit.) lists the following etiological factors which may be present in a given case showing a hemorrhagic tendency: inadequate dietary (particularly in fats and vitamin C), use of various drugs, irradiation, in-

fections, diseases of the liver, diseases of the spleen, trauma and congestion, and diseases of the bone marrow. The hereditary factor is of course all important.

In hemophilia the blood platelets although normal in number, are probably unable to form a normal clot, this defect is "genotypic", i.e., carried in the germ plasma. Purpura of the thrombocytopenic form is present in "destructive" conditions of the marrow (aplasia due to benzol, etc., tumor metastases, leukoses, etc.) and in the "selective" disorder of the marrow known as purpura hemorrhagica (Werlhof's disease) in which some defect in the bone marrow megakaryocytes is probably present. It is interesting in this connection to note that Lawrence and Knutti (*Am J M Sc* 188 37 1934) found that a diminution in megakaryocytes was present in only two of six cases of purpura hemorrhagica in which bone marrow biopsy was done. On this account these authors felt that there are at least two different types of the condition in so far as the bone marrow is concerned and that the types in which megakaryocytes were present in the marrow would be more likely to profit by splenectomy.

The non thrombocytopenic form of purpura is by far the most common type of hemorrhagic disorder encountered in practice, and in the reviewer's experience is frequently symptomatic of latent infection, a "toxic" process, senility, uremia, rheumatic fever, allergic processes, scurvy, etc.

**Diagnostic Methods** Kugelmass (loc. cit.) lists the following procedures which are of diagnostic value: (1) A complete blood study (hemoglobin, red and white cell counts, examination of the stained smear). This rules out the presence of leukemic processes and various other hematologic abnormalities. (2) Determination of the clotting time, clot retraction, bleeding time, platelet count to indicate the type of change in the clotting mechanism which is involved. (3) In rare cases when the above factors are normal, the content of fibrinogen, prothrombin, and antithrombin. (4) Application of the tourniquet test (for capillary resistance), occasional use of the microscope for study of the nail bed (of value in hereditary hemorrhagic telangiectasis). Nygaard (*Proc Staff Meet., Mayo Clin* 9 492, 1934) has devised a test of the coagulability of the plasma which he finds is of value in the diagnosis of purpura hemorrhagica. In this condition, the coagulability of the plasma is greatly reduced, despite the fact that the coagulability of the whole blood is normal (test-tube method). Nygaard concludes that the test tube method can not detect finer changes in the coagulability of the blood. Pemberton (*Am J Surg* 24 793, 1934) points out the value of study of the morphology of the platelets from a stained smear by a competent hematologist. With this state-

ment the reviewer heartily agrees, one can frequently obtain as much information from the single examination of a well stained smear as from all the diagnostic procedures outlined above.

Because of a low platelet count and hemorrhagic manifestations, one should not immediately make the diagnosis of purpura hemorrhagica, but should remember that the same phenomena are present whenever megakaryocytes are destroyed (as in aplastic anemia, leukemia, etc.). Neither is every case presenting ecchymotic spots an example of purpura hemorrhagica, usually the reverse is true and platelets are abundant. Search should then be made for some underlying condition: infectious, toxic, etc.

**Treatment.** For hemophilia, no acceptable method of treatment has been found despite the enthusiasm which was engendered by Birch's reports in 1931 and 1932 of the striking therapeutic responses to ovarian extracts. Stetson, Forkner, Chew, and Rich (*J A. M. A* 102: 1122, 1934) in a carefully conceived study, were able to demonstrate that theelol orally, soluble ovarian substance intramuscularly, ovarian substance orally, fresh whole beef ovary orally, aqueous extract of fresh whole beef ovary orally, solid residue of ovarian tissue orally, and theelin subcutaneously all were completely without effect on the coagulation time in seven cases of hemophilia. Several other authors have confirmed these results. Jones and Tocantins (*J A. M. A* 103 1671 1934) review the entire field of hemophilia and conclude that transfusion of blood constitutes the best method for the prevention and treatment of acute attacks of bleeding. They also found that intramuscular injection of whole blood has seemed to benefit some patients and that fresh serum was a satisfactory local hemostatic agent.

In the treatment of purpura hemorrhagica, splenectomy still holds first place as the method most likely to bring about remission. Pemberton (*Am J Surg* 24 793, 1934) states the problem from the surgeon's standpoint. He says that the procedure is often life-saving, and that remissions permanent in degree are present in sixty three per cent of the cases. The operative hazard in the chronic type is "minimal." He does agree, however, that in cases which are incipient or mild, splenectomy is rarely indicated. The reviewer would even go farther. It seems best to attempt all forms of palliative therapy in this disease which is so subject to remissions and relapses. We are now seeing more and more cases of recurrent bleeding following splenectomy. Among palliative methods to be used Kugelmass (loc. cit.) cites high protein and high fat diets, elimination of infectious foci, regulation of ovarian dysfunction by the use of the various pituitary and ovarian hor-

mones, injection of whole milk intramuscularly, transfusion of blood, etc. It is also wise, in the reviewer's experience, to use various vitamins in large concentration (A, B, C, D) and possibly to give liver extract and iron. When bleeding manifestations are numerous, it may be worth while to try some of the newer methods of therapy: the use of ascorbic acid (Meick) (vitamin C) given in solution intravenously as suggested by Boger and Schroder (*Munch med Wchschr* 81 1335, 1934). These authors found that the daily intravenous administration of 100 mgs of ascorbic acid was effective in controlling capillary bleeding even though the blood platelets might be diminished. The capillary wall is an important factor even when the platelets are reduced. Landau and Hejman (*Presse méd* 42 174, 1934) observed that there might be no correlation between the signs of bleeding and the platelet count and bleeding time and suggested that variations in the contractility of the blood vessels might occur. Vitamin C probably acts on the capillary endothelium and thus may be the rationale for its action. Similar reasoning is behind the recent use of moccasin snake venom therapy in the hemorrhagic states, as suggested by Peck in 1932 (Peck and Goldberger, *Am J Obst & Gynec* 25 887, 1933). The venom (obtainable from the Lederle Co.) is used in dilutions of 1:3000 in physiological saline and injected subcutaneously in gradually increasing doses usually twice weekly and for a length of time depending upon the type of case concerned. Peck was able to control bleeding in purpura hemorrhagica even though the platelet count did not rise, again suggesting that the venom has a direct action in capillaries.

An antivenom preparation (antivenin) has been in use for several years in the control of the hemorrhagic states. Taylor (*Am J Surg* 21 285, 1933) reports on several cases which have been treated in this fashion. (Antivenin may be obtained in 10 cc vials from certain drug houses and is injected intramuscularly after a preliminary test for sensitivity.) Taylor states that the antivenin of certain South

American snakes has greater efficacy than that obtained from the moccasin snake. The reviewer, in a limited experience, feels that it is worthy of further trial, in two cases bleeding stopped after injection of the antivenin. Whether this was coincidental is debatable. Savagnone (*Policlinico* 41 763, 1934) found that calcium gluconate given intravenously increased the platelet count somewhat, but his results are not at all conclusive. Jones and Rathmell (*The A. Am Physicians* 49 277, 1934) in a carefully controlled study found that large doses of viosterol had no real effect on the platelet count either in normal subjects or those in whom purpura was present.

With respect to transfusion, debate still continues regarding the relative merits of the direct versus the indirect methods. There can be no doubt, as Lundy (*Minnesota Med* 17 699, 1934) states, that the indirect method with the use of sodium citrate is simply and readily performed and no more formidable than any intravenous procedure. Lundy suggests administering the blood slowly, about fifteen cc per minute. When many transfusions are done, a direct method (the reviewer uses the Scannel) is preferable because the blood is unmodified, there is less handling, etc. From Soviet Russia has recently come an interesting suggestion: the use of stored blood obtained either from professional donors or even from cadavers shortly after death. Irger and collaborators (*Novy Khir Arkhiv* 32 53, 1934) report on this method and on their studies with experimental conservation of dog's blood. They conclude that because of various morphologic and biologic alterations which occur, the value of conserved blood for purpose of transfusion is much less than that of fresh blood.

In the non-thrombocytopenic forms of purpura, a vigorous search should be conducted for latent infections, even lues. Calcium in large doses is frequently of value. The reviewer uses calcium gluconate 1.5 Gm every three hours by mouth together with milk, and at times gives the same drug intramuscularly.

CASE RECORDS  
of the  
MASSACHUSETTS GENERAL  
HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C. CABOT M.D.

TRACY B. MALLORY, M.D., *Editor*

CASE 21431

PRESENTATION OF CASE

A seventy year old Hebrew potato merchant entered complaining of cough productive of yellow material

Four months prior to admission he had pneumonia involving the left lung. At this time there was a high leukocyte count and a negative blood culture. The sputum contained typical pneumococcus. He convalesced slowly and one month after the onset of his acute illness suffered a relapse which confined him to bed for two weeks. Subsequently he recovered and returned to his business. He continued working for six weeks although he felt weak and markedly short winded. His breathing became wheezing in character. A productive cough which had been present with varying intensity for thirty three or more years continued with somewhat increased severity. About two weeks before admission following undue exertion he felt "grippy and feverish". The following day he was found by his physician to have paroxysms of auricular fibrillation. Rales were audible at both bases and at the right top anteriorly and posteriorly. There was no leukocytosis at this time. Following this his temperature began to rise to 103° or 104° each night. His sputum increased and became purulent but had no foul odor. He slept poorly and was often irrational at night. His leukocyte count rose to 37,000 two days before admission.

At the age of forty thirty years before entry, he had been sent to Colorado because of cough and "germs" in his sputum. He remained there for five years but had a very active existence following his return East. At an examination eleven years before admission, when fifty nine years of age, rales were found over the right apex. Five years later definite medium crepitant rales were heard at both bases, more on the left. In the following year a prostatectomy was performed. Three years before admission, following physical strain he first coughed up blood. At this time medium crepitant rales were heard at the left base and axilla. There was no fever. No tubercle bacilli were found in his sputum.

Physical examination revealed a well-developed and nourished old man who was suffering from considerable respiratory distress. Except for slight pallor the skin and mucous membranes were normal. There was slight cyanosis of the nailbed and a suggestion of parrot beaking of the nails. The right pupil was slightly smaller than the left and both were contracted, presumably as a result of administered morphine. The teeth were in only fair condition. The tonsils were red and lumpy. The heart was not enlarged to percussion nor were there any auscultatory abnormalities noted. The blood pressure was 110/60. The brachial vessels were soft. The lungs were examined with the patient lying on the left side. There was dullness on the right side extending with increased intensity from the second rib to the upper border of the liver dullness. Posteriorly there was only slight impairment of resonance of the right chest from the upper border of the scapula to the base. On the left side there was some hyperresonance. The breath sounds were generally diminished in intensity, except for an area inferior to the right clavicle where bronchial breath sounds were obtained. Constant sibilant rales were audible throughout both sides and there were coarse crackling inspiratory rales at the left bottom posteriorly. Vocal resonance was diminished in the area of dullness. A lipoma in the region of the left costovertebral angle precluded examination here. The abdomen was slightly distended and tympanic. The liver and spleen were not palpable. Neurological examination was negative except for absent knee jerks.

The temperature was 102.5°, the pulse 100. The respirations were 24.

Examination of the urine revealed normal specific gravity and a slight trace of albumin. The sediment contained 3 to 100 white blood cells. The blood showed a red cell count of 4,700,000 with a hemoglobin of 65 per cent. The white cell count was 42,800, 83 per cent polymorphonuclears. Four sputum examinations revealed thick mucopurulent material which was negative for tubercle bacilli and elastic tissue. The stools were negative. The non protein nitrogen of the blood was 20 milligrams per 100 cubic centimeters. A Hinton test was negative. The icteric index was 4. A blood culture exhibited no growth.

X ray examination showed dullness in the region occupying the greater portion of the right upper lobe. The inferior margin of this dull area ended in a sharp horizontal line laterally. There was a lobulated shadow in its medial aspect which appeared to lie in the region of the lung root and was about two inches in diameter. The diaphragm, heart and mediastinum were normal.

On the day of admission an exploring needle introduced in the third right interspace in the midaxillary line elicited definite resistance which

increased after passing the pleura. A small amount of bloody fluid was withdrawn. On the fifth day a thick, creamy, odorless pus was removed from the third right interspace posteriorly. Microscopic examination of this exhibited pus cells and gram-positive organisms resembling pneumococci. X-ray at this time showed a small quantity of fluid in the posterior aspect of the right pleural cavity. On the following day under local anesthesia a resection of the third right rib was done. At the end of the second week the only significant change in the physical findings was a return of resonance at the right bottom anteriorly. Flatness was present in the infraclavicular region on this side. By the end of the third week the entire right side was dull. An x-ray film showed the small area of dullness in the right side of the chest to be increased. The operative wound was cleaned of granulation tissue and a half ounce of creamy pus was extruded. At this time the patient's chief discomfort was a constant hacking cough with inability to raise sputum. During the entire hospital stay the temperature remained between  $100^{\circ}$  and  $104^{\circ}$ , with an evening rise which averaged about two degrees. His pulse, despite the fact that he received 36 grains of digitalis within one week and a grain and a half daily thereafter, remained elevated, ranging between 100 and 160. The respirations varied, being from time to time between 30 and 60. The leukocyte count ranged from 26,000 to 37,000. During the fourth week the patient seemed to be improving. Shortly afterward, needle taps into the right second, fourth and seventh interspaces medial and lateral to the midclavicular line revealed resistance but no pus, air or blood. X-rays at this time showed an increase in the dullness of the right upper chest with some increase in the amount of fluid. The outline of the right side of the diaphragm was obliterated in its lateral half. The trachea was displaced toward the left in the region of the aortic arch. The right lower lobe contained only a small quantity of air. During the fifth week the patient developed considerable difficulty in coughing and his respiratory passages seemed filled with secretion. He died on the forty-eighth hospital day.

#### DIFFERENTIAL DIAGNOSIS

DR JAMES H MEANS. I do not know of any occupational hazard pertaining to potato merchandising so I think we must pass that over.

I think it is easiest to get a lucid and simple impression of this case by beginning with the past history rather than the present illness because I suspect that they are related.

We note above in the present illness that he had had a productive cough for thirty-three or more years. Indeed he had had a productive cough for about half of his life, and it is of

interest that it began some few years before he was sent to Colorado. That is all we know about this illness forty years ago. If he was told that he had germs in his sputum he was undoubtedly told he had tubercle bacilli. I cannot conceive of a doctor telling him about any other germs or sending him to Colorado for any other reason, so he either had or was thought to have pulmonary tuberculosis at that time. He remained there for five years and apparently made a good recovery because he was able to lead an active existence after his return East.

"At an examination eleven years before admission râles were heard at both bases, more on the right." I do not know where the examination was made. I should like to know what else was present at that time but that single finding is perhaps of interest. Our attention is directed toward the right apex. It certainly could have been a chronic tuberculous process which was lingering on. It may not have been active because one may have râles without actual tuberculous activity. One can also have a non-tuberculous infectious process in an old tuberculous cavity. This basal process, however, which is bilateral and was found some years later, interests me a good deal and when I am told that a man of seventy who has had a productive cough for half of his life has râles at both bases I am led to suspect that among other things he has some degree of chronic bronchiectasis, or something on that order.

In the following year a prostatectomy was performed. We do not know why. There is no mention of symptoms connected with that part of his body.

Three years before admission he coughed up blood. We do not know how much. He might have coughed it up because of an old tuberculous process, of course, or because he had bronchiectasis.

"At this time medium crepitant râles were heard at the left base and axilla." They had been heard at both bases prior to this.

"No tubercle bacilli were found in his sputum." Of course that does not mean he did not have tuberculosis before. Now going back to the first paragraph we are told that four months prior to admission he had pneumonia involving the left lung. We do not know anything about it, we are simply told he did have pneumonia. At this time he had a high leukocyte count and negative blood culture, and the sputum contained a type IV pneumococcus. I would feel that he either had pneumonia or something else. He convalesced slowly and one month later suffered a relapse which confined him to bed for two weeks. He subsequently recovered and returned to business, continuing work for six weeks although he felt weak and shortwinded. In other words, he did not recover completely.

I am interested in the wheeze probably as

pointing to something involving the bronchial tract.

This productive cough which he had apparently for thirty three years became intensified at this time.

"The following day he was found by his physician to have paroxysms of auricular fibrillation." That is not really significant. Any one of seventy may have paroxysms of auricular fibrillation, particularly when an infection has persisted. It might be present in a patient with arteriosclerotic change in the heart.

It seems to me we can draw certain inferences from the history. I think in all probability he did have tuberculosis and I think very likely he had in addition a chronic pulmonary disease, bronchiectasis which was not tuberculous. It is entirely possible for an individual to have both. The present condition suggests that he had a purulent process in the chest because he was developing a fever and running a high leucocyte count and was getting up some purulent sputum, so that the history points to his chest and to this lung and suggests that he has a chronic suppurative process of some kind, a suppurative process in the pleura communicating with the bronchus.

The fact that he is well developed and nourished on physical examination is of interest in a man suffering from a chronic disease. It shows good resistance to it. It had not caused any state of cachexia. Of course people with tuberculosis will go on for many years with lungs filled with cavities and remain fairly well and in a good state of nutrition. I have seen such cases, and I am sure we all have.

It appears that the heart is not the seat of his trouble.

"The lungs were examined with the patient lying on his left side." I do not know why they were examined in that position and it does not state whether they were examined in any other position. I do not know whether that was the only position he was able to assume or whether there was any special virtue in that position.

"There was dullness on the right side extending with increased intensity from the second rib to the upper border of the liver dullness." That area of dullness is more in the region of the middle lobe than of the other lobes. It makes us wonder if perhaps the seat of this difficulty is not in the middle lobe either wholly or in part. The signs are chiefly in front which would fit with a middle lobe lesion. On the left side where he may have had pneumonia there was some hyperresonance.

"Constant sibilant râles were audible throughout both sides and there were coarse crackling inspiratory râles at the left bottom posteriorly." That would fit with our conception of an initial process in both bases of a bronchiectatic nature. I should like to know

something more about the physical signs in the region of the right middle lobe. I do not see any mention of the tactile fremitus. I should interpret these signs at least as being consistent with a process in the lung field, one of consolidation and very likely in parts of it at least with plugging of the bronchus bringing about a diminution in the breath sounds.

I infer from the history that he had a suppurative condition in his lung, probably of a fairly recent origin, because I should be rather more inclined to explain the chronic symptoms on the basis of either an old tuberculous process of the right apex or this bronchiectasis, which I suspect he may have at both bases, and that the recent lesion is a suppurative one somewhere in the middle of his right chest. I think the physical findings are consistent with such an interpretation of the history and indicate that the lesion is in the anterior part of the right chest in the region of the middle lobe. I fancy that there must be a good deal of induration of the lung about the suppurative lesion and very likely some atelectasis.

The blood shows a moderate hypochromic type of anemia which anyone with chronic infection might have. He has a high leucocytosis which would go with a purulent condition and would suggest that the pus was not draining well, also with a high fever.

I went as far as I could with these x rays and I was not certain that the lesion clearly was in the upper lobe. I still think it could be middle lobe. It is unwise to disagree with the radiologist and I do it only in a sporting sort of fashion. There are a lot of dense spots in the left side that could be miliary tuberculosis, I suppose, and down at the bases some thickening that I think might go with my theory of an old bronchiectasis. Then there is a lesion in the middle of the right chest which is very peculiar. It has a flat bottom, out here is a straight line which could be, I suppose, the margin of the middle lobe with perhaps some fluid encapsulated in the interlobar space, and a most remarkable lesion toward the hilus which is dense and seems to be nodular. There are several parts to it. In the next picture it appears as though a cavity had been emptied.

There are some other interesting features. I was impressed that the ribs were close together on the right. The right chest is smaller than the left.

To go on with the story—"On the day of admission an exploring needle introduced in the third right interspace in the midaxillary line elicited definite resistance which increased after passing the pleura." Apparently they plunged their needle into something solid. On the second attempt they struck a hole, apparently, and obtained thick, creamy odorless pus. The fact that it was odorless might indicate that it was not of very long duration.

There was fluid at times in the base and I suspect it had been released from the lung in the process of paracentesis and thus was found at the bottom of the pleural cavity

Whatever happened, the fluid disappeared. Of course, it might be simply an accumulation of serous fluid of an irritative sort that was rapidly taken up. One sees it in the chest for example in connection with abscess of the liver. It could have been due to something like that.

Of course the pulse would not be slowed much by digitals because its rapidity is due to toxemia.

I should say at this point that they had attempted to drain a cavity, indeed they had drained a cavity, but he still presented the picture of undrained pus from which I would infer that there was more than one cavity.

Those in charge evidently thought the same and tried to find other pus pockets but did not succeed.

"The trachea was displaced toward the left in the region of the aortic arch." I should like to ask the radiologist about that. I cannot understand why it should be displaced toward the left if the right chest is smaller and there is atelectasis.

To summarize and interpret the findings in this case then, I would say that here was a man who had had three episodes related to his lungs over a period of four months, the first of which he was told was pneumonia on the left side.

During his stay in the hospital he presented evidence of a suppurative process in the right lung, which I believe to have been multiple abscess with a good deal of induration and atelectasis. I also believe that he had empyema probably resulting from the spilling of pus during paracentesis.

I believe that he has old pulmonary tuberculosis, and an old bilateral bronchiectasis. I am puzzled about what relation these old processes bear to the more acute terminal one.

I raise the question of an old healed military tuberculosis.

I think of malignant disease of the lung with secondary suppuration, but I cannot feel that we have the evidence to assert its presence.

That is as far as I can go.

#### X-RAY INTERPRETATION

DR AUBREY O HAMPTON We had as much difficulty with this patient as Dr Means has had, and in fact Dr Lord and I had quite a discussion over him. He had this complete consolidation of the lower aspect of the upper lobe and, as Dr Means says, it does extend down forward here to the diaphragm and the middle lobe might well have been involved. We could not see the top of the middle lobe, so we did not know for certain. The thing that interested us most was this round shadow here, and this irregular nodular shadow here at the lower as-

pect of the right lung root. The question was whether that was a tumor or not, whether that produced the whole picture certainly it looks like a tumor. The complication is this, which is probably bronchiectasis at the left base and perhaps bronchiectasis of the right middle lobe, or you could say that this was bronchiectasis and this was bronchiectasis, and all we have in addition is a consolidated right upper lobe.

DR MEANS Is that a cavity with fluid level?

DR HAMPTON We could not find a cavity that we were sure of. We took this Bucky film in an effort to show cavities. If this is tumor, why should not the heart shift toward the right? Apparently the trachea shifted in the opposite direction. We tried to explain that without much success. We did not find anything except calcified old tubercles in the left lung and these few dilated bronchi at the left base.

#### CLINICAL DISCUSSION

DR FREDERICK T LORD Our conclusions were in accord with those of Dr Means with respect to the probability of an old pulmonary tuberculosis and also of bronchiectasis at the left base. The complex of physical signs over the right upper part of the chest as presented in the case history is incomplete. Dr Means was, in consequence, at a disadvantage in interpreting the significance of the signs. They varied somewhat from time to time. In the right upper front there was dullness, diminished breathing, voice, whisper and tactile fremitus. At times, bronchial breathing was heard over the inner upper part of the dull area. These findings, with the roentgenologic evidence of a dense mass in the region of the right root, suggested obstruction of the right upper lobe bronchus due to malignant disease. The clinical aspects and the x-ray also suggested the possibility of encapsulated pleural fluid in this region. The tapping on the fifth day was done in the third interspace in the right upper axillary region and between one and two cubic centimeters of pus containing pneumococci (later shown to be type VIII) were obtained at what seemed to be the level of the pleura. It was, in consequence, thought that he had an encapsulated empyema, but at operation by Dr Churchill the pus was found to come from multiple small areas in the lung and not from the pleura. The finding of pneumonitis and cavity formation due to pneumococcus infection is of some interest because of its rarity. In explanation, it may be suggested that the usual factors leading to resolution of pneumococcus pneumonia could not operate under the pathologic conditions and that the absence of access of blood with its antienzyme permitted the unrestrained digestive action of enzyme on the lung framework.

## CLINICAL DIAGNOSES

Carcinoma of the lung?  
Bronchiectasis.  
Old tuberculosis  
Empyema, right.  
Bronchopneumonia.

## DR. JAMES H. MEANS'S DIAGNOSES

Multiple abscesses, right lung  
Pulmonary atelectasis, right.  
Empyema, right.  
Old tuberculosis, right top  
Chronic bronchiectasis, both bases  
Cancer of the lung with secondary suppuration?

## ANATOMIC DIAGNOSES

Oat-cell carcinoma of the lung, right upper, with metastases to the regional glands  
Bronchopneumonia, right upper  
Empyema, encapsulated, right.  
Compression atelectasis, right middle and lower  
Bronchiectasis, left lower  
Pulmonary tuberculosis, healed, left upper  
Pulmonary emphysema, left.  
Pulmonary osteoarthropathy, slight.  
Arteriosclerosis, slight, aortic

## PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY The autopsy findings are in part confirmatory and in part rather surprising. The most immediate finding on opening the thoracic cavity was that we broke into a very large empyema cavity on the right side which lay between the diaphragm and the base of the lung. It contained about a liter of pus and had thick walls. It was difficult to estimate how long it had been present but it certainly must have been there a couple of weeks. The lower lobe and middle lobe were completely atelectatic, probably from compression between the empyema cavity and the consolidated upper lobe. The bronchus to the right upper lobe was completely occluded by a mass of tumor which was infiltrating in rather fan shaped fashion the entire lobe. The lung abscess found by Dr. Churchill had been adequately drained and had nearly healed. On the left side there was a localized area of bronchiectasis at the left base and the other lobes were essentially normal, with slight compensatory emphysema.

A PHYSICIAN Was there any tuberculosis at the right apex?

DR. MALLORY The left apex had a small tuberculous scar. That was all the evidence of tuberculosis that we found. The right upper lobe beyond the obstruction of the bronchi was largely atelectatic, to a certain extent chronic

ly infected. There were no obvious cavities at the time of autopsy.

A PHYSICIAN What was the tumor?

DR. MALLORY It appears to be an oat-cell carcinoma, quite typical.

DR. EDWARD D. CHURCHILL The empyema that was found at autopsy probably came in the last two weeks in this illness and at that time we had practically decided he had an advancing malignant disease because of the operative findings and the physical signs of bronchial obstruction.

## CASE 21432

## PRESENTATION OF CASE

A fifty seven year old white American widow was admitted to the surgical service complaining of increasing weakness and bleeding from the rectum and vagina.

She had been well until three years previously. At this time her menses, which had always recurred regularly at monthly intervals and lasted for three to four days, suddenly became irregular. The intervals varied from three to ten weeks and the duration extended to one week. The flow was quite profuse and contained many large clots. There was no associated distress. She considered this the result of her menopause and continued with her normal activity until one year prior to entry. At this time she began to lose her appetite and her diet was gradually limited to fruits, soft foods and milk. She lost thirty pounds during the year before entry to the hospital and became progressively more readily fatigued so that she was compelled to discontinue her housework and spend most of the day in bed. About one month before admission she first noted fresh blood and clots in her stools associated occasionally with tenesmus and cramplike "gas pains." She had always been constipated and took a laxative each day. For three days before admission she had frequent desire to go to stool with the passage of blood and clots.

At the age of forty-eight she had complete amenorrhea for a period of ten months. Subsequently the previous cycle returned. She had typhoid fever at the age of fourteen.

Her mother died of gastric hemorrhage resulting from an ulcer at the age of forty seven. Her father died of a stroke at the age of seventy five.

Although married for twenty five years the patient had no children. There was a questionable miscarriage after one month of amenorrhea.

Physical examination showed a well developed, rather obese woman in no apparent distress. There was slight exophthalmos but the eyes were otherwise negative. The heart was enlarged to the left. There was a loud blowing systolic murmur audible over the precordium.



The blood pressure was 174/84. Palpation of the abdomen demonstrated a firm slightly tender rounded mass in the right lower quadrant, extending from within the pelvis halfway to the umbilicus. Vaginal examination showed that the mass was connected with the uterus. Rectal examination elicited a sphincter so spastic as to preclude demonstration of further details.

The temperature was 100°, the pulse 88. The respirations were 20.

Examination of the urine showed a slight trace of albumin with a specific gravity of 1.002 to 1.012. There was no sugar present. The sediment contained on one occasion many red blood cells but in other specimens there were few or none. It was, however, loaded with white blood cells and contained an occasional cast. The blood showed a red cell count of 2,030,000, with a hemoglobin of 40 per cent. The white cell count was 12,350, 81 per cent polymorphonuclears. The platelets were normal. The blood Hinton and Wassermann tests were strongly positive. The nonprotein nitrogen of the blood was 57 milligrams.

On the second day a proctoscopy was done. The proctoscope passed for a distance of eight and a half inches. The bowel was not dilatable beyond this point and a slot-like opening with considerable bleeding was observed. A biopsy was done. That night the patient's temperature suddenly rose to 103.8°. She became somewhat drowsy but talked coherently. On the next morning she was comatose, cyanotic, incontinent and had Cheyne-Stokes respiration. The pupils were constricted and fixed. There was a bilateral Babinski sign. The temperature remained elevated but the pulse dropped to 70. The blood pressure was 90/40. A lumbar puncture showed an initial pressure of 200 millimeters. The fluid was clear and negative. She improved gradually, became less comatose and on the fifth hospital day was transferred to the neurological service. Examination there demonstrated a definite exophthalmos. The pupils were constricted, equal and reacted to light and distance. The heart findings were unchanged. The blood pressure had risen to 156/54. There was dullness and diminished tactile fremitus at both lung bases posteriorly. Breath sounds were present and appeared to be coarsened. The bladder was found to be halfway to the umbilicus. The patient was fairly well oriented but remained semistuporous for the greater portion of the examination. The right knee jerk and ankle jerk were slightly greater than the left. The Babinski sign was absent. The remainder of the neurological examination was negative. Subsequently there was definite mental improvement. A portable x-ray of the chest on the eighth day showed a mottled area of dullness in the right upper lung field and another below the right hilus. Four days later the consolidation in the right upper lobe had

decreased. There was no great change in the patient's general condition until the beginning of the third week. At this time echolalia, increasing distention of the abdomen, and enlargement of the tumor mass in the right lower quadrant were noted. A positive Babinski sign appeared on the left side. On the twenty-third hospital day the temperature rose rapidly to 105°, the pulse was 100 with many dropped beats, and the respirations became shallow with the rate of 50 per minute. There was dullness at both bases posteriorly with bubbling râles on the right. Her breathing became Cheyne-Stokes in character and the temperature rose to 107°. The patient became comatose and expired that day.

#### DIFFERENTIAL DIAGNOSIS

DR. ARTHUR W. ALLEN. This is a rather complicated story of a woman who has lues and who comes in at the age of fifty-seven bleeding from the vagina and rectum. We have certain evidence that there is a tumor in the pelvis which probably is quite significant. The omission of any note as to whether this tumor was expansile I think in this instance, even in a luetic, is not important. With the story as presented, one thinks in this type of case of a carcinoma of the body of the uterus which has now become quite widespread and has involved the lower large bowel, so that you have not only bleeding from the vagina but bleeding from the rectum as well.

The important thing that is omitted from the history that we should like to know is the character of this discharge that she had from the vagina. It simply mentions blood and clots, nothing about the odor. In carcinoma of the fundus of the uterus you frequently get a very foul discharge which is quite characteristic.

In the sequence of events one wonders what happened in the proctoscopy to cause the temperature to rise so rapidly. Perhaps there was no connection between this examination and the definite increase in the patient's illness. Also, there was a biopsy taken which is withheld from us.

DR. TRACY B. MALLORY. We will be glad to tell you that, Dr. Allen. It showed adenocarcinoma.

DR. ALLEN. That is extremely helpful because we now know that the patient not only had lues but adenocarcinoma as well. Of course the thing that interests us is whether this could be a primary bowel lesion. Could this uterine condition have been a fibroid or an ovarian cyst in the pelvis and the real lesion be in the bowel itself? I think we probably can feel pretty sure that the right sided mass does not mean primary carcinoma in the cecum. She comes in with enough anemia to fit such a diagnosis, but I would question whether she would go three

years with symptoms of this sort with a primary lesion in the cecum.

One wonders about the cerebral accident that happened in the hospital. Was it due to metastatic malignant disease, lues, hemorrhage or anemia of the brain. The spinal puncture would help somewhat if we could be sure that the fluid was clear and negative. I suppose that means negative for a Wassermann as well as other things. Therefore I suppose we can say that the cerebral symptoms were not due to lues. If it were due to metastatic malignant disease it would surprise me a little to have her improve rather than continue to get more confused. I should be inclined to think that the cerebral accident was due to hemorrhage or thrombosis rather than to malignant metastases, although she may have had malignant metastases to the brain. She probably did have malignant metastases to the lung.

I should be inclined to favor the diagnosis of primary adenocarcinoma of the fundus of the uterus with secondary involvement of the sigmoid or high rectum, and a generalized carcinomatosis otherwise and burnt-out lues.

#### CLINICAL DISCUSSION

DR. ERNEST M. DALAND. I examined the patient an hour or two after she came into the hospital and at that time she said nothing about any rectal symptoms but spoke only of her vaginal bleeding. I did a pelvic and rectal examination on her at that time. She had this large mass slightly to the right. It was freely movable and smooth and it seemed like a large fibroid although the possibility of an ovarian cyst was considered. It did not feel like carcinoma of the fundus. It was too large and not firmly fixed. That afternoon when the history was more carefully taken the rectal bleeding was brought out. The next morning I did a proctoscopy. This was done without any difficulty in the knee-chest position. The proctoscope passed eight and a half inches. I could not inflate the bowel above that, and, as the history says, she showed a narrow slit with bleeding coming from the slit. The specimen was taken with a curet through the slit. I could not see any definite growth through the edge of the slit. It looked granular. We got a poor specimen which grossly we could not diagnose. The appearance was not that of carcinoma arising in the sigmoid.

DR. CHARLES S. KUBIK. I saw the patient a short time after the cerebral accident. Some improvement had already taken place and so I thought it was vascular occlusion that is thrombosis or embolism, rather than hemorrhage, and because it was stated that at the onset the pupils were constricted and both plantar reflexes were extensor in type I was inclined to think that the trouble was in the basilar artery.

#### CLINICAL DIAGNOSES

Adenocarcinoma of the sigmoid.  
Tertiary lues.  
Cerebral thrombosis  
Bronchopneumonia.  
Arteriosclerosis.

#### DR. ARTHUR W. ALLEN'S DIAGNOSES

Adenocarcinoma of the uterus  
Secondary involvement of the sigmoid  
Metastatic carcinoma, possibly of the lung and brain  
Cerebral thrombosis  
Tertiary lues

#### ANATOMIC DIAGNOSES

Adenocarcinoma of the uterus with infiltration of the rectal wall  
Peritonitis, acute localized  
Atrophy of the right kidney  
Compensatory hypertrophy of the left kidney  
Hydronephrosis, left  
Hydroureter, left.  
Pulmonary edema, slight.  
Arteriosclerosis, marked, aortic

#### PATHOLOGIC DISCUSSION

DR. MALLODY. The biopsy which was taken, as Dr. Daland has described, showed a superficially normal mucosa underlying which in the submucosa islands of definite adenocarcinoma could be seen. One might be tempted to conclude from such findings that the gut was invaded from without but that would be very dangerous since often rectal biopsies are taken not from the center of the tumor but from the edge, and we frequently find normal mucosa overlying cancer which is infiltrating laterally. So that our suspicions were not aroused at all and knowing nothing of the story at that time we assumed that it was a primary carcinoma of the bowel.

The autopsy showed that it was not that but a primary uterine cancer which had grown upward and laterally to involve nearly sixteen centimeters of the upper rectum and sigmoid. The tumor mass seemed at first very hard and firm but as we cut into it we found there was simply a shell of tumor on the outside and the center was composed of gelatinous, necrotic material. The terminal ileum also had become involved in the tumor and two or three loops were firmly adherent to it. Between these loops we found a small abscess about eight centimeters in diameter filled with pus. It is not very clear that that played any part in the symptomatology. We found as is so common in carcinoma of the uterus practically no metastases. In other words all the tumor present was direct extension from the uterus. The lungs, liver, brain were all free from metastases.

The brain lesion turned out to be localized infarct in the left globus pallidus

One other rather striking feature at the autopsy table, but of no importance whatever in the clinical course of the disease, was a completely atrophic right kidney with an imperforate ureter on that side. On the other side we of course found compensatory hypertrophy, and there was also a moderate degree of hydronephrosis and dilatation of the upper part of the ureter with obstruction lower down where it passed beneath the tumor mass.

A PHYSICIAN: Were there any syphilitic lesions anywhere?

DR. MALLORY: No anatomical trace of them.

The heart was entirely negative except for very slight hypertrophy.

DR. JAMES H. MEANS: What was the exophthalmos?

DR. MALLORY: I am not clear about that, Dr. Means. It was not very evident on the autopsy table. It may have been a transitory affair. Have you any explanation, Dr. Kubik?

DR. KUBIK: No, I do not recall that as being a striking feature. She may have had simply a myopia.

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## THE IMPORTANCE OF RECOGNIZING CHRONIC CONSTRICTIVE PERICAR- DITIS (PICK'S DISEASE)

It has become of far more than academic interest to recognize chronic constrictive pericarditis, for it has been proved recently that a considerable percentage of the cases, formerly incurable, can now be completely relieved by surgery consisting of pericardial resection. It is not a common disease but neither is it excessively rare for in three clinics alone in this country (one in Boston, one in Cleveland, and one in Nashville) in the last few years at least forty cases have been recognized at the last count (spring of 1936) and fourteen have been cured. Others throughout this country and in Germany have also been relieved by pericardial resection.

Three essentials for a successful operation have recently been outlined by White in the St. Cyr's Lecture of the National Hospital for Diseases of the Heart at the Royal Society of Medicine in London.<sup>1</sup> They are first, a correct diagnosis, secondly, selection of a patient who is seriously crippled by the disease and yet a

satisfactory risk for operation, and thirdly, an experienced thoracic surgeon. In the series of fifteen cases presented by White, Dr. E. D. Churchill of the Massachusetts General Hospital effected cures in six and a large measure of improvement in one other out of ten cases on whom he operated.

The following definition and diagnostic clues have been offered by White. "Chronic constrictive pericarditis consists of a chronic fibrous or callous thickening of the wall of the pericardial sac which is so contracted that the normal diastolic filling of the heart is prevented." The points for diagnosis are (1) the insidious development of dropsy in a young or middle-aged person without previous disease of heart or kidneys, (2) preponderant liver enlargement and ascites, (3) the presence of little or no cardiac enlargement, (4) increased prominence of the neck veins—a very important sign, (5) small pulse pressure, often with "paradoxical" (Griesinger-Kussmaul) pulse, (6) x-ray evidence (poor pulsation of entire heart or of right heart border alone, calcification, chronic pleuritis), (7) abnormal electrocardiogram (low voltage or low or inverted "coronary" T waves in chronic disease in early youth), and (8) a previous history of acute pericarditis. The first, third, fourth, and seventh of these clues are the most important and consistent ones.

The three conditions with which chronic constrictive pericarditis has been usually confused are the ordinary portal cirrhosis of the liver, chronic heart disease (in particular, mitral stenosis) with congestive failure, and acute or subacute polyserositis (which is Concato's, not Pick's disease). From portal cirrhosis of the liver chronic constrictive pericarditis is to be distinguished chiefly by two signs (in the absence of complicating heart disease): (1) engorgement of the neck veins, and (2) abnormal electrocardiogram. From heart disease chronic constrictive pericarditis is to be distinguished by the absence of characteristic murmurs, especially the diastolic murmur of mitral stenosis, and of much cardiac enlargement. Actually heart disease itself is found with only the greatest rarity complicating chronic constrictive pericarditis. And finally, from acute or subacute polyserositis chronic constrictive pericarditis is to be distinguished by the absence of evidences of infection (fever and leukocytosis) and of friction rubs (of acute pleuritis or acute pericarditis), and by the presence of increased systemic venous pressure (except when there is a pericardial effusion as a part of the acute polyserositis). In this connection it is important also to call attention to a frequent error, namely that of considering perihepatitis or Zuckergussleber (frosted liver) and perisplentitis as a necessary part of the clinical entity of chronic constrictive pericarditis. There may or may not be a chronic peritonitis involving capsule of liver

or spleen, as a part of a chronic polyserositis which may accompany Pick's disease, the pericardium may be the only serous sac involved in this disease and the liver capsule may be clear and glistening even though the liver is enlarged. The degree of hepatic cirrhosis in cases of chronic constrictive pericarditis as a rule is relatively slight. Conversely there are cases of chronic peritonitis with the liver not enlarged but closely encased in a thick capsule with no evidence of chronic constrictive pericarditis.

## REFERENCE

- 1 White P D. Chronic Constrictive Pericarditis (Pick's Disease). Treated by Pericardial Resection. *Lancet* 229: 539-597 (Sept. 7-14) 1935

## PROGRESS IN MEDICAL EDUCATION

THE statistical review of medical education in the United States for the past year, recently published in the *Journal of the American Medical Association*<sup>1</sup> presents material which deserves consideration by every person interested in that fascinating subject, but especially by every physician. In the comment accompanying the review are suggested some trends the importance of which one can only guess.

The problem of relieving suffering and of overcoming disease confronts the physician daily, in fact many times a day, and in an important sense schools of medicine are springs which supply the rivers of healing. Physicians must be interested in every fact pertinent to the question of how this primary problem concerning the springs is being solved, or at least is being attacked.

Excellent reviews of recent progress in the various branches of medicine have been issued in the literature, notable among them being the articles on medical progress in the past twenty-five years which appeared in the *British Medical Journal*<sup>2</sup>.

The time is ripe for a study of the progress in medical education which has been made in the twentieth century. A superficial survey has been presented by the statistical studies, to one of which reference has already been made, but what is needed is a more penetrating analysis which will note the new ideas, their introduction, their spread, their influence, perhaps advancing, perhaps receding, their results, possibly their relatively permanent contribution to education.

There is, for example, the idea of a university. This was relatively slight in its influence in American medical education in 1900, yet of all ideas now working themselves out, it has wrought, perhaps, the greatest transformation. Most medical schools are associated with universities. To what extent are they dominated by the idea of university education? It is reported that educational methods appropriate

for secondary school have been hyper-extended into the medical departments of some so-called universities. There is still much opportunity for improvement.

Another idea growing in importance of influence of late is that the patient, the concrete person who is sick, is the focus of interest for the medical student as well as for the physician and should be recognized as such. Then the old idea of learning by doing, applied especially in the internship, is receiving more widespread attention.

A fourth idea, vague, threatening, portentous, is the socialization of medicine. Few of us, if any, know just what this means. Its manifold connotations bewilder us. We are sure all is not well with the world of the practice of medicine. Some say it is the "individualization" of medicine that is the matter. Others say that medicine is essentially individualistic, and physicians are in their nature individualists. Then there is the retort discourteous that individualism is a cloak for selfishness.

It is too soon to record the influence of this fourth idea, it has hardly begun its course in its modern form and certainly it demands study. But those ideas mentioned first and others which might be noted have obviously been at work for years and of their effect too little has been said.

What we want to know is what progress has been made in this, the latest, of the centuries, in educating physicians. It is not merely what increase has there been in the information which every physician or any physician, must have as part of his armamentarium, but what progress in method has been achieved so that with a given expenditure of time and effort, and if one may say so, of brains, there comes to the individual student more power as a physician. Here is a challenge indeed to the medical educator.

## REFERENCES

- 1 J A M A 105: 677 (Aug 31) 1936  
2 Brit. M. J 1: 909 (May 4) 1935

## SIGNING THE PLEDGE

MANY readers of the *Journal* who hold teaching appointments at the various universities have doubtlessly within the last few weeks been asked to take an oath of allegiance to the Constitution of the United States. This oath, made mandatory by an Act of the Great and General Court of Massachusetts, was the subject of considerable controversy a few months ago. It is now required of teachers in private institutions, and of school children.

There is no reason why any good citizen of the Commonwealth should stickle over his rights and his principles and refuse to take this oath, objectionable as the coercive method may be to him. True such coercion may be opposed to the spirit of the Constitution which it professes

to uphold, but the oath itself will do no harm, nor will it serve any useful purpose

Surely there can be no advantage in denying to our political guides an opportunity of rendering lip service to the ideals of robust Americanism and, by twisting the American eagle's tail a little harder, make it scream a little more loudly

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

**RICHARDSON, HORACE K. M.D.** Tufts College Medical School 1905 Formerly Senior Physician, Sheppard and Enoch Pratt Hospital Towson, Maryland Now, Assistant Medical Director, The Austen Riggs Foundation Stockbridge Mass Consulting Psychiatrist, The Fairview Hospital, Great Barrington, Mass., and Mental Hygiene Clinic House of Mercy Hospital, Pittsfield, Mass. His subject is "Psychopathy and the General Practitioner" Page 787 Address P O Box 235, Stockbridge, Mass.

**WETHERBEE, WINTHROP JR. A.B., M.D.** Columbia University College of Physicians and Surgeons 1931 Formerly, House Officer and Resident Physician, Fifth Medical Service, Boston City Hospital, and Resident Physician, Medical Out-Patient Clinic, Boston City Hospital. Now, Assistant in Medicine, Boston University School of Medicine Address 482 Beacon Street, Boston, Mass. Associated with him is

**FOLEY, JOHN A. A.B. M.D.** Harvard University Medical School 1915 Assistant Visiting Physician, Boston City Hospital Associate Professor of Medicine, Boston University School of Medicine. Address 464 Commonwealth Avenue, Boston, Mass. And

**REISCH, JOSEPH. B.S., B.E., M.D.** Tufts College Medical School 1918 Physician in Chief, Department of Physical Therapeutics, Boston City Hospital Head of Department of Physical Therapy, Greater Boston Hospital for Chronic Diseases (Bikar Cholm), Roxbury, Mass Address 184 Bay State Road Boston, Mass Their subject is "Diathermy in Lobar Pneumonia." Page 796

**ARONER, BENJAMIN H. A.B., M.D.** Columbia University College of Physicians and Surgeons 1920 Assistant Visiting Physician Lincoln Hospital, New York City Formerly, Instructor of Clinical Medicine Cornell University Medical College, Chief of Arthritis Section, Cornell Clinic, Chief of Arthritis Service, Mount Sinai Hospital His subject is "Specific and Non-specific Arthritis (With Special Reference to Trauma)" Page 799 Address 1964 Grand Concourse, New York City

**HALSTED, JAMES A. A.B., M.D.** Harvard University Medical School 1930 Assistant in Medicine, Massachusetts General Hospital His subject is "Gonadotropic Hormone (Prolan) in Relation to Carcinoma of the Cervix." Page 803 Address 264 Beacon Street, Boston, Mass

**DAMESHEK WILLIAM M.D.** Harvard University Medical School 1923 Associate Physician, Beth Israel Hospital Physician Boston Dispensary Instructor in Medicine Harvard University Medical School Assistant Professor in Medicine Tufts College Medical School His subject is "Progress in Hematology (Late 1933 and 1934)" Page 805 Address 371 Commonwealth Avenue, Boston, Mass

### The Massachusetts Medical Society

#### SECTION OF OBSTETRICS AND GYNECOLOGY\*

<b>C. J. KICHAM, M.D.,</b> Chairman	<b>R. S. TITUS, M.D.,</b> Secretary
524 Commonwealth Ave., Boston, Mass	472 Commonwealth Ave., Boston, Mass

#### WHAT IS YOUR OPINION AS TO THE DANGER OF BARBITURATES IN OBSTETRICAL ANALGESIA?

During the past five years, the use of the barbiturates in obstetrical analgesia has increased tremendously. The drugs in popular usage are sodium amylal and sodium pentobarbital (nembutal), the latter has been rapidly replacing sodium amylal. The employment of these medications has become so universal that they have often been given indiscriminately.

One of the pronounced disadvantages of the barbiturates is the extreme restlessness of the patient. Sodium pentobarbital has a more depressing effect upon the higher brain centers with a decreasing amount of excitement. Consequently any patient who has been given these medications must be watched by a trained attendant, and it is therefore most unwise to administer these drugs to a patient who is having the baby at home. In the hospital, a nurse should be at the patient's bedside throughout the entire labor and also during the postpartum period until the patient has fully awakened. Many a patient after delivery has gotten out of bed and wandered around the hospital corridors. It is good policy not to give cardiacs any of the barbiturates.

The barbiturates should not be administered after the patient has eaten. In the first place, it is possible that the medication will not take effect inasmuch as it may be slowly absorbed.

A series of short selected articles by members of the Section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the Section.

and, secondly, much more important, should the medication be absorbed, there is definite danger of the patient losing her swallowing reflex and inadvertently inspissating some vomitus or mucus in the trachea. This has not been an infrequent occurrence, and mortalities have been reported in the literature

The barbiturates are prone to stimulate the flow of mucus, sodium amytal being a worse offender than sodium pentobarbital. If the patient, therefore, shows a tendency toward mucus production, one should cut down the dosage of the barbiturates and keep her in a much more wakeful condition. A great many of these patients take gas oxygen, as a terminal anesthetic, very badly. They are prone to gag and vomit. Drop ether is much more satisfactory. In patients with upper respiratory infections or those with tuberculosis, barbiturates should not be administered. It is ideal, of course, to keep a patient comfortable especially if she has a long labor. In such cases, one should be very careful to administer very small dosages of the barbiturates so that the patient can be awakened to take fluids. If she is narcotized too deeply, she is quite apt to become dehydrated and also to develop acidosis.

The bladder, during labor, has always needed careful watching. Should the bladder become distended, there is a great possibility that the muscle fibers will become paralyzed and that the patient will consequently have urinary retention and be unable to void. If she is kept deeply narcotized, frequent catheterizations during labor are imperative. Likewise, following delivery, if she is too sleepy to void, the bladder should be emptied by catheterization ten hours after delivery even without apparent distention. In this way, much of the incidence of postpartum urinary infection will be avoided.

In conclusion, the barbiturates should never be administered to a patient at home. During labor and until fully awakened after delivery, a nurse should be in constant attendance. These drugs are contraindicated in cardiacs, in upper respiratory infections, tuberculosis, and if the patient has had a full meal. Drop ether is the most satisfactory terminal anesthetic. The bladder has to be carefully watched both during labor and during the postpartum period. In long labors, the patient should be kept semi-conscious so that she can take plenty of fluids, thereby avoiding dehydration and acidosis.

### THIRD ANNUAL POSTGRADUATE MEDICAL EXTENSION COURSE

The following sessions have been arranged by the Committee for the week beginning October 27

#### Barnstable

Sunday, October 27, at 4 00 P M., at the Cape Cod Hospital, Hyannis Subject Arthritis

(a) Medical Care of Patient in the Home  
(b) Orthopedic Treatment in Hospital and Aids in Home Treatment. Instructors L T Swaim and R T Phillips J I B Vail, Chairman.

#### Bristol South (Fall River Section)

Monday, October 28, at 4 00 P M., at the Stevens Clinic of the Union Hospital, Prospect Street, Fall River Subject Pediatrics Abdominal Disease in Childhood, Medical and Surgical Aspects Instructors S H Clifford and H W Hudson, Jr Eugene A McCarthy, Sub-Chairman

#### Essex North

Friday, November 1, at 4 00 P M., at the Hotel Bartlett, 95 Main Street, Haverhill Subject Ophthalmology and Otolaryngology (a) The Major Hazards in Diagnosis of Diseases of the Eye, Ear, Nose and Throat as Seen in General Practice (b) Special Treatment in Acute Medical and Traumatic Diseases of Eye Emergencies Arising in the Treatment of the Ear, Nose and Throat. Instructors L G Richards and W P Beetham Francis W Anthony, Chairman

#### Essex South

Tuesday, October 29, at 4 00 P M., in the Nurses' Home of the Salem Hospital, Salem Subject Cancer of Stomach, Bowel and Genito-Urinary Tract. Modern Care of Inoperable and the Incurable, the Development of Improved Methods of Caring for These Cases with Less Pain and Discomfort with Minimum of Drug Therapy Instructors Horatio Rogers and R C Graves Walter G Phippen, Chairman

#### Hampden

Thursday, October 31, at 4 00 P M., at the Academy of Medicine, Professional Building, 20 Maple Street, Springfield, and at 8 00 P M., at the Holyoke City Hospital, Holyoke Subject Kidney and Bladder Diseases, A (Surgical) Hematuria Its Significance in Surgical Diseases of Kidney and Bladder Instructor W C Quinby George L Schadt and George D Henderson, Chairmen

#### Hampshire

Wednesday, October 30, at 4 15 P M., in the Nurses' Home of the Cooley Dickinson Hospital, Northampton Subject Cancer of Stomach, Bowel and Genito-Urinary Tract. Modern Care of Inoperable and the Incurable, the Development of Improved Methods of Caring for These Cases with Less Pain and Discomfort with Minimum of Drug Therapy Instructors David Cheever, W C Quinby and M C Sosman Robert B Brigham, Chairman

#### Middlesex East

Wednesday, October 30, at 4 00 P M., at the

Melrose Hospital Melrose. Subject Lung Diseases (a) Significance of Symptoms and Signs in Chronic Lung Disease Tuberculosis, Bronchiectasis etc. (b) The Value of Surgery in Above Disease Problems instructors Cleveland Floyd and H F Newton. Joseph H. Fay Chairman.

## Middlesex South

Tuesday October 29 at 4 15 P.M., at the Cambridge Hospital, Cambridge Subject Kidney and Bladder Diseases A (Medical) Acute Nephritis — Etiology Diagnosis and Treatment. Nephrosis and Its Treatment Instructor L. B. Ellis Edmund H Robbins Chairman.

## Norfolk South

Monday October 28 at 8 30 P.M., at the Quincy City Hospital, Quincy Subject Diseases of the Liver Surgical Problems in Diagnosis of Acute Disease of Gall Bladder and Liver Instructors F D Adams and W R. Morrison David L Belding Chairman

## Plymouth

Tuesday October 29 at 4 00 P.M. at the Brockton Hospital, Brockton Subject Neurological Aids in the Diagnosis and Treatment of Disease from the Medical Viewpoint. Problems of History and Examination with Special Reference to (a) Neurosyphilis, Multiple Sclerosis and Other Degenerative Conditions (b) Diseases with Acute Onset, such as Meningitis and Cerebral Accidents. Instructor T J Putnam. W H. Pulsifer Chairman.

## Worcester North

Friday November 1 at 4 30 P.M. at the Burbank Hospital, Fitchburg Subject Kidney and Bladder Diseases, B (Medical) Chronic Nephritis Cardioresenal Disease. The Use of Diuretics. Instructor J P O'Hare Edward A. Adams Chairman.

## MISCELLANY

## ANTERIOR POLIOMYELITIS CASES FOR 1935

WEEKLY LIST OCTOBER 14-19

## City or Town

Attleboro	1
Dighton	3
New Bedford	2
Somerset	1
Brockton	3
Frammingham	1
Hanover	1
Milton	1
Natick	1
Quincy	1
Randolph	1
Stoughton	2

Boston	9
Cambridge	2
Concord	1
Medford	1
Revere	1
Waltham	2
Watertown	1
Wellesley	1
Lowell	2
Lynn	1
Salem	2
Leicester	1
Worcester	4
Springfield	1
	47

HARVARD MEDICAL SCHOOL APPOINTMENTS  
AND RESIGNATIONS

## RESIGNATIONS EFFECTIVE SEPTEMBER 1, 1935

George W. D. Hamlett, Research Fellow in Anatomy

Robert Amory Member of Epilepsy Commission

## APPOINTMENTS

From September 1 1935 to April 1, 1936

Albert E. Rauh Research Fellow in Anatomy

From November 1, 1935 to July 1 1936

Paul B. Cassaday Research Fellow in Medicine

For one year from September 1 1935

Enrique Savino Research Fellow in Epidemiology (School of Public Health)

Carl T. Nelson, Instructor in Bacteriology

Maurice Fremont Smith Instructor in Medicine

Benjamin Castleman Instructor in Pathology

Gilbert Horrax, Instructor in Neurology Courses for Graduates.

Kurt H. Semser Teaching Fellow in Bacteriology

Alfred Krane Assistant in Medicine

Lowrey F. Davenport Assistant in Medicine.

Isadore E. Budnitz, Assistant in Medicine.

William M. MacKay Assistant in Medicine

Benedict F. Massell, Assistant in Medicine.

Edgerton McC. Howard Assistant in Neurology

Christian F. Midelfart, Assistant in Neurology

Hugh P. Newbill Assistant in Neurology

Melior G. Karp Assistant in Orthopedic Surgery

Quentin M. Gorman, Assistant in Comparative Pathology in Medical School and School of Public Health.

Nells L. Anthonisen Assistant in Psychiatry

Grosvenor B. Pearson, Assistant in Psychiatry

John D. Stewart, Assistant in Surgery

Frederick W. Klempner Research Fellow in Biological Chemistry

Georges J. P. Hornus Research Fellow in Bacteriology

James G. M. Hamilton, Research Fellow in Medicine.



Francis J C Herrald, Research Fellow in Medicine

Michel Pijoan, Research Fellow in Medicine

John A. V Davies, Research Fellow in Pediatrics

David Weinman, Research Fellow in Comparative Pathology

Felix Deutsch, Research Fellow in Psychiatry

Erik Homburger, Research Fellow in Psychology

Georges E P Coppee, Research Fellow in Physiology

#### DR. GASSER SUCCEEDS DR FLEXNER

Dr Herbert S Gasser has been appointed to the position of Director of the Rockefeller Institute for Medical Research to fill the position made vacant by the resignation of Dr Simon Flexner. Dr Flexner has been given the title of Director Emeritus after thirty two years of service.

Dr Gasser was formerly Professor of Physiology and Director of Physiological Laboratories at the Cornell University Medical College.

#### A TESTIMONIAL DINNER AND MEETING IN HONOR OF DR. DAVID L EDSALL

A testimonial dinner, in honor of Dr David L Edsall, recently retired dean of the Harvard Medical School, was held by the Harvard Medical School Alumni Association at the Harvard Club of Boston, Wednesday evening, October 23. President James B Conant, of Harvard, presided, and Dr A Lawrence Lowell, president-emeritus of Harvard, delivered the principal address. Dean Charles S Butler, of the Harvard Medical School, also spoke.

Preceding the dinner, a meeting was held at the Harvard Medical School. Addresses on "The Development of Medical Education in the United States Since the World War" were made by Dr Walter A Jessup, President, Carnegie Foundation for the Advancement of Teaching, Dr Eugene DuBois, Professor of Medicine, Cornell University, and Dr Lawrence J Henderson, Professor of Chemistry, Harvard University. Dr Walter B Cannon, Professor of Physiology, Harvard, presided. Members of the medical profession in the Boston area were present.

#### APPOINTMENT OF DR. HOSEA W McADOO

The appointment has been announced of Dr Hosea Webster McAdoo as medical director of the Ring Sanatorium and Hospital in Arlington, Mass. Dr McAdoo, a Texan by birth, was graduated in medicine from Tulane University in 1920. After serving a year's internship at the Southwestern Railroad Hospital in St. Louis, he was resident physician for two years at the Warren State Hospital, Pennsylvania. This was followed by a three months' period as psychiatrist in St. Elizabeth's Hospital in Washington, D C. From 1924 to 1929 he was medical officer in psychiatry in the United States Veterans Hospital at Little Rock, Arkansas, and from

1929 to 1930 assistant professor of pathology at Baylor University in Dallas. Dr McAdoo became clinical director of the Springfield State Hospital in Sykesville, Maryland, in 1930 and was appointed superintendent in 1932, a post which he held up to the time of his present appointment.

## CORRESPONDENCE

### DIABETES AND CHRISTIAN SCIENCE

October 7, 1935

Editor, *New England Journal of Medicine*,

Within the past few weeks I have had to attend two diabetic patients who had been treated with Christian Science and were in coma when I saw them. One of them I had seen in consultation ten years before. She followed medical advice for a time with satisfactory results, but later succumbed to the teachings of Christian Science. Diet and insulin were discarded. When I saw her again two months ago, she was greatly emaciated, stuporous and acidotic and vomited persistently. Her family very sensibly had called their former family physician at the beginning of this episode. She was immediately removed to the hospital and after a strenuous three-day battle was out of danger.

The other patient, seen first by me about a year ago, came at the insistence of a relative, a physician, but made only one visit and did not accept medical advice. A month ago the call came to see her again. She was in deep coma and had been so for more than twenty-four hours. Her attending Christian Science friends had refused to call medical aid. This patient, also, was removed to the hospital, but despite heroic treatment did not regain consciousness and died a few hours later.

The question arises: Is this manslaughter? It certainly is not science, and I doubt that it is Christian.

I believe that Christian Science is a helpful form of psychotherapy, but its practitioners should recognize its futility in organic disease.

Very truly yours,

HELMUTH ULBICH

99 Bay State Road,  
Boston, Mass

## RECENT DEATH

FALLON—JOSEPH FRANCIS FALLON, M.D., of 440 Boylston Street, Brookline, Massachusetts, died at his home, October 14, 1935. Dr Fallon was born in Brookline in 1882 and after graduating from Boston College, entered Jefferson Medical College and was given his medical degree in 1908. He served his internship at the Bellevue-Gouverneur Allied Hospitals in New York and took a postgraduate course in London.

He served in the World War with the rank of lieutenant in connection with the transportation of troops.

Dr Fallon joined the Massachusetts Medical Society in 1912 and was a member of the American Legion the Clover Club and the Brookline Lodge of Elks

He is survived by his widow two sons two daughters two sisters and a brother

## OBITUARY

HENRY JOSEPH FITZSIMMONS A.B. M.D.  
F.A.C.S.

FEBRUARY 21 1880-OCTOBER 5 1935

A talented honest generous serviceable man. Thus is the Honorable Patrick Andrew Collins for mer mayor of Boston characterized on the statue erected to his honor. This is saying much of a man and all of these epithets may with equal truth be applied to Henry Joseph FitzSimmons. Gentleness also was his in attitude and action. His passing removes a living example of conduct which has been helpful to younger medical men. It will continue to endear him to those of us who walked the same paths as he.

Born on February 21 1880 he was graduated from Harvard College in 1903 and received his medical degree also from Harvard in 1908. His first internship of eighteen months was on the Surgical Service of the Boston City Hospital after which he became Resident Surgeon at the East Boston Relief Station. After completing with distinction a six months internship on the Orthopedic Service of the Boston Childrens Hospital he determined to make orthopedic surgery his chief concern and was awarded a travelling fellowship for two years by the Boston Childrens Hospital. These two years between 1910 and 1912 were profitable ones spent under masters of orthopedic surgery. Six months with Sir Robert Jones during part of which he was Resident Surgeon at the Liverpool Royal Southern Infirmary work in the clinics of Calvé and Mennard at Berck Plage work under Lamy in Paris, Putti in Bologna, Schanz in Dresden, Bielsalski in Berlin, Lange in Munich and in the orthopedic clinics of Rome and Vienna. While in Munich Lange perfected his original technique for the implantation of silk artificial ligaments and tendons. The young American orthopedic surgeon became one of his favorite pupils. FitzSimmons may be said to have introduced the method into this country. Upon his return from Europe he familiarized himself with the type of work being done in the orthopedic clinics of Baltimore Philadelphia, New York, Chicago and Rochester Minnesota. He settled in Boston was appointed a Junior Surgeon at the Boston Childrens Hospital and had advanced to the position of full Visiting Surgeon and Instructor in Orthopedic Surgery at the Harvard Medical School at the time of his death.

He was consulting Orthopedic Surgeon to the Quincy City Hospital the Ochoate Hospital in Woburn the House of Providence in Holyoke and St. Margaret's and St. Mary's Infant Asylum and for many years conducted at regular intervals an

Orthopedic Clinic at the Day Nursery in Holyoke, Massachusetts

During the World War he enlisted in 1918 in the Medical Officers Reserve Corps with the rank of Captain and saw service at Camps Greenleaf, Fort Oglethorpe, McPherson, Devens and finally at Base Hospital No. 10 Parker Hill, Roxbury, Massachusetts, being honorably discharged June 20 1919.

Dr FitzSimmons was married in 1914 to Elizabeth Rogers. His wife and four daughters survive him.

He was a member of the American Medical Association, American College of Surgeons, American Academy of Orthopedic Surgeons, Massachusetts Medical Society, Eastern States Orthopedic Club, Boston Orthopedic Club, Aesculapian Club, Military Order of the World War and the Charitable Irish Society.

Clinical work absorbed most of this busy surgeons time, but he managed to carry out over a series of years important research studies as to the causes and treatment of Congenital Torticollis or wryneck. His conclusions were made authoritative by a large true end result study. His final paper published in *The New England Journal of Medicine*, July 13 1933 is a noteworthy contribution.

One of Dr FitzSimmons' close medical associates is unable to remember ever hearing him speak in derogatory terms of any of his professional associates and all of us were conscious of his infinite kindness. His medical opinion was honestly given and valuable. He was a most generous consultant whose mind was open. His devotion to his private industrial and hospital patients was complete. His monument will be the abiding memory of a talented honest generous serviceable gentleman.

R. B. O.

## NOTICE

MEDICAL CLINIC AND STAFF ROUNDS AT THE  
PETER BENT BRIGHAM HOSPITAL

At 3 30 P.M. on Thursday October 31 in the amphitheater of the Peter Bent Brigham Hospital Dr. Henry A. Christian, Physician-in-Chief, Hershey Professor of the Theory and Practice of Physic in the Harvard Medical School, will give a medical clinic. To it are cordially invited practitioners and medical students. These clinics will be repeated on Thursdays October to May.

On Saturdays in the wards of the Peter Bent Brigham Hospital from 10 to 12 staff rounds will be conducted by Dr. Christian.

## REPORT AND NOTICES OF MEETINGS

MIDDLESEX SOUTH DISTRICT MEDICAL  
SOCIETY

OCTOBER 9 1935 HOTEL CONTINENTAL, CAMBRIDGE

Nearly two hundred and fifty Fellows were assembled to honor Dr. Charles E. Mongan, an outstanding member of this district society and recent

ly elected President of the Massachusetts Medical Society

The meeting was called to order by the district President, Dr Sumner H Remick, after a luncheon had been served

The minutes of the previous meeting were accepted unread.

Dr Alexander A. Levi, the secretary, next summarized the present status of the various hospitals in the district in relation to the following resolutions which were adopted at a meeting held during October, 1934

Resolution (1) That the Trustees of Hospitals in this district be requested to make all industrial accident cases private patients in the hospital

Resolution (2) That the Trustees of Hospitals in this district be requested to require from each patient applying for ward service a letter from a physician certifying that it is a suitable case for such service

Up to the present the resolutions have been adopted and are functioning in the following named hospitals

- (1) Charles Choate Memorial Hospital
- (2) Framingham Union Hospital
- (3) Newton Hospital
- (4) Middlesex Hospital
- (5) Symmes Arlington Hospital
- (6) Whidden Memorial Hospital
- (7) Waltham Hospital
- (8) Winchester Hospital
- (9) Somerville Hospital
- (10) Malden Hospital
- (11) Leonard Morse Hospital

The resolutions have not as yet been adopted by

- (1) The Lawrence Memorial Hospital ("Some action taken by board")
- (2) The Marlborough Hospital ("No action taken by board of trustees")

A second letter requesting information as to whether any action had been taken by the Board of Trustees of the Cambridge Hospital and the Emerson Hospital to date has remained unanswered. The first letter acquainting these institutions with the resolutions as adopted by the Middlesex South District Medical Society was sent during December, 1934 and a second was sent during September, 1935

Dr Edward J O'Brien, Jr, a member of the subcommittee of the Public Relations Committee, presented the following report

"(1) The committee composed of representatives from Norfolk Middlesex South and Suffolk District Societies of the Massachusetts Medical Society to study and work on the abuse of medical charity in the City of Boston has been active during the summer months and now wishes to make a report of progress and some recommendations

"The committee has studied conditions covering the admission of patients to the Peter Bent Brigh-

am Hospital, Massachusetts General Hospital, Boston City Hospital, Children's Hospital and the Boston Dispensary

"With the exception of the Boston City Hospital, there are theoretical safeguards against the abuse of charity. Since April, 1935, the Boston City Hospital has promised to place some social workers in the Out-Patient Department in order, theoretically at least, to control the abuse of charity which is admitted by its trustees to exist there. Up to October 5, 1935, when this report was written, the social workers had not begun to operate

"In July, 1935, your committee asked the Boston Dispensary to admit to its Evening Pay Clinic only patients referred by physicians. The officers of the Boston Dispensary said that they would take this suggestion under consideration and report on their decision. No report has as yet been received

"Your committee believes that theoretically the Department of Health of the City of Boston tries to stimulate the public to go to private physicians for well baby clinic work and preventing tuberculosis work. If, however, the patients do not employ private physicians for this work, the Health Department makes no provision at these clinics run by the Department to separate those who can afford to pay from those who cannot. The reason they do not make this attempt is because the Department considers the work educational and fears that if patients were refused admission, the educational aspects of this work would be interfered with. Only preventive work is done at these clinics. Practically the same condition exists in regard to immunization work.

"(2) Several specific instances of doctors referring patients for operation to the charity services in hospitals in the City of Boston were cited. It is hoped that the physicians of the District Societies will pay attention to the votes passed by the District Societies urging the doctors not to try to have charity work done on their patients who are able to pay

"Your committee is interested in the experiment being tried in the District of Columbia on 'The Co-ordination of Resources for Medical Care in the District of Columbia' and wonders if some such program might not be worked out in Boston. It is felt that if this or some other program is to be worked out, the guiding force should be the recently established Hospital Council of Boston.

"In view of the above it is moved that each of the District Societies included in the City of Boston urge the Hospital Council to take active steps to eliminate the abuse of charity not only theoretically but practically in the free clinics for medical service in the City of Boston.

"It is further moved that each of the District Societies situated in the City of Boston urge its members to organize for immunization work at a fee commensurate with the ability of the patients to pay"

The report and the two motions contained in it were adopted by unanimous vote.

Dr Edward J O'Brien, Jr., then presented the following motion

"Resolved That the Secretary of the Middlesex South District be instructed to communicate either by letter or postal card with each member of the Middlesex South District, informing him of the abuses of medical charity and asking for aid and cooperation by not referring to charitable institutions or clinics persons who are able to pay for medical services It was seconded and unanimous ly accepted without debate

Dr William R. Morrison the Chairman of the Committee of Arrangements for the Annual Meeting of the Massachusetts Medical Society was next introduced. He described some of the plans which had been made and urged the members to attend the annual meeting to be held in Springfield June 8 9 10 As an added inducement he stated, the charge for the annual dinner would be one dollar only

Dr Reginald Fitz associate professor of medicine at Harvard University Medical School was then presented. He spoke of his fond regard for Dr Mongan. He said Dr Mongan as a member of the House of Delegates of the American Medical Association probably knows more doctors than any one other than Drs. Morris Fishbein and Olin West that "most of us make bad citizen-doctors but Dr Mongan has taught me what it means to be a good medical citizen"

Dr Henry D Chadwick, Commissioner of the State Department of Health then addressed the members and acquainted them with some early history of the Massachusetts State Department of Health He concluded his remarks by offering the felicitations of his Department to Dr Mongan and the Massachusetts Medical Society and stated that he would cooperate in every way possible to improve the circumstances of the public and physicians in Massachusetts

Dr Charles E Mongan who was next asked to speak was greeted by his fellow members The continuous applause indicated the esteem and good feeling in which the Society holds him After thanking Dr Remick and the two preceding speakers, Dr Mongan covered the wide field of economics and how it applies to medicine. He felt that he has "a mission to perform—namely to sell the Medical Society to its members that the Medical Society has every reason to be proud of its achievements and therefore expects the right to be heard in the Legislature as experts." Dr Mongan stated, "The welfare of the people is the fundamental purpose of all these laws

"The medical man is a cog in this thing called culture or civilization. You are loyal—you are willing. However you need to be directed You can do a great deal of work to prevent the lowering of the standard of living in Massachusetts to improve the standards of medical education and to in-

crease your sense of proprietorship in the Society" He asked the members to serve on committees when asked to do so and gave it them in charge to help carry out the traditions of the practitioner in Massachusetts

The meeting was then adjourned

ALEXANDER A. LEVI, M.D. *Secretary*

#### HAMPDEN DISTRICT MEDICAL SOCIETY

The regular Fall Meeting of the Society will be held at the rooms of the Springfield Academy of Medicine, 20 Maple Street, Springfield on Tuesday October 29 1935 at 4 15 P.M.

Paper for the afternoon Recent Advances in Medicine, Dr Reginald Fitz of Boston Discussion by Fellows

Supper at 6 P.M. at expense of Society

HERVEY L. SMITH *Secretary*

Censors meet for examination of candidates in the rooms of the Academy on Thursday November 7, at 4 P.M.

#### ESSEX NORTH DISTRICT MEDICAL SOCIETY

##### CENSORS MEETING

Censors Meeting at the Hotel Bartlett, Main Street, Haverhill, at 4 P.M. Thursday November 7 1935 Candidates must present applications and show diplomas to Secretary at least two weeks in advance

E. S. BAGNALL, M.D. *Secretary*

#### MASSACHUSETTS SOCIETY OF EXAMINING PHYSICIANS

##### FALL MEETING AND DINNER

The Copley Plaza, Wednesday October 30 6 30 P.M. \$2.50 per plate.

Subject Symposium on Silicosis and Asbestosis.

This will be an extremely interesting meeting and a large attendance is desired.

GEORGE H. R. GOODMAN M.D., *President*

Wm. P. COVES M.D., *Secretary*

#### NORFOLK DISTRICT MEDICAL SOCIETY

A stated meeting of the society will be held in the Sharon Sanatorium Sharon, Mass., on Tuesday October 29 Telephone Sharon 2172.

##### PROGRAM

4 00 to 4 30 P.M.—Ward Visits

4 30 to 5 00 P.M.—Business Meeting

5 00 to 6 00 P.M.—Communications

The Early Diagnosis of Tuberculosis Dr Walter A Griffin

The Treatment of Bronchiectasis Dr Edward D Churchill

A collation will be provided following the presentation of the papers

From Dedham rotary traffic circle proceed on Providence route 1 for eight miles turning left on route 27 and continuing thereon for 2 2/3 miles to sanatorium entrance

From Mattapan Square proceed through Canton to Sharon Square and thence to sanatorium

FRANK S CRUICKSHANK, M D, *Secretary*  
1236 Beacon Street,  
Brookline, Mass

## SUFFOLK DISTRICT MEDICAL SOCIETY

### CENSORS' MEETING

The Censors of the Suffolk District Medical Society will meet for the examination of candidates at the Medical Library, 8 Fenway, Thursday, November 7, 1935, at 4 00 o'clock.

Candidates should make personal application to the Secretary, and present their medical diplomas at least one week before the examination

CHARLES C LUND, *Secretary*  
319 Longwood Avenue, Boston

## SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, OCTOBER 28, 1935

#### Monday, October 28—

- \*9-10 A.M. Boston Dispensary 25 Bennet Street, Boston G I Clinic Case Presentation Dr K. S Andrews
- \*8 15 P.M. New England Heart Association Massachusetts General Hospital, Ether Dome

#### Tuesday October 29—

- \*9-10 A.M. Boston Dispensary 25 Bennet Street, Boston Flat Feet Dr John D Adams
- 6 30 P.M. Massachusetts Psychiatric Society Parker House Boston

#### Wednesday, October 30—

- \*9-10 A.M. Boston Dispensary, 25 Bennet Street, Boston Ward Cases Dr S J Thannhauser
- 112 M Clinico-Pathological Conference Children's Hospital
- 6 30 P.M. Massachusetts Society of Examining Physicians Copley Plaza Boston

#### Thursday, October 31—

- \*8 30-9 30 A.M. Clinic Surgical and Orthopedic Staffs of Children's Hospital, at the Children's Hospital.
- \*9-10 A.M. Boston Dispensary, 25 Bennet Street, Boston 'Revision of Interpretation of Laboratory Tests for Syphilis' Dr Hinton
- \*3 30 P.M. Medical Clinic at the Peter Bent Brigham Hospital

#### Saturday November 2—

- \*10-12 Staff rounds at the Peter Bent Brigham Hospital

\*Open to the medical profession  
\*Open to Fellows of the Massachusetts Medical Society

October 24—New England Society of Psychiatry will be held at the Medfield State Hospital Medfield at 12 30 P.M.

October 25—Boston University School of Medicine Surgical Clinic at the Boston City Hospital, Cheever Amphitheatre, 12-1

October 25—William Harvey Society will meet at 8 P.M. in the Auditorium of the Beth Israel Hospital, Boston

October 28—New England Heart Association will meet in the Ether Dome of the Massachusetts General Hospital at 8 15 P.M.

October 28 - November 1—The Twenty-Fifth Clinical Congress of the American College of Surgeons See page 1065 issue of May 30

October 29—Massachusetts Psychiatric Society will meet at 6 30 P.M. at the Parker House, Boston

October 30—Massachusetts Society of Examining Physicians See page 839

October 31—Medical Clinic at the Peter Bent Brigham Hospital See page 837

December 5 7—National Society for the Prevention of Blindness See page 795

## DISTRICT MEDICAL SOCIETIES

### ESSEX NORTH DISTRICT MEDICAL SOCIETY

November 7—Censors' Meeting See page 839

### HAMPDEN DISTRICT MEDICAL SOCIETY

October 29—See page 839

November 7—Censors' Meeting See page 839

### NORFOLK DISTRICT MEDICAL SOCIETY

October 29—See notice on page 839

### SUFFOLK DISTRICT MEDICAL SOCIETY

October 30—Stated Meeting Boston Medical Library The Interpretation of Problems in Bright's Disease and Related Conditions Dr Soma Weiss The Management of the Problems in Bright's Disease and Related Conditions, Dr Laurence B Ellis Discussion Dr George Gilbert Smith and Dr Louis E Phaneuf

November 7—Censors Meeting See notice elsewhere on this page

December 11—Joint Meeting with the New England Heart Association at the Boston Medical Library "Constrictive Disease of the Pericardium" Dr Charles Sidney Burwell Discussion Dr Edwin D Churchill and Dr Paul D White

January 29, 1936—Joint Meeting with the Boston Medical Library at 8 Fenway "Observations Around the World" Dr Walter B Cannon

March 18, 1936—Meeting at the Boston Medical Library "The Laboratory and Clinical Story of Fatigue, Dr Arlie V Beck and Dr David B Dill Discussion Dr Donald J McPherson and Dr Augustus Thorndike, Jr

April 29, 1936—Annual Meeting at the Boston Medical Library "The Treatment of Septicaemia, Dr Champ Lyons "The Pleurality of Scarlatinal Streptococcus Toxin," Dr Sanford B Hooker Discussion Dr Hans Zinsser

The medical profession is cordially invited to attend all of these meetings

ROBERT L DeNORMANDIE, M.D., President,  
CHARLES C LUND, M.D., Secretary,  
FRANCIS T HUNTER, M.D.  
Boston Medical Library

## WORCESTER DISTRICT MEDICAL SOCIETY

November 7—Censors Meeting will be held in the Library Rooms of the Worcester District Medical Library, Inc., 34 Elm Street, Worcester, at 4 30 P.M.

November 12—Wednesday evening Grafton State Hospital, North Grafton, Mass Dinner and scientific program Subjects of program to be announced later

December 11—Wednesday evening St. Vincent Hospital Worcester, Mass Dinner and scientific program Subjects of program to be announced later

January 8, 1936—Wednesday evening Worcester City Hospital, Worcester, Mass Dinner and scientific program Subjects of program to be announced later

February 12, 1936—Wednesday evening Worcester State Hospital, Worcester, Mass Dinner and scientific program Subjects of program to be announced later

March 11, 1936—Wednesday evening Memorial Hospital, Worcester, Mass Dinner and scientific program Subjects of program to be announced later

April 8, 1936—Wednesday evening Hahnemann Hospital Worcester, Mass Dinner and scientific program Subjects of program to be announced later

May 13, 1936—Wednesday afternoon and evening Annual Meeting of Society Time, place and details of program to be announced in an April issue of the Journal.

ERWIN C MILLER, M.D., Secretary

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## A NEW METHOD OF CALCULATING DISCHARGE RATES IN MENTAL DISEASES WITH SPECIAL CONSIDERATION OF THE AGE FACTOR<sup>1</sup>

BY NEIL A. DATTON, M.D.\*

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1. Fundamental Errors in Present Method of Computing Discharge Rates Based upon Discharges per Hundred Admissions
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3. The New Discharge Rate Applied to the Condensed Classification by First and Readmissions Psychosis and Age.
  - (a) Total Discharge Rates in the Psychoses by First and Readmissions
  - (b) Total Discharge Rates in First and Readmissions by Age.
  - (c) Discharge Rates in the Psychoses, by First and Readmissions and Age.
  - (d) Psychoses with High Discharge Rates by Age
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  - (g) Discharge Rates in First Admissions Compared with Readmissions
  - (h) Possible Sources of Error
4. Summary
1. FUNDAMENTAL ERRORS IN PRESENT METHOD OF COMPUTING DISCHARGE RATES BASED UPON CASES DISCHARGED PER 100 ADMISSIONS

IN the 1923 publication of the Bureau of the Census<sup>2</sup> reporting patients in hospitals for mental disease, there appeared a new table in which the discharge rates for the year 1922 were computed. In this table the number of discharges was compared with the number of admissions for the same year, by psychosis. A discharge rate was then calculated per 100 admissions of the same psychosis. As this method apparently had the approval of a governmental agency, it was accepted by other states and is now quite commonly used in statistics on mental diseases.

1. Read at the 91st annual meeting of the American Psychiatric Association, Washington, D. C. May 13-17, 1935. From the Division of Statistics and Research, Massachusetts State Department of Mental Diseases. Miss Janet Dolan, Chief Research Worker, collaborated in the preparation of the statistical material for this paper.

2. Table 42, page 58. Patients in Hospitals for Mental Diseases, 1923. Department of Commerce, U. S. Bureau of the Census.

DATTON, Neil A.—Director Rockefeller Research Project in Mental Disease and Defect, Massachusetts Department of Mental Diseases. For record and address of author see "This Week's Issue," page 224.

Over the past few years, however, it has become evident that the Census approach in the matter of calculating discharge rates is not very satisfactory. This is partially due to the overlooking of basic differences between admissions and discharges and also to a lack of consideration of all cases subject to the chance of discharge. In the first place the admissions and discharges of any one year do not comprise the same patients. A study of the outcome of admissions shows that only a certain portion will be discharged and that these discharges will be spread out over many years in the future. Some of the admissions will die while in hospital, some will be deported, others will be transferred, while still others will remain within the institution. On the other hand, the discharges of any one year are the fractional remnants of the admissions that have occurred over many years in the past. The basic incomparability of the two groups and the overlooking of all patients within hospitals who are potential candidates for discharge compel serious questioning of the Census method of basing a rate upon the number of admissions and discharges for the same year.

A second point of discrepancy lies in the variation between the proportions of first admissions and readmissions in both admissions and discharges. Under the old method, first and readmissions were combined, the total number of admissions being compared with the total number of discharges. Inspection of the actual differences reveals the danger of comparing such obvious mixtures of classification. For example, in the psychoses with cerebral arteriosclerosis, the discharges (1934) comprised 87 per cent of first admissions and 12 per cent of readmissions. On the other hand, the admissions made up 93 per cent of first admissions and but 6 per cent of readmissions. This factor again emphasizes the incomparability of the two groups, as first admissions and readmissions show widely differing discharge rates.

A third difficulty arises through differences between the ages of admissions and discharges. Over a given period the admissions of any one year tend to sort themselves into four groups in reference to age: (1) those dying, the

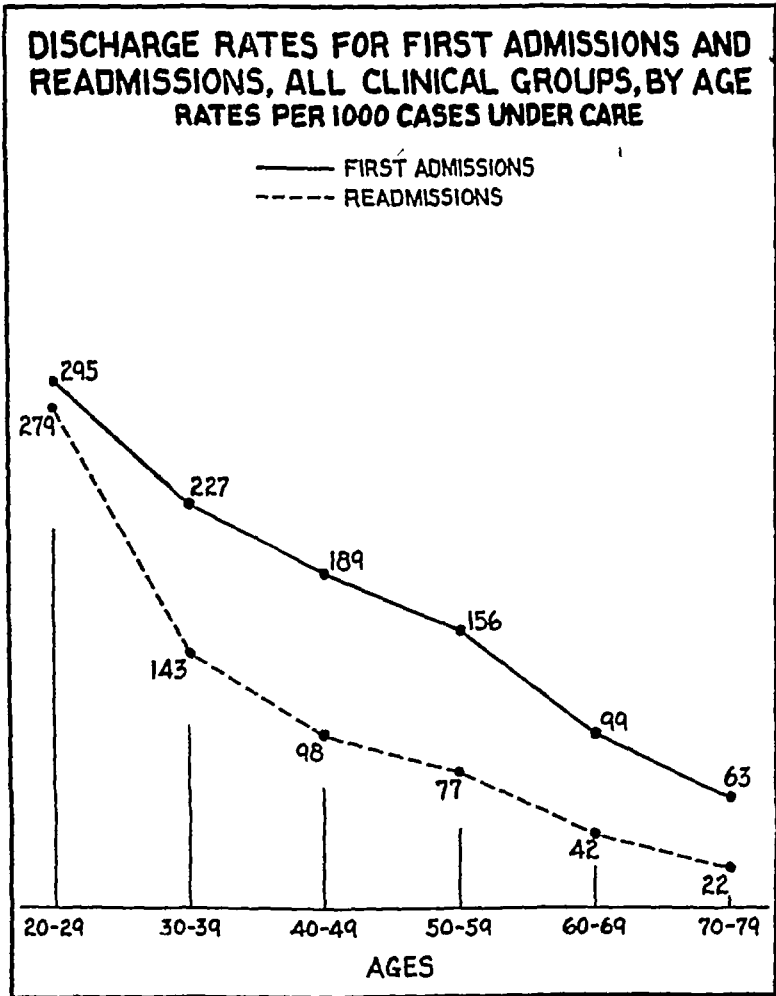
twenty-four groups of the condensed classification. It also records the total number of cases under care and the total cases discharged during 1934. Of each 1,000 first admissions under care during 1934, 183 or about one out of five were discharged. Of each 1,000 readmissions under care, 104 or about one in ten were discharged. The rate for first admissions is nearly twice that of the readmissions.

In the first admissions the psychoses due to drugs show the highest discharge rate of 702. The psychoneuroses are second with a discharge rate of 561. Psychoses with other infectious diseases with 460, and the traumatic psychoses with a rate of 330, are next in order. We then have a group of seven psychoses led by the manic-depressive group which show rates between 279 and 234. Starting with paranoia, we observe a group of six psychoses with discharge rates between 191 and 102, the latter being the rate for dementia praecox. Finally we have discharge rates below 100 occurring in psychoses with cerebral arteriosclerosis (94), psychoses with mental deficiency (93), psychoses with convulsive disorders, epilepsy (82), and the senile psychoses (44). There is a rather

remarkable spread between the highest and the lowest discharge rates for 1934. The psychoses due to drugs discharged about seven out of every ten patients under care, while at the other extreme the senile psychoses discharged but one out of every twenty-two patients under care.

*Total Discharge Rates, by Age* Table 3 presents the detail of the discharge rates per 1,000 under care for all psychoses together, by first and readmissions and by age. The first admissions present a total discharge rate of 183 per 1,000 for the year. Temporarily discarding the 10-19 and 80 years plus groups because of the small numbers involved, we note that the 20-29 year age group presents the highest discharge rate of 295 cases per 1,000, or about one case discharged in every three of the same age group under care (Graph 1). The age group 30-39 years shows a discharge rate of 227, or about one in four under care, the group 40-49 years a rate of 189 or one in five, the group 50-59 years a rate of 156 or one in six, the age group 60-69 years a rate of ninety-nine or one in ten, and the age group 70-79 years shows the low rate of sixty-three, or one in fifteen. Among first admissions the greater chance of discharge

GRAPH 1



Me	CLASSIFICATION					
	60-69 Years		70-79 Years		80 Years Plus	
	First Ad- mis- sions	Re- ad- mis- sions	First Ad- mis- sions	Re- ad- mis- sions	First Ad- mis- sions	Re- ad- mis- sions
Due to drugs						
Psychoneuroses	333	400	667	—	—	—
With other inf	292	200	—	—	—	—
Traumatic psy	—	—	—	—	—	—
Manic depressiv	—	—	222	—	—	—
Due to new gr	122	104	46	36	167	37
Alcoholic psyc	500	—	—	—	—	—
Due to other m	83	32	85	20	—	—
With organic d	118	125	—	—	—	—
With other dis	148	—	—	—	—	—
With psychopa	130	500	154	—	—	—
Paranoia and	56	—	—	—	—	—
With epidemic	34	58	104	26	—	—
Involuntional p	—	—	—	—	—	—
With syphilitic	92	52	—	50	—	—
With other for	54	91	—	—	—	—
Dementia praec	53	100	—	—	—	—
With cerebral	21	5	10	8	—	41
With mental d	114	122	65	54	68	—
With convulsiv	—	—	—	—	—	—
Senile psychos	39	—	—	—	—	—
Undiagnosed p	58	138	41	61	24	—
Without psych	800	—	333	333	—	—
Primary behav	676	487	650	—	1 000	—
	500	—	1 000	—	—	—
Total rate						
	99	42	63	22	47	86

the year 1934





very definitely confined to the younger cases under care.

The readmissions show a total discharge rate 104 for each 1,000 readmissions under care during the year. The highest rate throughout various ages occurs in the group 20-29 years with 279 cases discharged, or about one out of every three under care (Graph 1). The readmissions then show a much more precipitate drop in the remaining age groups than is evidenced in the first admissions. The age group 30-39 years shows a rate of 143, or one in seven, 40-49 years a rate of ninety eight or one in ten, 50-59 years a rate of seventy seven or one in thirteen, 60-69 years a rate of forty two or one in twenty four, and 70-79 years a rate of 22 or one in forty five. It will be noted that the readmissions present lower discharge rates than first admissions in all ages. In this group we also note definitely higher discharge rates in the younger age groups.

TABLE 4

CASES DISCHARGED FROM NUMBER UNDER CARE AND FIRST AND READMISSIONS BY AGE RATIOS

Ages	Cases Discharged from Cases Under Care	
	First Admissions	Readmissions
20-29 Years	1 in 3	1 in 3
30-39 "	1 in 4	1 in 7
40-49 "	1 in 5	1 in 10
50-59 "	1 in 6	1 in 13
60-69 "	1 in 10	1 in 24
70-79 "	1 in 15	1 in 45
Total	1 in 5	1 in 10

To simplify the comparison between first and readmissions table 4 is inserted presenting the ratios for discharges over cases under care in each age group. The first admissions make the best showing in the age group 20-29 years with a ratio of one in three discharged. The ratios increase gradually with the lowest discharge ratio of one in fifteen in the age group 70-79 years. The readmissions also show a very low ratio in the 20-29 year age group, with one out of three discharged. They then show precipitate increases in the ratios to a high of one case in forty five discharged in the age group 70-79 years. The first admissions make a better showing in all age groups except the 20-29 year group. In the totals, the first admissions discharged one case in every five, while the readmissions discharged but one case in ten<sup>a</sup>.

a. Owing to space limitations, sex differences are not presented in the tables but are being outlined briefly in this footnote. Among the first admissions the females showed higher discharge rates than the males in eleven clinical groups. These are as follows: with other infectious diseases; traumatic psychoses; alcoholic psychoses; due to other metabolic diseases, etc.; with other disturbances of circulation; with psychoneurotic personality; with epidemic encephalitis; with syphilitic meningoenephritis; dementia praecox; with cerebral arteriosclerosis

*Discharge Rates by Psychosis and Age* We now return to a discussion of the discharge rates within the different age groups for certain psychoses of the condensed classification as outlined in table 3. We have arbitrarily limited these sections to a discussion of the eleven psychoses of the condensed list which had 800 or more cases under care during the year. Dividing those psychoses with less than 300 under care would mean very small numbers in any one age group. Consequently the resulting rates would be more subject to chance fluctuation. We also eliminate consideration of the age groups 10-19 years and 80 years plus as they present even smaller numbers. The eleven psychoses divide themselves into three groups in reference to discharge rates throughout the age groups. These are as follows:

*Groups with High Discharge Rates* The first admissions in the psychoneuroses, the manic depressive and the alcoholic groups, show rather high discharge rates in all age groups (Graph 2). The psychoneuroses show a high discharge rate of 675 in the 20-29 year group, and a low of 292 in the 60-69 year group. The alcoholic psychoses start with a discharge rate of 574 in the 20-29 year group and fall to a low of 83 in the 60-69 year group. The manic-depressive group starts with a high discharge rate of 408 in the 20-29 year group and falls to a low of 49 in the 70-79 year group. The outstanding characteristic of these curves is their rapid fall in rates as the older age groups are approached. The curves for the psychoneuroses and the manic-depressive group are somewhat flatter than that of the alcoholic and tend to preserve fairly high discharge rates for the age groups 20-29, 30-39, 40-49 and 50-59 years. However, in the groups over 60 years of age both show a rapid fall to lower levels. The curve for the alcoholic group shows a more precipitate fall throughout the various age groups.

The readmissions also show rather high discharge rates in practically all age groups (graph 5). Again we note the decidedly higher rates for the younger ages.

and with mental deficiency. In the remaining thirteen groups the males showed higher discharge rates. In the readmissions the females showed higher discharge rates in but five psychoses namely with psychopathic personality; paranoia with epidemic encephalitis; with syphilitic meningoenephritis; and in psychoses with mental deficiency. In the remaining nineteen clinical groups the males demonstrated higher rates for discharge. In the totals for all psychoses the males presented a discharge rate of 196 among the first admissions while the females showed a rate of 169. The total readmissions showed a discharge rate of 116 for the males and ninety-one for the females.

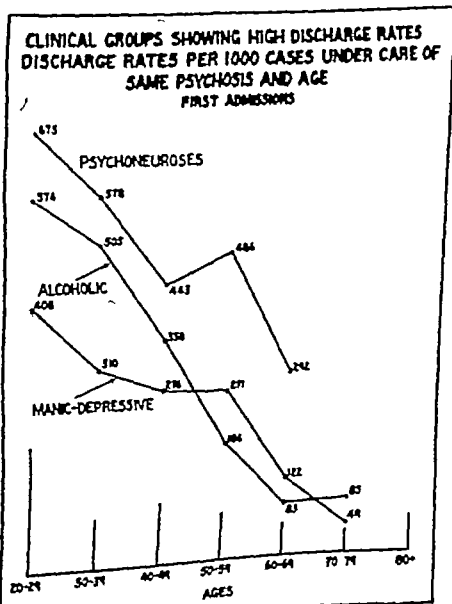
The female first admissions present higher total discharge rates in the groups 10-19 years, 30-39 years and 50 plus years, while the males show the higher rates in all age groups from 20 to 79 years. Among the readmissions the females show the higher rates in but two age groups, 30-39 years and 50 years plus, while the males present higher discharge rates in all of the remaining age groups. (For detail see Table 45 of the 1914 Annual Report Massachusetts State Department of Mental Diseases.)

b. Cases under care by psychosis are shown in table

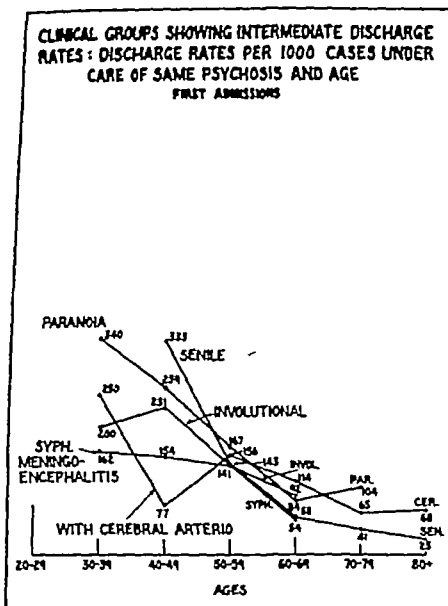
*Groups with Intermediate Discharge Rates*  
Certain psychoses show discharge rates within the various age groups which may be termed intermediate. They are, syphilitic meningo-encephalitis, paranoia, with cerebral arterio-sclerosis, and the involutional and senile groups

the cases have passed the age of 50 years. Paranoia and the senile group tend to be more closely associated with age, as we see higher rates in the younger ages and a sharper fall in rates as we approach the older age groups. On the other hand, the curves for syphilitic men-

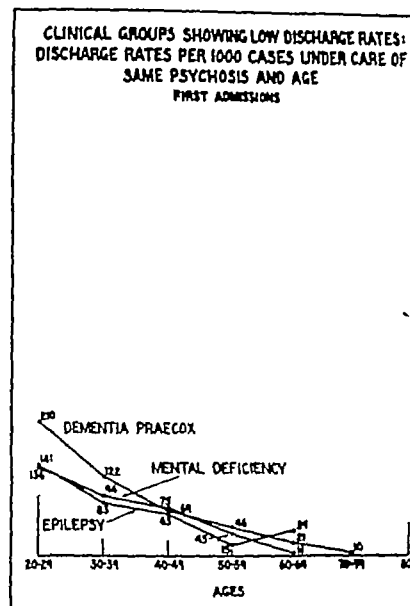
GRAPH 2



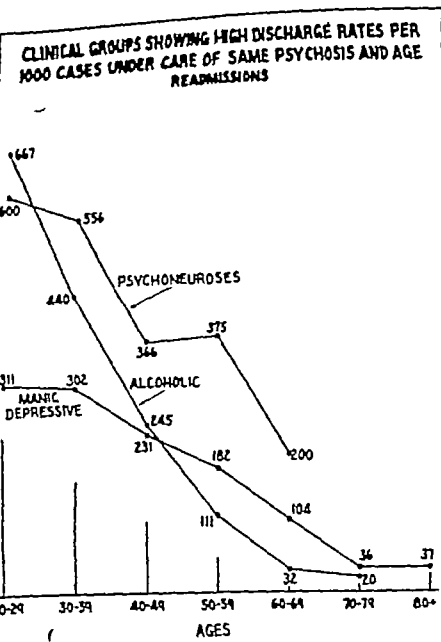
GRAPH 3



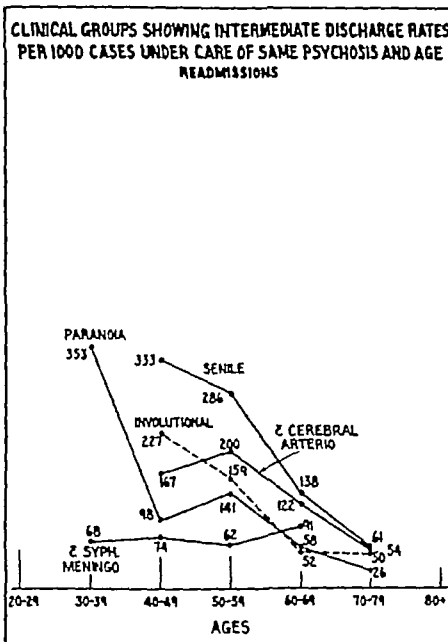
GRAPH 4



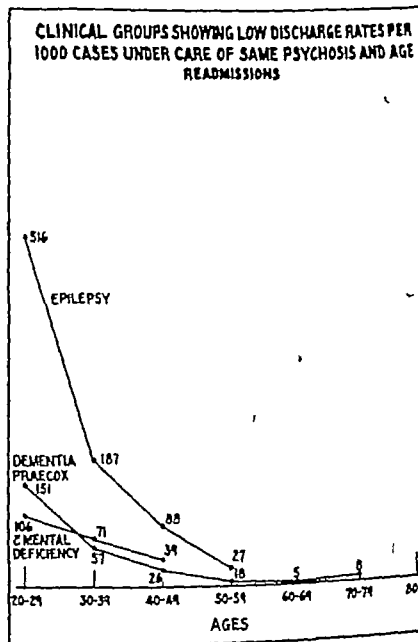
GRAPH 5



GRAPH 6



GRAPH 7



(graph 3) Among the first admissions the same trend for lower discharge rates in the older age groups is seen. We observe, too, that the rates tend to cluster beginning with the age group 50-59 years, suggesting that age as well as psychosis is an important factor in the matter of discharge. These five psychoses, widely differing from the clinical viewpoint, tend to present the same discharge rate once

meningo-encephalitis and the involutional group are flatter and suggest that age is of less importance.

The readmissions of this intermediate group show certain variations, but the same tendency for higher discharge rates in the younger age groups is observed (graph 6).

*Groups with Low Discharge Rates* First admissions in the psychoses dementia praecox,

with mental deficiency, and with epilepsy tend to show low discharge rates in all of the age groups (graph 4). Starting with comparatively low rates in the 20-29 year group they have less opportunity to show any rapid degree of fall in the older ages. However we note the same general characteristics noted in the other psychoses, namely, higher discharge rates in the younger age groups and lower discharge rates in the older age groups. While the differences appear minor, actually this is not the case. Dementia praecox, for example discharged one out of five patients in the age group 20-29 years, but only one out of each hundred under care in the age group 70-79 years. Mental deficiency discharged one out of seven patients in the group 20-29 years but only one out of twenty two in the group 50-59 years. In reality, marked differences exist here which are not distinctive on the graph because of the low rates in the younger age groups.

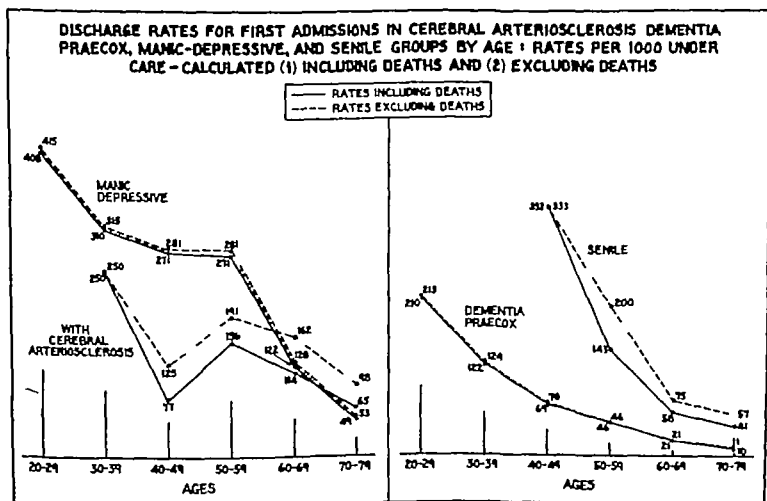
In the readmissions, dementia praecox and the psychoses with mental deficiency show uniformly lower discharge rates than the first admissions (graph 7). With a flatter curve and smaller differences between the rates for the younger and older age groups, these readmissions show the least association between the matter of discharge and age. The epileptic psychoses, however, present a marked contrast in showing higher discharge rates in readmissions than in first admissions for all age groups. In the readmissions the rates for this psychosis show an extremely precipitate

fall so that the first and readmissions from the age of 50 years onward show only a slight separation.\*

**Possible Sources of Error** When it became evident that lower discharge rates in the older age groups were appearing quite uniformly in all of the psychoses, an effort was made to uncover possible contributing factors other than age alone. One possibility seemed worthy of serious analysis. The very high death rates in the older age groups and the consequent withdrawal of large numbers of cases under care through death, might be expected to produce a lower discharge rate in the older ages. With more patients dying fewer would be available for discharge. To test this point the discharge rates were calculated *excluding* the deaths. If the deaths were the cause of

There is an apparent consistency in the placement of some of the psychoses in the groups with high intermediate and low discharge rates. For example, dementia praecox is placed in the group with low discharge rates, while the senile psychoses are placed in the intermediate group. This apparently disagrees with the data as outlined in table which would place dementia praecox in the intermediate group (total rate 182) and the senile psychoses in the low group (total rate 44). Yet if we compare the distribution of these discharge rates in graphs 3 and 4 first admissions, and graphs 5 and 7 readmissions, we note that the distribution for the senile group is actually higher than that of dementia praecox, both in first and readmissions. This apparent paradox occurs because each of these psychoses will tend to have its total rate approximate the rate for the age group presenting the largest number of cases discharged and under care. Dementia praecox tends to present larger numbers discharged and under care in the younger age groups. Therefore, the total rate for this psychosis will tend to cling to the higher rates observed in the younger age groups. Conversely the senile group has the largest number of cases discharged and under care in the older age groups. Therefore, the total rate for the senile psychoses will tend to approximate the low rates observed in the older age groups. This shows the advisability of comparing comparisons between psychoses to the same age groups and to guard against being too greatly influenced by the total rates for different psychoses.

GRAPH 5



diminishing discharge rates in the older age groups, then the calculation of a rate excluding them should produce a flat curve with approximately the same discharge rate in every age group. However, the results for the various age groups were quite uniform with those of the rates including deaths, for all psychoses and in both first and readmissions. Graph 8 presents these in four of the psychoses. Two were selected from the point of large numbers involved, dementia praecox and the manic-depressive group. The senile psychoses and the psychoses with cerebral arteriosclerosis were chosen because they involved the older ages with high death rates. Graph 8, in presenting two curves for each psychosis (1) including the deaths and (2) excluding the deaths, shows quite definitely that the deaths have not been a deciding factor in the determination of the trend in discharge rates. In the senile group and the group with cerebral arteriosclerosis the removal of the deaths from cases under care does result in a higher discharge rate, but the two curves in the various age groups remain practically parallel. That is, the resulting discharge rates are higher in the younger as well as the older ages. While the differences are smaller in both dementia praecox and the manic-depressive psychoses, the two discharge rates parallel each other throughout the age groups. It becomes quite clear that the low discharge rates in the older age groups are not to be attributed to the high death rates in those particular ages.

SUMMARY

1 The Census method of calculating discharge rates in mental diseases, based upon the number of cases discharged per 100 admissions of the same psychosis, presents certain inconsistencies which render its use inadvisable. Fundamental errors arising through the lack of separate consideration of first and readmissions, and the disregarding of the age factor, are discussed. These points emphasize the necessity of changing the present method of approach in the matter of determining discharge rates.

2 A new method of calculating discharge rates is presented (table 1). Each psychosis is divided into first admissions and readmissions, and into ten-year age groups. We then determine the number under care in each age group for each psychosis. This is accomplished by adding (1) cases in residence in hospitals at the end of the statistical year, (2) cases temporarily out of hospitals on visit, parole, etc., (3) cases discharged during the year, and (4) cases dying during the year. The resulting total under care is then compared with the total number discharged of the same age, and a rate determined. This new method is applied to each of the twenty-four clinical

groupings of the condensed classification, presenting a discharge rate for first and readmissions separately, by age.

3 Of each 1,000 first admissions under care during 1934, 183 were discharged. Of each 1,000 readmissions under care, 104 were discharged (table 2). The total discharge rates on the eleven psychoses presenting more than 300 cases under care during the year are as follows:

Mental Disorders	Discharge Rates Per 1,000 Under Care	
	First Admissions	Readmissions
Psychoneuroses	561	449
Manic depressive psychoses	279	197
Alcoholic psychoses	261	134
Paranoia and paranoid conditions	191	102
Involuntary psychoses	139	112
With syphilitic meningo-encephalitis	136	72
Dementia praecox	102	34
With cerebral arteriosclerosis	94	98
With mental deficiency	93	45
With convulsive disorders (epilepsy)	82	125
Senile psychoses	44	91

4 Considering all psychoses together, the discharge rates in both first and readmissions are very much higher in the younger age groups and decrease as the older age groups are approached (table 3 and graph 1). In the totals about one out of five first admissions under care were discharged and one out of ten readmissions. Eliminating the 10-19 and 80 years plus groups because of the small numbers involved, the rates and ratios are presented in the following table:

Ages	Discharge Rates		Ratios of Cases Discharged from Cases under Care	
	First Admissions	Readmissions	First Admissions	Readmissions
20-29 Years	295	279	1 in 3	1 in 3
30-39 "	227	143	1 in 4	1 in 7
40-49 "	189	98	1 in 5	1 in 10
50-59 "	156	77	1 in 6	1 in 13
60-69 "	99	42	1 in 10	1 in 24
70-79 "	63	22	1 in 15	1 in 45

5 When we study the discharge rates by age groups we find that the psychoses group themselves in three classes presenting, in general, high, intermediate or low rates. All show the same characteristic curve, with higher discharge rates in the younger age groups and lower in the older age groups (table 3 and graphs 2, 3, 4, 5, 6 and 7). The following table is inserted to show these tendencies toward high or low rates for each psychosis ac-

accompanied by the age group in which the rate occurs. The 10-19 and 80 years plus groups have been eliminated because of small numbers. The figures for the eleven important groups among the first admissions are as follows:

Mental Disorders	High and Low Discharge Rates for Age Groups	
	High	Low
<b>High Discharge Rates</b>		
Psychoneuroses	675 (20-29)	292 (60-69)
Alcoholic psychoses	574 (20-29)	87 (60-69)
Manic-depressive	408 (20-29)	49 (60-79)
<b>Intermediate Discharge Rates</b>		
With syphilitic meningo-encephalitis	162 (30-39)	34 (60-69)
Paranoia and paranoid conditions	833 (20-29)	84 (60-69)
With cerebral arterio-sclerosis	250 (30-39)	65 (70-79)
Involuntary psychoses	231 (40-49)	92 (60-69)
Senile psychoses	333 (40-49)	41 (60-69)
<b>Low Discharge Rates</b>		
Dementia praecox	210 (20-29)	10 (70-79)
With mental deficiency	136 (20-29)	45 (60-69)
With convulsive disorders (epilepsy)	141 (20-29)	15 (50-59)

6 To test whether the high death rate in the older age groups were producing the low discharge rates in these ages, the discharge rates

were calculated *excluding* deaths. Graph 8 shows the discharge rates both *including* and *excluding* deaths for four psychosis groups. In the senile group and the group with cerebral arteriosclerosis, the removal of the deaths from cases under care results in a slightly higher discharge rate although the trends of the curves remain parallel. In the dementia praecox and manic-depressive psychoses, the discharge rates parallel each other very much more closely. Low discharge rates in the older age groups are not attributable to high death rates in these ages.

7 For many years psychiatrists have been stressing the point that mental disorders should have early recognition and care before they in terject a serious handicap into the life of the individual. The findings of this communication support these assumptions in a rather striking way. We see that mental disorders under care in the 20-29 year decade have a much better chance for discharge than cases under care in the older age groups. Even the psychoses occurring in the older ages have this same characteristic, with cases under care in the 50-59 year group showing higher discharge rates than those of the 60-69, 70-79 or 80 plus groups. The younger cases under care have the greater chance of discharge in every psychosis and in both first and readmissions.

## HEMOPTYSIS IN TRICHINIASIS\*

BY LEONARD J. GOLDWATER, M.D.,† ISRAEL STEINBERG, M.D.,† HARRY MOST, M.D.,† AND JOSEPH E. CONNERY, M.D.†

THE occurrence of pulmonary signs and symptoms in trichiniasis is relatively well known. A great variety of pathological lesions of both lungs and bronchi has been described to account for these findings. Minot and Rackemann<sup>1</sup> in reviewing 102 case histories of trichiniasis to ascertain the frequency of respiratory signs and symptoms quote a number of earlier authors who have written on lung changes in trichiniasis. In Minot and Rackemann's series 50 per cent of the patients showed pulmonary signs or symptoms. There were three cases with blood tinged sputum but no case of frank hemoptysis. As early as 1860 Wunderlich<sup>2</sup> reported a case of hemoptysis in a butcher whose illness was at first diagnosed as acute tuberculosis but later, upon recovery was believed to be trichiniasis. Kestner<sup>3</sup> has described what he calls pneumonia due to trich

inae occurring in the fourth week of the infestation. His description of the symptoms strongly suggests infarction. The sputa according to his report differ from those of true pneumonia in that they are composed mostly of blackish blood. Hunt<sup>4</sup> (1869) described a case of trichiniasis in which blood streaked sputum occurred about six weeks after the onset of the disease. His description, however, sounds like that of a terminal pneumonia, the sputum being at times rusty. Spink and Augustine<sup>5</sup> more recently in a review of thirty-five cases of trichiniasis observed two patients in whom coughing was productive of bloody sputum.

Askanazy<sup>6</sup> in experimental trichiniasis in rabbits found young trichinae in the lungs causing embolization with hemorrhage into the alveoli and small bronchioles. Frothingham<sup>7</sup> reported an autopsy on a case of trichiniasis which showed many areas of hemorrhage into lung tissue. Trichinellae were found free in the hemorrhage. Thus Askanazy's experimental findings were confirmed in man.

Ordinarily in the differential diagnosis of hemoptysis in our opinion, one is not likely to consider trichiniasis as a possibility. In the articles on trichiniasis in several of the commonly used "Systems of Medicine", no men

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tion is made of hemoptysis, nor is it listed in French's or Cabot's Differential Diagnosis. In none of the textbooks of medicine or diseases of the chest which we consulted did we find any mention of blood-spitting in the course of trichiniasis.

Clinical cases of trichiniasis are not uncommon. The number of cases so mild or so atypical that they pass undiagnosed cannot be determined with certainty. In this latter connection the finding by Riley and Scheffley<sup>8</sup> of trichinae in the diaphragms of 18.2 per cent of 520 unselected cadavers and autopsy cases is significant. In view of this apparent frequency of infestation with trichinae, and because of the fact that the symptom of hemoptysis in trichiniasis has not received wide attention, the following cases are being reported.

**CASE 1** Patient H S, white, male, aged thirty six, nativity U S, occupation peddler. Admitted to the hospital Feb 9, 1934. Chief Complaints: Swelling of the face, arms and legs, and loss of appetite. Previous History: The patient stated that he frequently ate bacon and pork and that recently he had eaten fresh ham.

**Present Illness** On the morning of February 1, 1934 the patient was awakened by severe abdominal cramps. These lasted throughout the day. On February 2, 1934 he noticed swelling of his legs from the knees down, and of the arms, eyelids and face. He vomited once on February 3, 1934. Muscular pains appeared on February 5, 1934 and grew worse until the time of admission.

**Physical Examination** at the time of admission revealed puffiness of the eyelids and engorgement of the conjunctival vessels. The lungs were clear. There was tenderness in both upper quadrants of the abdomen, but the liver and spleen were not palpable. There was tenderness of the triceps and gastrocnemii muscles and pitting edema of the legs up to the knees. The temperature on admission was 99°F, pulse 100 and blood pressure 112/68. The blood count was RBC 2,800,000, Hb 9 grams per 100 cc, WBC 7,800, polymorphonuclear leukocytes (young) 7 per cent, (mature) 41 per cent, lymphocytes 16 per cent, eosinophiles 36 per cent. The urine showed nothing abnormal at this or any other time, nor did the stools.

**Course** A biopsy of the left deltoid muscle done on February 14, 1934, revealed the presence of typical trichinellae. On February 20, 1934, the patient developed pain in the left chest, which was relieved by adhesive strapping. On February 22, 1934 the entire right leg became swollen and tender. On the following day the patient began to raise sputum heavily streaked with blood and containing clot-like masses of blood and mucus. For seven days the patient continued to raise this type of bloody sputum. By March 5, 1934 the swelling of the right leg had subsided. A chest x-ray taken at this time revealed a flattening of the left diaphragm with obliteration of the left costophrenic sinus, and a small patch of parenchymal infiltration in the fifth left interspace. Several days later the left leg showed changes similar to those in the right, indicating at first phlebitis and later thrombosis of the femoral vein. This ultimately subsided, and no further complications arose.

In this case the diagnosis of trichiniasis was definitely established by the finding of trichinel-

lae in a muscle biopsy specimen. In the following two cases the parasites were not demonstrated, but the history, clinical course, and laboratory findings were such that there seemed to be little doubt that trichiniasis was the diagnosis.

**CASE 2** Patient H C, white, male, aged twenty four, nativity U S, occupation medical student. Admitted to the hospital November 7, 1933.

**Chief Complaints** Headache, malaise, muscular pains, swelling of the eyelids.

**Previous History** There was no recollection of the ingestion of raw or poorly cooked pork, and no diarrhea.

**Present Illness** On November 2, 1933 upon awakening in the morning the patient noted edema of both upper eyelids, especially the left. On November 4, 1933 generalized malaise was experienced. The edema of the eyelids became more marked. On the same day muscle and joint pains developed. Diplopia, lasting from three to five minutes, was experienced on November 4, 1933 and again on November 5, 1933. Severe frontal headache began on November 5, 1933. Hoarseness with cough and moderate mucoid expectoration developed on November 6, 1933. The patient was seen at the student health office during this time but could not be prevailed upon to enter the hospital until the fifth day of his illness.

**Physical examination** at the time of admission to the hospital revealed nothing significant except tenderness over the left maxillary sinus, and a slight mucopurulent exudate on the posterior pharyngeal wall. The temperature was 101.8°F, pulse 106 and blood pressure 128/82. The blood count on admission was as follows - RBC 4,490,000, Hb 11 grams per 100 cc, WBC 9,500, polymorphonuclear leukocytes (mature) 33 per cent, (young) 10%, lymphocytes 7 per cent, monocytes 1 per cent, eosinophiles 44 per cent. The urine at no time showed any abnormality.

**Course** On November 8, 1933 the temperature rose to 104.4° but later fell to 103°. The following day pterygia were present in both eyes and the spleen was palpable. The patient was hoarse at this time. A skin test with trichinella antigen was strongly positive. On November 10, 1933 the temperature was lower, but there were muscular soreness and tenderness in the extremities. During the next seven days there was gradual improvement. On November 17, 1933 the white cell count was 14,500 with 41 per cent eosinophiles and three days later it was 17,000 with 38 per cent eosinophiles. At this time (November 20, 1933) the patient complained of severe pain and marked tenderness in the right subscapular region. There had been no chill and there was no cough. The skin over the right side of the chest posteriorly was hyperesthetic, and there were diminished expansion and decreased breath sounds over the right lung. The pain was relieved by strapping the chest. At no time was there any evidence of consolidation. On November 21, 1933 and November 22, 1933 on several occasions the patient raised small amounts of tenacious mucoid sputum mixed with bright red blood. No trichinae were found in this sputum. On November 23, 1933 pain similar to that just described developed on the left side. There was no significant rise in temperature accompanying either of these attacks of pain. The course from this point on was uneventful and the patient was discharged on December 3, 1933.

**CASE 3** Patient S S, white, male, aged thirty seven, occupation butcher, nativity Austria. Admitted February 27, 1934.

**Chief Complaint** Cough accompanied by pain in the chest, and bloody sputum

**Family History** Irrelevant

**Previous History** Irrelevant except that patient stated that he had "bronchitis" for fifteen years

**Present Illness** On February 2, 1934 patient developed what he called a cold with coryza, chills, fever, malaise and nonproductive cough. There was a transient attack of nausea and diarrhea. After several days weakness, backache and pains in the extremities developed, confining the patient to bed for a week. He was treated by his local physician for "grippe" and improved somewhat but there persisted a dull pain in the chest, weakness, occasional feeling of chilliness associated with sweating and a cough productive of tenacious muco-lent sputum. He returned to work but on February 23, 1934 he coughed up about two drams of blood. The following night he raised a similar amount of blood. Subsequently the amount of blood decreased so that when he entered the hospital there was merely a blood-streaked sputum.

**Physical Examination** on admission revealed nothing abnormal except for numerous sibilant and sonorous râles over both lungs and a few faint moist râles at the left base and in the left axilla. There was some dullness at the left base.

**Laboratory data** Hb 12.2 grams per 100 cc. I. B. C. 4100,000. W. B. C. 8,000 polymorphonuclear leukocytes (young) 4 per cent (mature) 59 per cent lymphocytes 37 per cent Wassermann negative. Sputum on two occasions negative for acid-fast bacilli but was definitely bloody. The temperature was 100° F at the time of admission but subsequently was never above normal. Chest roentgenograms on February 28, 1934 and March 3, 1934 revealed changes associated with chronic bronchitis and emphysema. Bronchial neoplasm or bronchiectasis was suspected but bronchoscopy and lipiodol studies revealed nothing abnormal and the patient was discharged.

After the patient returned to his home additional history was obtained by a member of his family who is a physician. It was learned that the patient had eaten poorly cooked pork immediately before the onset of his illness and that he had had edema of the eyelids for several days before he entered the hospital. Further blood studies revealed on several occasions an eosinophilia of 20 per cent to 30 per cent.

## COMMENT

It is interesting that in all three cases hemoptysis occurred approximately three weeks after

the onset of symptoms of trichiniasis. This is in accord with the results of Askanazy\* who found trichinae in the lungs of infected animals no sooner than three weeks after experimental infestation. In cases 2 and 3 there is no explanation for the hemoptysis except that proposed by Askanazy, namely embolization due to trichinae. In case 1 however, the presence of femoral thrombophlebitis offers another possible etiology for the bloody sputum, although there is no reason to believe that the mechanism in this case was different from that in cases 2 and 3.

The failure to find trichinae in the sputum is consistent with the observations of other workers<sup>9</sup>

## SUMMARY

1. Three cases of trichiniasis with hemoptysis are reported.
2. In one case the diagnosis was missed because of failure to demonstrate eosinophilia and failure to obtain a complete history.
3. In two cases, in which the sputum was examined, no trichinae were found.
4. The importance of considering trichiniasis in the differential diagnosis of hemoptysis is emphasized.

## REFERENCES

1. Minot G. R. and Rackemann F. M. Respiratory signs and symptoms in trichinosis. *Am. J. M. Sc.* 150: 871 1915
2. Wunderlich. Quoted by Glasier W. C. W. United States Marine Hospital Service. Report on Trichina and Trichinosis. Washington Government Printing Office p. 117 1881
3. Kistner. Quoted by Glasier
4. Hun E. R. Trichina spiralis. *Trans. N. Y. State Med. Soc.* p. 187 1888
5. Splink W. W. and Augustine D. L. The diagnosis of trichinosis with especial reference to skin and precipitin tests. *J. A. M. A.* 104: 1801 (May 15) 1935
6. Askanazy M. Zu Lehre von der Trichinosis. *Virchows Archiv* 141: 4 1895
7. Frothingham C. A contribution to the knowledge of the lesions caused by trichina spiralis in man. *J. M. Res.* 10: 423 1906
8. Riley W. A. and Schellney C. H. Trichinosis of man as a common infection. *J. A. M. A.* 108: 1217 (April 14) 1934
- 9a. Minot, G. R. and Rackemann F. M. Respiratory signs and symptoms of trichinosis. *Am. J. M. Sc.* 150: 871 1915
- 9b. Thompson W. G. Trichinosis a clinical study of fifty-two sporadic cases. *Am. J. M. Sc.* 140: 187 1910

## UNCINARIASIS AND APPENDICITIS\*

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**DURING** the past eighteen months we have had the privilege of seeing in this hospital a large number of young adults from a section of the country where hookworm, *Necator americanus*, is quite prevalent. In a number of these cases, presenting fairly characteristic signs and symptoms of acute appendicitis, the appendix was found at operation to be not sufficiently

pathological to account for the clinical picture. This observation was especially frequent in those patients infested with hookworms. In an attempt to find a relationship between uncinariasis and this syndrome resembling acute appendicitis a study was made of 100 cases treated in this hospital for suspected appendicitis.

In the extensive literature dealing with uncinariasis and appendicitis separately there has been little intimation of any connection between the two

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The differential diagnosis is difficult or impossible preoperatively

2 In patients with uncinariasis the small intestine and cecum are frequently found to be acutely inflamed at operation. The appendix may or may not be involved. The inflammation involves chiefly the mucosa and muscularis leaving the peritoneum relatively clear.

3 There is little evidence that hookworms are a common cause of acute appendicitis. No hookworms were found in sixty-eight appendices removed surgically from patients coming from a highly infested hookworm district, in thirty-eight of these patients hookworm ova were found in the stool. It is conceivable, however, that a widespread intestinal inflammation

caused by hookworms might involve the appendix, where the process, due to the anatomy of this organ, might become fulminating.

#### REFERENCES

- 1 McGehee, W. W. Is the uncinaria duodenalis sometimes an etiologic factor in appendicitis and appendiceal colic? *J. A. M. A.* 54: 1309 (April 16) 1910
- 2 Giudice, Sur un cas d'appendicite à ankylostomes. *Ann. d'hyg. et de med. colon.* Paris 16: 436 1913 (Summarized in *Trop. Dis. Bull. Lond.* 11: 634 1913)
- 3 Risquez, J. R. Nota acerca de la parasitologia apendicular. *Gac. med. de Caracas* 24: 71 (May 15) 1917 (Summarized in *Trop. Dis. Bull.* 1917 p 106)
- 4 Verdet, L. et Sigalis, R. Appendicite et necatorose. *Gaz. hebdomadaire de med. de Bordeaux* 42: 150 1921
- 5 Bacigalupo, J. Estudio helmintológico de 100 apéndices de extracción quirúrgica. *Prensa med. argent.* 17: 252 (July 10) 1930
- 6 Gordon, Harold. Appendical oxyuriasis and appendicitis based on study of 26 051 appendixes. *Arch. Path.* 16: 177 (Aug.) 1933
- 7 Lane, Clayton. Hookworm infection. London: Edinburgh Oxford Med. Publications P 319

## CATARACTS AND DINITROPHENOL\*

BY DAVID G. COGAN, M.D.,† AND FRANCES C. COGAN, M.D.†

**D**URING the past two and one half months, there have occurred in the literature no less than twenty cases of cataracts developing after the use of dinitrophenol. This sudden and somewhat tardy appearance of the entity is striking in view of the widespread use of the drug over the past several years. The physiological action of the drug is fairly well understood, and the type of cataract is remarkably constant (vide infra). With this in mind, it is our intention to review the reported cases and to suggest a possible pathogenesis for dinitrophenol cataracts.

#### SURVEY OF CASES

**Age.** Average age of occurrence was 37.9 years with extremes of 25 and 50. Even the oldest member in this group is younger than the age at which we find the usual senile cataract.

**Sex.** With one exception (No. 13), all cases occurred in women. This is undoubtedly due to the relatively greater consumption of dinitrophenol among women.

**Dosage.** Here we wish to make an extremely significant observation, and one of great importance to the dispensing physician. Excepting one case only (No. 11), all were taking dinitrophenol in the recommended therapeutic doses and the majority were taking it under the supervision of a physician. The average maximal daily dose of the patients in this series was 45 grams which is not large when one considers the weight of most of the patients taking the drug. Furthermore there were three patients, developing cataracts, who took a daily dose which at no time exceeded 3 grams (No. 12, No. 14, No. 17).

**Time of taking dinitrophenol.** The total period during which dinitrophenol was taken was stated definitely in sixteen of the twenty cases. It averaged 8.4 months with a minimum of one month (No. 14)‡ and a maximum of 21 months (No. 7).

**Loss of weight.** By some this is taken to be proportional to the efficacy of the drug and hence is recorded here. Total loss of weight was noted in twelve of the twenty cases. It averaged 50¾ pounds over an indefinite period. Minimum weight loss was 21¼ pounds and maximum was 100 pounds.

**Other toxic reactions.** In only three of the twenty cases is there any mention of other toxic manifestations. Of these three, one (No. 20) had merely slight gastrointestinal upsets when she took the drug, one (No. 10) complained that her feet and hands became numb, and one (No. 13) had a frank peripheral neuritis.

**Rate of cataract development.** It is impossible to give any average for this group but a glance at the table will show the characteristic rapidity with which the cataracts develop, once that they are first noticed. Thus, in at least one case (No. 1), vision declined from the first observable dimness to mere light perception, all in the short space of a single week. In five more cases virtual blindness ensued within a month (No. 2, No. 3, No. 7, No. 8, No. 13).

**Type of cataract.** This is probably the most significant from the ophthalmologists' point of view for two reasons: first, the cataracts have a characteristic morphology; secondly, cataracts of this type point to some exogenous etiology. In ten of the twenty case reports, there is adequate de-

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‡There is some question of this patient having taken dinitrophenol for a short time one year previously. In this case the minimal time of taking dinitrophenol would have been a three month period (No. 13).

1	Boardman	50	sturbance
2	Boardman	36	
3	Boardman	39	
4	Boardman	40	
5	Boardman	—	
6	Boardman	—	
7	Horner Jones, Boardman	50	cortex resemble
8	Horner Jones Boardman	36	cortex resemble
9	Horner Jones Boardman	30	rior cortex re-
10	Shutes	44	pacities
11	Shutes	39	
12	Shutes	36	pacities
13	Cogan Cogan	38	
14	Cogan Cogan	25	
15	Barber*	27	clear spaces
16	Man	27	cortex
17	Lazar	44	shaped coppery
18	Gifford†	42	
19	Kniakern	37	
20	Allen	38	



scription of the lens changes to recognize the type as "Cataracta Complicata." In the remaining ten the descriptions are insufficient to tell just what the nature of the lens changes is, but we may infer they were of the same type. The characteristics, par excellence, of Cataracta Complicata are the subcapsular position of the opacities, and the initial involvement of the posterior cortex. This is aptly described as having a "brass filing" appearance. In cataracts of this type the ophthalmologist suspects a source of systemic intoxication.

With the data listed in the accompanying table we have attempted to correlate the time at which the cataracts appeared following the first ingestion of the drug with (1) the total dosage taken, (2) the total time during which the drug was taken, (3) the average rate of dosage per month, and (4) the loss of weight. The relations have been computed on a scale varying from +100, which represents a 100 per cent direct correlation, to -100 which represents a corresponding inverse correlation.

The total dosage and time of appearance of cataracts have a relation of +26. This has only slight statistical value in a small series. We might expect a correlation of this order inasmuch as the total dosage will be greater the later the cataracts develop. The total time of drug ingestion and time of appearance of cataracts have a relation of +58 which has a somewhat higher statistical value. But here again, the longer it takes for the cataracts to appear the more time will there have been to take the drug. It is doubtful if these two factors have any further causal relationship. It should be noted here however that, with the exception of one case (No 14), the minimum time between first taking the drug and appearance of cataracts was six months. The one exception we exclude because of its alleged unreliability. The average time between first taking the drug and appearance of cataracts was slightly more than fifteen months. It is because of this delayed effect that cases are only now beginning to appear although the drug has been used for several years. For the same reason we may expect many more cases in the near future.

The relation between the time of appearance of cataracts, both with the rate of dosage and with the loss of weight approximate a statistical value of -12 and +17. Neither of these figures is large enough, positively or negatively, to be significant in a small series.

As a result of these studies, therefore, we cannot say that the production of cataracts by dinitrophenol is a function of the total amount taken nor of the length of time that it was taken, nor of the rate with which it was taken, nor of the loss of weight.

## COMMENT

The above points to an individual susceptibility as the significant factor in the development of dinitrophenol cataracts. Other toxic manifestations of the drug show a similar variability. Thus, however, is not a unique characteristic of the drug as the allied chemical, trinitrotoluol (T.N.T.), has also shown a varying susceptibility among ammunition workers.

We have had the opportunity to examine nine other patients who had been taking small doses of the drug, over a period of forty nine days, none of whom showed lens changes or any notable toxic reactions. Others have made a similar observation.

The *modus generendis* of these cataracts presents an interesting problem. The drug dinitrophenol, is chemically and physiologically allied to the naphthol group especially dinitroalphanaphthol. Edsall<sup>6</sup> states that the two drugs have similar metabolic and toxic effects, which vary widely for individuals of the same species. The chief difference between the two is quantitative only. It may be of significant interest therefore, that cataracts have been produced in both industrial naphthol poisoning and in experimental rabbits, and that these cataracts, as in this series developed in the short period of a few weeks. However there are to date two incompatibilities in this analogy. In the first place we have not been able to produce dinitrophenol cataracts in our limited experiments on rabbits<sup>7</sup>; secondly, there is no report of retinal or iris lesions in these cases as have been noted to accompany naphthol cataracts. We cannot say at present, therefore, that the cataracts of dinitrophenol have the same pathogenesis as those of naphthol poisoning.

On the other hand, the tissue anoxemia produced by dinitrophenol may account for much of the damage. Dinitrophenol apparently increases the cellular metabolism to a degree in ordinate with its oxygen supply. The tissues become acidotic, lactic acid is piled up and the products of decomposition are incompletely oxidized. That this is largely responsible for the toxicity of dinitrophenol is shown by the marked reduction of its toxic effects through the inhalation of pure oxygen<sup>8</sup>. There is no reason why the lens epithelium should not partake of this general tissue anoxemia and be thereby damaged. In fact it is our opinion that the relatively remote position of the lens from its nutritive source renders it more vulnerable than other tissues.

In view of the morphology of the lens changes and the known effects of dinitrophenol on tissue metabolism it seems likely as we have noted in a previous publication<sup>4</sup> that

We have been giving large doses of dinitrophenol to two rabbits for a period of two months without the development of cataracts.

the cataracts are the result of damage to the lens epithelium rather than to precipitation of the lens constituents. This is why the toxic effects occur, not as immediate reactions, but after more or less prolonged use of the drug, and may occur after the drug has been discontinued altogether. Four cases in this series (No 9, No 12, No 13, No 20) developed cataracts practically a year after the discontinuance of the drug while two more cases (No 4, No 15) developed them, four and three months after it was discontinued. Furthermore, we have immersed immature cataractous lenses (removed intracapsularly) in a 2 per cent solution of dinitrophenol without the development of more opacities as we might expect were it a primary precipitation of the lens substance. We conclude, therefore, that the anoxemia of the lens epithelium resulting from dinitrophenol is, in all probability, responsible for the cataracts.

#### SUMMARY

The entity of dinitrophenol cataracts appears to be established by the number of recent reports. The cataracts have a characteristic morphology and rate of development. A statistical study of the relationship of time of

cataract formation with (1) total dosage, (2) total time of taking drug, (3) average rate of dosage, and (4) loss of weight, shows no definitely causal connection. Like other toxic manifestations of the drug, the development of cataracts shows a bizarre idiosyncrasy but unlike most other toxic reactions, cataracts develop from merely therapeutic doses. The pathogenesis of cataract formation may be similar to that of the allied drug, naphthol, but seems more likely a result of tissue anoxemia with consequent damage to the lens epithelium.

#### REFERENCES

- 1 Boardman W W. Rapidly developing cataract after dinitrophenol. *J A. M. A.* 105: 108 (July 13) 1935.
- 2 Horner W D, Jones R B and Boardman W W. Cataracts following the use of dinitrophenol: preliminary report of three cases. *J A. M. A.* 105: 108 (July 13) 1935.
- 3 Shutes M H. Dinitrophenol. *Am J Ophth* 18: 752 (Aug) 1935.
- 4 Cogan D G and Cogan, F C. Dinitrophenol cataract. *J A. M. A.* 105: 793 (Sept 7) 1935.
- 5 Lazar N K. Cataract following the use of dinitrophenol. *J A. M. A.* 105: 794 (Sept 7) 1935.
- 6 Knisgaern P W. Cataracts following dinitrophenol. *J A. M. A.* 105: 794 (Sept. 7) 1935.
- 7 Allen T D and Benson V M. Late development of cataract following use of dinitrophenol about a year before. *J A. M. A.* 105: 795 (Sept. 7) 1935.
- 8 Edsall Geoffrey. Biological actions of dinitrophenol and related compounds: a review. *New Eng J Med* 211: 385 (Aug 30) 1934.
- 9 Tainter M L. Treatment of acute dinitrophenol poisoning. *J A. M. A.* 104: 1071 (March 30) 1935.

## ELECTROSURGICAL APPENDECTOMY\*

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**A**MONG surgeons there is considerable difference of opinion with regard to inversion of the stump of an appendix. The opponents hold that when the stump is tied and inverted it is simply buried in the wall of the cecum, that this leads inevitably to inflammatory changes in the wall, and possibly to abscess. They maintain that perforation of the gut during the insertion of the purse-string suture may lead to infection, and finally that the whole process may result in extensive adhesions around the cecum.

On the other hand, the proponents of inversion hold that any abscess that forms in the wall after the inversion will quickly slough into the lumen of the bowel, especially if the stump of the appendix has been crushed and a tie of fine plain catgut used. And they say further that any capable surgeon should be able to insert a purse-string suture without perforating the gut. They hold that when not inverted inflammatory reaction in the stump may result in adhesions of the small intestine to the appendiceal site, or, that since the circulation is shut off distal to the tie, sloughing may result in leakage.

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Still others assume that the whole discussion is "much ado about nothing", and that good results are obtained by either method. There is one point, however, to be brought up here. If a surgeon should nick a hole in the colon during an operation, would he pick up the tissues and close the opening with a catgut ligature, cauterizing the stump thus created, or would he place inverting stitches? There is little difference between this situation and that with a dangling stump of an appendix. It is generally agreed, however, that with a gangrenous appendix and indurated cecum inversion should not be attempted, but adequate drainage employed.

In the past well-conceived methods have been used to avoid abscess of the cecal wall following inversion of the appendiceal stump. One of the best is that of Lexer.<sup>1</sup> For several years a slight modification of this method has been used at the Massachusetts Memorial Hospitals. A brief description follows. With linen or catgut suture material a stitch is taken just distal to the base of the appendix on the wall of the cecum, and a tie made, the object being to secure a small vessel usually present at this point. Then, running a continuous Lembert stitch, picking up the cecum on either side of the base of the appendix, a cuff is built around the appendix for about a half-inch, the sutures being

so placed as to pull the cecal wall rather tightly around the appendix. The base of the appendix is crushed and the clamp applied. The continuous suture is loosened, but held ready to be pulled up. Then the appendix is cut off with a knife below the clamp, and the stump of the appendix retracts as the suture is tightened. One or two sutures are taken over the top completing the operation.

Obviously, this method is open to criticism on the ground that contamination may occur as the stump of the appendix retracts. Cautey excision would tend to prevent this. To place a ligature around the stump before it is pulled in would defeat the object of the whole procedure and amount to the same thing as inversion with a purse string suture. In the absence of the tie, however, there is sometimes considerable hemorrhage into the lumen of the colon.

The question of inversion of the stump of the appendix, as against the method just described (Lexer), has been investigated by Birkle-de la Camp.<sup>1</sup> This author found on monkeys that, when the stump was tied and inverted, there was pronounced exudation between the stump and the overlying serosa, with considerable leucocytic infiltration and inflammation of the cecal wall. The Lexer technique however showed no such disadvantage.

*Electrosurgical appendectomy* by the method to be described avoids the danger of contamination and hemorrhage, and at the same time prevents formation of an abscess in the cecal wall about the inverted stump.

The method follows. After cutting away the mesentery, the base of the appendix is crushed over a distance of about a half inch, down to and perhaps, including a small portion of the cecal wall. The pressure should not be vigorous enough to crack through and produce contamination. The crushed mucosa and fecal contents of the lumen are pushed out by squeezing with the clamp, which is discarded. A tie of coarse linen is placed around the base of the appendix in the crushed zone, that is, a small devitalized section is left below the linen tie. Then a clamp is applied about a half inch distal to the tie. With the "cutting current" heavy dehydration low voltage, and using a

needle electrode, the appendix is cut off. The cutting is done with the side of the needle, progressing slowly, perhaps moving the needle from side to side a short distance to make it act more as an ordinary cautery, to seal off the lumen as it is cut across, and to sterilize the fecal contents. Then with the "coagulating current", using biterminal fulguration (sparking), the whole stump is thoroughly treated, including the small crushed portion of the cecum below the linen tie. The devitalized stump is then inverted with a double row of Lambert sutures. A closure as secure as would be required with a hole in the bowel is necessary.

Experimentation upon dogs has shown that the stump sloughs off into the cecum within twenty four hours, leaving the walls nicely inverted and approximated at this point.

In three patients who died after major abdominal operations where incidental appendectomy was performed by this method, the cecum was examined postmortem. In one, after forty eight hours the stump had sloughed into the lumen of the bowel leaving the inverted edges closely approximated. In the second, also after forty-eight hours the stump was hanging by a few small threads of necrotic tissue, and the closure of the cecum underneath it was firm. In the third, after four days, the edges of the infolded gut were clean.

Examination of the records of fifty personal cases of electrosurgical appendectomy reveals good results. The method was used only in those cases in which there was no induration of the cecum itself. The average stay in bed was eight and one-half days. There were no untoward symptoms, nor any complications referable to the abdomen.

The advantages of electrosurgical appendectomy as described are as follows. It is simple and aseptic, it promotes rapid sloughing of the stump into the lumen of the colon, without danger of hemorrhage or abscess of the cecal wall; and it leaves a firm closure of undamaged tissues.

#### REFERENCE

- 1 Birkle-de la Camp H. Zentralbl. f. Chirurgie 88: 701 (Aug. 27) 1922. Abstr. Internat. Surg. Digest 14: 225 (Dec) 1922.

## PRIMARY ABSCESS OF THE OMENTUM\*

BY RALPH W. FRENCH, M.D.†

THE great omentum is a structure to which are ascribed multiple functions, yet a discussion of its pathology rarely appears in the literature. Von Recklinghausen and Bizzozzero<sup>1</sup> as early as 1885 by experimentation with animals demonstrated the major rôle of the

omentum to be the absorption of substances from the peritoneal cavity. When the omentum was removed, there was marked increase in susceptibility to abdominal infection. If the circulation of a particular organ was impaired, as in the spleen or kidney, the omentum formed a capsule over the necrotic organ and walled it off, retarding the spread of infection. By the formation of adhesions the omentum walled off inflammatory processes and lessened the es-

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cape of intestinal contents in cases of rupture of a viscus. It furnished protection and warmth and filled in irregularities between intestinal coils. Arnaud<sup>2</sup> ascribes to the omentum the following functions:

"It fixes microscopic bodies, surrounds large im-mo-bile foreign bodies, has secretory powers, regulates isotonicity and maintains the sterility of the peritoneal cavity. It has greater power of exudation and fibrin production than the peritoneum."

It is, therefore, something of a paradox when the omentum, which is known to possess these bactericidal and protective powers, itself becomes inflamed or infected. Experience with a recent case of inflammation of the omentum which went on to abscess formation led to a search of the literature for similar cases. Few reports of primary abscess of the omentum were available, but those found presented interesting hypotheses as to the etiology and altogether showed a wide range of pathology.

The condition it seems, of primary acute epiploitis or inflammation of the omentum was first observed by Championnière<sup>3</sup> in 1892. He encountered two cases in a series of 275 herniotomies in which a portion of the omentum was found in an old hernial sac at the time of operation or became inflamed shortly afterwards. (The French and German authors always refer to the condition as epiploitis and never use the word omentitis in their descriptions of this entity.)

Schnitzler<sup>4</sup> collected twenty-four cases including his own. Braun<sup>5</sup> added eight others and Zesas<sup>6</sup> collected twelve more, so that by 1909 the total number of cases reported was forty-four. Since this time about thirty more have appeared in the literature.

Chronic abscess of the omentum may not be so rare as these statistics seem to indicate. It is difficult to determine the exact pathology at operation when one simply drains a localized abscess of the abdomen adherent to the abdominal wall. The abscess in such cases is generally considered secondary and there is no opportunity to locate the origin of the inflammatory process. The cases recorded, however, are sufficiently numerous to compare the various theories offered in answer to the question, "Why should the omentum fall victim to infection?"

There is controversial opinion as to the mobility of the omentum and its property of migrating to areas of inflammation. The most plausible explanation is offered by Schutz<sup>7</sup>. After experimenting with dogs he found that peritoneal irritation caused hyperemia and as the blood vessels of the omentum lost their tortuosity there was a blind mass movement of the entire omentum toward the focus of irritation. Hertzler suggests a chemotactic attraction between the area of irritation and leucocytes in the infiltrated omentum. Some au-

thorities claim that only the edge of the omentum has the power to migrate, slowly drawing the omentum to wall off an infected area. When the ommental edge has been removed in animals, the power to migrate seems to have been lost.

For the most part, the anomaly of omentitis is ascribed to operations or to the rise of inflammatory processes within the abdomen. It is affirmed that ligation of the ommental flaps with silk or catgut can cause inflammation of the omentum. After an operation for, let us say, inguinal hernia, a portion of the omentum might accidentally have been tied off, if the patient experiences abdominal pain with rise of temperature, it is natural to infer that infection resulting from a break in asepsis or from the ligature material is the cause of symptoms. The site of the inflammatory mass is usually in the region where the omentum was tied off. Proof of this condition is borne out by the fact that a piece of catgut was found in the abscess cavity in several instances.

From a study of his eight cases Braun draws the following conclusions:

"These inflammatory tumors of the omentum appear at a period varying from one to ten weeks after operations in which the omentum is tied off, there are recorded cases in which the interval was as long as four months and even three years. It is natural to infer that infection, either previously existing or resulting from the ligature material, is the cause. The swellings may be found almost anywhere in the lower abdomen depending partly upon the locality in which the omentum was tied off, usually, however, they are in the vicinity of the umbilicus. The surface is smooth, the mass is firm in consistency, sensitive to pressure, and is not influenced in its position by respiratory movements. If there are no parietal adhesions, the swelling is movable laterally and upward but not downward, as the intestines lie behind it, there is dullness on percussion. Usually pain is the first evidence followed by fever, occasionally chills and vomiting, the course of the temperature depends upon whether or not suppuration takes place."

As a preventive measure, Braun cautioned us to ligate only non-inflamed omentum and to include only small portions of the omentum in each ligature. This theory of etiology is all the more plausible because of the fact that the pus in some cases with abscess has contained shreds of silk as well as catgut. Hamann<sup>8</sup> added three cases attributable to this cause.

Steiger<sup>9</sup> mentioned a case in which a stab wound in the abdomen caused infection of the omentum from perforation of the intestine. Sowles<sup>10</sup>, Giraud<sup>11</sup>, and Labry and Arnulf<sup>12</sup> each reported a case in which the inflammation of the omentum followed as the result of a blow in the abdomen. After resection of the inflamed area the patients recovered.

It is well established that the omentum may also become inflamed by contact with an inflamed viscus or as a result of operative trauma. After operating upon three patients with hy-

peritoneal inflamed omentum, Emerson<sup>15</sup> came to the following conclusion:

"The abnormal condition of the omentum at the site of pain and the relief after partial omentectomy warrant the conclusion that there is a distinct entity as a late sequela of the pelvic surgery which I call chronic localized omentitis."

These three patients after pelvic surgery complained of severe abdominal pain and exerting tenderness with fullness and resistance in the pelvis suggestive of tumor. When the abdomen was explored the only lesion found was the hypertrophic omentum.

Symptoms often make their appearance after appendectomy, cholecystectomy, or other pelvic operations, and in these cases operative soiling cannot be ruled out, especially when the pain is localized at the site of the previous operation. Arnold<sup>14</sup>, Thévenard<sup>15</sup>, and others reported cases of postoperative inflammation of the omentum in which, although the omentum had not been disturbed during operation the patient did not make a complete recovery and symptoms of inflammation appeared from one month to one year afterwards.

There are some cases, however, which must be placed in another category, those in which there has been no previous operation. In these the origin of the condition must be considered embolic, since the inflammatory tumor is apparently not connected with any demonstrable intraperitoneal pathology at the time of exploration. The only pathology in the abdomen is that found in the omentum where the inflammatory process appears to be primary. In Adams's case<sup>16</sup> there was no previous operation or injury and the only recent illness had been pneumonia one year previously and frequent colds. This patient complained of acute pain in the lower right abdomen for four days. At operation an abscess of the omentum was found overlying a normal appendix and cecum.

Panchet<sup>17</sup> reported two cases which he interpreted as acute exacerbation of a chronic omentitis. The omentum showed inflammatory change at the lower border. The omentum was resected and a normal appendix removed incidentally with recovery in both cases. He stated that the epiploön in this type of case became infected by way of the lymphatics.

In 1929 Schomberg<sup>18</sup> reported three cases of acute hemorrhagic epiploitis. A section of the omentum was discovered to be dark red, densely infiltrated, and there was considerable serosanguineous fluid in the abdomen. Two of the patients had always been in good health, the third man had epididymitis several years before the onset of symptoms of epiploitis. In these three cases the appendix was normal. After resection of the omentum the three patients recovered.

In McWhorter's<sup>19</sup> three cases the condition in the first apparently followed severe bronchi-

tis, in the second it was probably due to an infected thrombus from appendicitis, and in the third no etiology was found. Walther<sup>20</sup> reported several cases in which there was no pathology except the inflamed omentum in the peritoneal cavity. He pointed out, however, that it might be argued that the original pathology subsided and the omentum detached itself from the old lesion.

Thorek<sup>1</sup> divided cases of omental suppuration into two groups: (1) the Schnitzler-Braun or chronic type, and (2) the Küttner-Schmieden or fulminating type. Boltanski<sup>21</sup> and Rouslaire<sup>22</sup> also reported cases as either congestive inflammatory or chronic adhesive. Thorek ascribed an embolic origin to the acute inflammatory omentitis and believed that both types might occur with or without adhesions to neighboring viscera.

It appears from Haller's<sup>23</sup> research that the omentum is found altered in patches in many laparotomies, thus he reported 372 patients treated for epiploitis. In many of these cases, however, the degree of inflammation was slight. Instances were few in which the condition simulated malignant disease and in these the prognosis was discouraging.

In Pantzer's two cases<sup>24</sup> the condition followed an operation in which convalescence was retarded by peritonitis, and he interpreted the pathology thus:

"The *matériau morbi* passed the prohibitory portals of the omentum became implanted there at various points and were held in inoffensive isolation for a long time. Then owing to faulty metabolism or debility as a result of severe physical strain, the poisonous elements in these foci were liberated and caused grave systemic sepsis."

These patients did not get well after operation and remained semi-invalids complaining of abdominal tenderness and pain, yet between attacks showed no evidence of disease. At operation the omentum was found studded with numerous minute abscesses and the structure was thickened in the areas in which the abscesses were located. Pantzer believed that in these two cases the products of inflammatory reaction were held in retention in the omental tissue, contrary to the usual process whereby the infected emboli are gradually taken up by the lymph channels of the omentum and eventually disappear. In the milder cases, the portion of omentum which has become adherent to an inflamed viscus when stripped off shows little evidence of inflammation within itself.

Once the omentum becomes infected the process seems to take one of two courses: either the omentum becomes more and more hypertrophied or multiple tiny abscess cavities form in scattered areas of the thickened and inflamed omentum. Of all the cases reviewed, Pantzer's two fatal cases of multiple abscesses of the omentum and Maunsell's<sup>25</sup> report of chronic fibrous epiploitis, in which the omentum



was transformed into a smooth, pearl-white membrane adherent deep down in the pelvis, are examples of the two extremes of this pathology of the omentum.

The case which I encountered recently and which prompted a study of the cases reported in the literature was one of acute primary inflammation of the omentum that went on to abscess formation

The patient was a woman forty-six years old, who was admitted to the Truesdale Hospital October 25, 1934, complaining of pain and soreness in the left lower quadrant of the abdomen which had persisted for six weeks. Two years previously she was in the hospital for bronchopneumonia complicated by anemia. At that time it was noted that the spleen was slightly enlarged. Shortly afterwards she returned for cholecystectomy for gall stones and her convalescence was very satisfactory, except that it was complicated by a small ischio-rectal abscess. The condition cleared up readily, however, and the patient remained well for a year and eight months until the onset of her present illness.

On admission the patient gave a history of moderate abdominal pain for two weeks in the left lower quadrant gradually increasing in severity. A large, hard, smooth, tender mass was palpable in the left lower quadrant of the abdomen. Her temperature was 100.4 degrees, pulse 100 and respirations 24. The red blood count was 4,420,000, white count 9,400, and hemoglobin 60 per cent. The nonprotein nitrogen was 30.6 mgm., the blood sugar 100 mgm. The blood Wassermann was negative. The general physical examination was otherwise not remarkable. A diagnosis of ovarian cyst with twisted pedicle was made and the patient prepared for operation.

Exploration revealed an inflamed omentum like a mat, six inches in diameter, in the left lower abdomen and pelvis. The center was broken down and contained thick staphylococcus pus in a cavity two inches in diameter. Around this the omentum was very hard and fully two inches thick. (See illustration.) It was easily lifted up from the pelvic organs and intestines which it covered and showed no adhesions to these organs. It involved approximately the left half of the omentum, whereas the right half was apparently normal and free. There were only a few filmy adhesions under the scar of her gall bladder operation. They did not appear to play any part in this picture. From the omental edge the induration extended upward to the transverse colon. Because of the extensive suppuration and its proximity to the colon, it was deemed safer to drain the abscess cavity than to remove the cakelike mass.

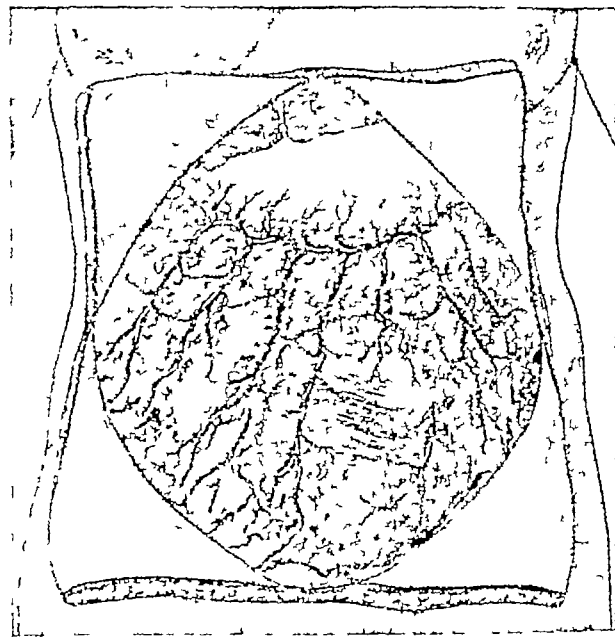
Since the process was so hard that I thought it simulated malignancy, a piece was removed for microscopical examination. The pathologist reported an acute exacerbation superimposed on a chronic inflammation.

The pelvic organs were all found to be normal and the sigmoid and small intestines under the mass showed no sign of inflammation or other abnormality.

Her convalescence was slow. She complained of general abdominal discomfort and a substernal burning sensation, and slept poorly. There was a cramplike pain in the upper abdomen after the ingestion of food which persisted for nearly two weeks following operation. On the tenth post operative day the white count was still 21,700.

Drainage, which was profuse at first, gradually diminished but the patient continued to complain of tenderness in the left lower quadrant, and the temperature remained elevated around 102 degrees.

Five weeks after the first operation a secondary abscess developed and pointed to the left and above the center of the previous abscess. Her temperature continued at 102 degrees and the white count varied from 21,700 to 11,200. This abscess was opened through a counterincision. There was a soft area of necrotic tissue in the thickened omentum into which drains were placed. Thereafter her



Primary abscess of the omentum

recovery was steady with a gradual drop in the temperature and white count to normal ten days after the second incision was made. After this second operation the mass palpable beneath the abdominal wall became slowly but steadily smaller. The patient left the hospital nearly six weeks after the first operation. She has remained well with no inflammatory symptoms and is leading a normal active life.

In this case drainage of the abscess cavity effected a cure. According to Hamann,

"If the progressive increase in the size of the swelling, fever, parietal adhesions and leukocytosis indicate the presence of pus, an incision is to be made and the abscess cavity evacuated and drained. The ultimate results are in the vast majority of cases favorable."

Drennan<sup>27</sup>, however, disagrees and states

"Unless there is abscess formation, the outlook usually is good. In the presence of abscesses, however, a less favorable prognosis must be given, for these abscesses may break, thus causing a fatal peritonitis."

He advises laparotomy in every instance where abscess formation is suspected. Whenever it is feasible, extensive resection has been the method of choice when induration and abscess formation are present.

## COMMENT

Cases of acute primary omentitis coexistent with pancreatitis, sigmoiditis, and diverticulitis have been reported by Baur<sup>1</sup>, Hatzegann<sup>2</sup>, Lepoutre<sup>3</sup>, and Canonne<sup>4</sup>. An acutely inflamed omentum gave rise to encapsulating peritonitis in two cases reported by d'Allaines and Jomain<sup>5</sup>, and was the cause of intermittent fever of long duration in several instances<sup>6</sup>. Thus the omentum, whatever may be its pathology, is a structure to be reckoned with in complications of the abdomen and may be the sole cause of symptoms. The differential diagnosis is difficult because acute primary omentitis may simulate many other inflammations such as acute appendicitis, cholecystitis, ovarian cyst with twisted pedicle, or diverticulitis. As Schragar pointed out

"If the mass is at or above the level of the umbilicus, there must be differentiation from pathology of the appendix or the gall bladder wandering liver neoplasms of the spleen or tumor of the colon. If the mass is below the umbilicus one must rule out ovarian cysts, or inflammatory masses or tumors of the pelvis."

Furthermore, the condition must be differentiated from other pathological conditions of the omentum itself, such as simple torsion, lipoma, cysts, malignancy, tuberculosis, or syphilis.

In the severe cases the prognosis is discouraging, whether treatment is conservative or daring, but if operation is performed fairly early in the course of the disease, the usual outcome is recovery.

## REFERENCES

1. Quoted by Schragar V L., and Bergen, S.: Primary acute epiploitis. *Ann. J. Surg.* 30: 45 (April) 1933.
2. Arnold, M., and Finney J. A.: Du mécanisme pathologique des principaux symptômes péritonéaux. *Marseille Méd.* 1: 752 (June 8) 1933.
3. Champagnier, Lucien: Présentation d'une péritonite à une épiploite chronique ayant entraîné tout le tableau épiploïque en une masse endurée occupant tout l'abdomen. Inflammation chronique ayant une hernie inguinale pour point de départ. *Bull. et mém. Soc. d. chirurgiens de Paris* 84: 195 (May 6) 1933.
4. Schmitzer J.: Ueber Epiploitis im Anschluss an Operationen. *Wien. klin. Wochenschr.* 14: 4 1930.

5. Braun, H.: Ueber entzündliche Geschwülste des Netzes. *Arch. f. klin. Chir.* 63: 378 1901.
6. Zesse, D. G.: Über im Anschluss an Bauchoperationen und Entzündungen der Bauchorgane vorkommende entzündliche Geschwülste des Netzes (Epiploitis). *Deutsche Zeitschr. f. Chir.* 93: 503, 1909 (References 4 & 5 from Schragar and Bergen).
7. Schmitz, C. B.: The mechanism controlling migration of the omentum. *Surg. Gynec. & Obst.* 50: 541 (March) 1930.
8. Hamann, C. A.: Inflammation and suppuration of the omentum. *Cleveland M. J.* 8: 169 (Dec.) 1909.
9. Stalger W.: Quoted by Schragar and Bergen, ref. 3.
10. Sowles H. K.: Traumatic abscess of the omentum. *New Eng. J. Med.* 189: 564 (Sept. 20) 1923.
11. Giraud Thésis. Montpellier 19: 8 Quoted by Labry R., and Arnould G. ref. 5.
12. Labry R., and Arnould G.: *Lyon méd.* 151: 595 (May 14) 1933.
13. Emerson C.: Omentitis hypertrophica a new clinical entity. *Nebraska M. J.* 14: 39 (Jan.) 1929.
14. Arnold, H. H.: Post-operative abscess-formation in omentum. *West. J. Surg.* 58: 520 (Sept.) 1930.
15. Thévenard, M.: Deux cas d'épiploite aiguë. *Bull. et mém. Soc. d. chirurgiens de Paris* 83: 521 (May 1) 1931.
16. Adams, D. S.: Primary acute inflammation of the great omentum—Case report. *Boston M. & S. J.* 189: 931 (Dec. 13) 1923.
17. Pauchet, V.; Bécart, A., and Gschlinger H.: *Bull. et mém. Soc. d. chirurgiens de Paris* 83: 319 (May 2) 1930.
18. Schomburg H.: Akute hämorrhagische Epiploitis unter dem Bilde einer akuten Appendicitis. *Beitr. z. klin. Chir.* 148: 88 1930.
19. McVortier G. L.: Abscess of omentum following appendectomy with perforation and general peritonitis after five months of chronic illness. Resection of omentum with complete recovery. *Burg. Clin. N. A.* 8: 545 (June) 1923.
20. Walker C. J.: *de med. et chir. prat.* 98: 166 (March 10) 1917.
21. Thorek, M., and Thorek, P.: Postoperative epiploitis with abscess. *J. A. M. A.* 98: 1848 (April 20) 1932.
22. Bollański, E.: Les péritonites abdominales et les épiploites chroniques. *La Médecine (suppl.)* 14: 1 (April) 1932.
23. Rousselle, L.: Processus congestifs et oedémateux du péritoine viscéral et de l'épiploon. *Marseille méd.* 1: 75 (June 8) 1933.
24. Haller, Thésis. Paris 1911.
25. Pantzer H. O.: Multiple abscesses of the omentum. *J. A. M. A.* 43: 1523 (Nov. 18) 1904.
26. Mannell, R. C. B.: Chronic fibrous epiploitis. *Brit. M. J.* 1: 1051 (June 11) 1937.
27. Dreyman, L. M.: Abscess of the great omentum—a case report. *Proc. M. A. Athenian Canal Zone* 6: 94 1917.
28. Baur F. L.: Diverticula intestinalia et epiploitis aiguë. *Soc. d. méd. mil. franc. Bull. mens.* 23: 43 1915.
29. Hatzegann, I., and Danchev I.: *Clin. med.* 9: 493 (Aug.) 1915.
30. Lepoutre C.: Des péritonites enkystées du l'arrière cavité des épiploons d'origine pathologique. *Rev. méd.-chir. d. mal. du foie* 7: 76 (July-Aug.) 1932.
31. Canonne H.: Sur un cas d'épiploite aiguë avec algomélie par corps étranger. *Bull. et mém. Soc. d. chirurgiens de Paris* 84: 265 (May 6) 1933.
32. d'Allaines, F., and Jomain A.: Propos de l'origine de la péritonite encapsulante. *Bull. et mém. Soc. nat. de chir.* 69: 310 (Feb. 24) 1934.
33. Costedoat, A.: Une cause de fièvre intermittente de très longue durée. L'appendicite chronique d'emblée avec épiploite. *Bull. et mém. Soc. méd. d. hôp. de Paris* 49: 167 (Feb. 2) 1923.

## THE ROLE OF PERIPHERAL CIRCULATORY FAILURE IN CLINICAL MEDICINE\*

BY DANA W. ATCHLEY, M.D.†

IN addressing the New England Heart Association on the subject of circulatory failure my New England conscience forces me to state that I am not a cardiologist and that although my interest in the shock syndrome has included many phases of the problem my actual investigative work has been confined only to those aspects which are related to electrolyte phys-

iology. If one is interested in this ubiquitous complication of disease, there is a fascinating literature available for his consumption. The whole gamut of man's absurdity and man's brilliance in the study of natural phenomena is included in the various writings about shock. One may see oft recurring the almost obsessive urge to invent a foreign toxin to explain a simple physiological process. The so-called "toxemias" of burns, diabetic coma, pyloric obstruction, Addison's disease and traumatic shock are examples of this misguided ingenuity. On the other hand in few fields have the obvious truths been so clearly stated and so long

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buried I shall point out to you that about seventy years intervened between the first rational analysis of shock in cholera including the appropriate therapeutic suggestions and its general practical application. Janeway pointed out clearly, in 1907, the more frequent termination of severe infectious diseases by peripheral vascular failure than by cardiac failure, yet most modern textbooks of medicine still place their emphasis on the use of cardiac stimulants in such situations.

However, a large number of painstaking investigations, many of them remarkable in their vision far beyond contemporary scientific boundaries, have brought to this field a knowledge of the underlying disturbances of physiology that may produce the shock syndrome and have, moreover, clarified in great detail the effects of shock itself upon the organism. As one reviews the research of these workers, it is apparent that there are a few simple mechanisms which constantly recur and that the appearance of this complication in a wide variety of totally different diseases may be correlated with one or more of these mechanisms. Thus are we able to understand the apparent identity of the final stages of such totally different diseases as cholera, diabetes and severe burns.

For purposes of simplification it may be stated that whenever it occurs, the state of shock is the physiological result of an acute disparity between the circulating blood volume and the functioning capacity of the vascular bed. This result can, of course be brought about by a relatively rapid decrease in blood volume or by a sudden expansion of the vascular bed, and also by a concurrent appearance of both changes. When this discrepancy reaches an advanced stage its ill effects upon the individual are profound and indeed often fatal. I need offer only brief reminder of the clinical picture with its evident great prostration, cold extremities, sweating, pinched features, pallor, sunken eyes, small rapid pulse and low blood pressure. As the result of varied researches, many of them from the Harvard physiological laboratories, the pathological physiology is well understood. There is stasis of blood in the capillaries with a generalized anoxemia and tissue asphyxia. Before the blood pressure actually drops the cardiac output in most instances decreases, thus augmenting the process. The capillaries dilate due to oxygen want, with consequent increase in the vascular bed and leakage of serum into the tissues. Dissipation of serum into the tissue spaces contracts the blood volume and increases blood viscosity. A vicious circle is thus initiated that rapidly hastens the downward course. The kidneys cease to serve their purpose in relation to acid base and electrolyte physiology. Nitrogenous waste products accumulate. If infection be present there is serious interference with the

immunity mechanism. Bacterial toxins cannot be normally neutralized or removed. The whole body economy is at a standstill during what is usually a very critical period because of the original disease process of which the circulatory failure is a complication. However, it is not alone the seriousness and frequency of shock in clinical medicine that demands attention but also and, perhaps more important, the fact that it is in many instances an avoidable danger. In order to prevent shock or treat it properly when it occurs, it is necessary to be familiar with the various routes by which the final stage may be reached. In no realm of clinical medicine is theoretical physiology more fruitfully productive of practical therapy than in this.

The mechanisms that produce a discrepancy between the blood volume and the vascular bed are in ultimate analysis few and simple. A decrease in blood volume may be due to direct loss of whole blood as in hemorrhage, it may be due to loss of salt and water from the blood by a variety of routes and, finally, it may be due to loss of serum from capillaries that have dilated and hence become more permeable to protein. The vascular bed may be increased in size by toxins that cause the capillaries to dilate either by direct physiological effect or by poisoning them. Vasodilatation may also be produced by the neurogenic route, through the sympathetic nervous system.

These underlying mechanisms offer an excellent framework for a discussion of the occurrence of shock in clinical medicine. Because it is the first competent analysis of such an underlying mechanism that I have been able to discover, I would like to detail to you a letter that Dr W. B. O'Shaughnessy of Newcastle-upon-Tyne wrote in 1831 to the *London Medical Gazette*. This letter embodied the results of several years of what he termed his "experimental inquiries" into the cholera. His terse summary of a physiologic mechanism in terms of modern chemistry is a delightful contrast to the usual clinical sophistry of that day. As I quote his conclusions, I am sure you will agree that his work would still be modern 100 years after he lived. He states:

"1 The blood drawn in the worst cases of the cholera, is unchanged in its anatomical or globular structure.

"2 It has lost a large proportion of its water, 1000 parts of cholera serum having but the average of 850 parts of water.

"3 It has lost also a great proportion of its neutral saline ingredients.

"4 Of the free alkali contained in healthy serum, not a particle is present in some cholera cases, and barely a trace in others.

"5 Urea exists in the cases where suppression of urine has been a marked symptom.

"6 All the salts deficient in the blood especially the alkali or carbonate of soda, are present in large quantities in the peculiar white dejected matters."

Quite wisely I believe, a contemporary reviewer of Dr O'Shaughnessy's "Chemical Pathology of Cholera" called particular attention, in *The Lancet* of 1832, to the 'strictly logical series of deductions disfigured neither by empty hypothesis nor by untenable and wild speculations.'

In other words by quantitative chemical analysis, he demonstrated dehydration salt depletion, acidosis and urea retention and he covered that the base loss occurred via the copious stools

Turning next to the therapeutic implications which naturally follow from the biochemical disturbances found in the disease Dr O'Shaughnessy states further that the cure is seemingly dependent upon two principles "First, to restore the blood to its natural specific gravity (i.e., its water content) secondly to restore its deficient saline matters. He then states that, "The first of these can only be affected by absorption, by imbibition or by the injection of aqueous fluid into the veins. The same remarks, with sufficiently obvious modifications, apply to the second. The practical application of these principles was described as follows "In severer cases copious enemata of warm water, holding the natural salts of the blood in solution are strongly recommended." When absorption is entirely suspended the author recommends the injection into the veins of tepid water holding a solution of the normal salts of the blood. Thus it is apparent that over one hundred years ago a physician with an investigative and critical mind was able, with the crude methods at his disposal to unravel the mechanism of the essential manifestations of cholera, viz., dehydration, salt depletion and shock. Furthermore he logically employed the specific therapy indicated by such a disturbance in physiology.

Although the implications of O'Shaughnessy's extraordinary work were confirmed by a number of workers in Britain as well as on the Continent, the struggle to overcome the traditional prejudices of those in authority is beautifully exemplified by the following words written by Dr J Piddock to the *London Medical Gazette*, August 21 1832

"Turning hopelessly away from the Central Board and Local Hospital, I resolved to pursue the experiment (i.e. saline therapy) among the poor in my district convinced that the brandy and laudanum system had been too highly recommended, and too long sanctioned by authority to admit of the introduction by the same individuals of another system so diametrically opposed to it. Perhaps such a revolution in a cherished opinion, and a favourite

practice, would be a stretch of candour and liberality almost superhuman."

In spite of the fact that in 1850, the German biochemist Karl Schmidt repeated and greatly amplified these analytical results of O'Shaughnessy, there were subsequently but occasional references to the therapeutic value of intravenous salt solutions. It was not until Rogers, and Nichols and Andrews in 1900 used saline injections with a remarkable decrease in the mortality of a cholera epidemic in the Philippine Islands that this rational treatment became generally accepted.

I have taken time to trace the development of the chemical pathology of cholera because it presents, as I have already said, one of the earliest instances in which there was an understanding recognition of the physiologic processes involved in the development of this common complication of many disease conditions, viz., dehydration, salt depletion and shock. Furthermore it was in the treatment of cholera that for the first time a rational replacement therapy was instituted with I might add, the anticipated clinical benefit.

Chronologically, the next correct appraisal of this problem of dehydration may be found in the Guy's Hospital reports of 1874. Dr C. Hilton Fagge described, therein, "A Case of Diabetic Coma treated with partial success by the injection of a saline solution into the blood." The most impressive feature of this pioneer experiment in therapy was the rationale which he offered. It is best expressed in his own words, "What suggested to my mind the advisability of injecting a saline solution into the blood in this case was the idea that coma was due to the drain of water from the system, caused by the diabetes. I suppose that the hypothesis upon which I acted was essentially similar to that which formed the basis of the like treatment in the collapse of cholera." The importance of this observation was nine years later overshadowed by Stadelmann's discovery of the existence of an acidosis in diabetic coma. Stadelmann quite logically felt that the replacement of alkali was the obvious point of attack. This concept so completely dominated the treatment of diabetic coma that even the more modern textbooks omit mention of the clear correlation between dehydration and circulatory collapse which Fagge had demonstrated in 1874. One must not neglect to state that for at least twenty five years salt solution has been routinely employed in the treatment of diabetic acidosis. However, it was usually done with the coincident assumption that the picture of low blood pressure, thready pulse, oliguria and collapse resulted from 'toxic' cardiac failure rather than from shock due to decreased circulating blood volume and vasomotor paralysis. We were able to show in our clinic that the loss of salts and water in

diabetes is dependent upon two apparently unrelated mechanisms. One of these is the obviously necessary loss of base resulting from the excretion of salts of the ketone acids. The other is more difficult to understand but it is definitely associated with the occurrence of severe glycosuria, and may be found even in the absence of ketosis. These two forces working together in an acute diabetic crisis bring about a loss of salts and water that is cataclysmic in its effects upon the patient. It is amazing to note the failure of the textbooks to emphasize this predominant pathological force in diabetic coma, it is not an exaggeration to assert that aside from wholly unrelated complications such as pneumonia, the chief cause of death in severe diabetic acidosis is shock, a death which may occur with normal blood sugar and bicarbonate levels. I belabor the point because it is usually easy to prevent such deaths.

The clinical picture dependent upon dehydration, salt loss and consequent shock is found in many other disease conditions. Prominent among these is the group characterized by pyloric or high intestinal obstruction, as well as those patients in whom for some reason there exist fistulous openings from the upper gastrointestinal tract or the bile ducts. It naturally follows that the picture of shock in these patients results in part at least from constant vomiting or persistent drainage of body fluids normally rich in sodium salts. It should be pointed out that in certain cases of intestinal obstruction no actual loss of salt from the body occurs, but the same result is effected by the outpouring of salts and water into the distended loops of intestine, thus removing them from the circulating blood and tissue spaces. The chemical changes in the blood under these conditions, viz., decreased water, sodium and chloride contents and increased urea concentration, have been recognized for many years. Furthermore, clinicians have for a long time appreciated the therapeutic value of intravenous salt solution. The original hypotheses assumed that the condition was due to a toxemia and that the saline therapy acted as a detoxicant. Gamble's careful balance experiments finally proved that for pyloric obstruction, at least, no other factors than salt loss and dehydration were required to produce the entire disease picture. As in cholera and diabetic acidosis, striking clinical improvement follows the replacement of salt and water.

Underhill and others have studied the serious consequences of extensive burns and have demonstrated that the exudations into the burned area deplete the blood to such an extent that fatal shock may ensue. Animal experiments by Blalock indicate that it requires approximately the same total fluid loss whether by hemorrhage or as edema fluid in burns to

cause fatal circulatory paralysis. More recently Harkins has studied the causes of death by freezing and has observed that there is a definite similarity to the effect of burns, viz., extensive loss of fluid from the circulating blood into the damaged tissues. Of course, I would not assert that there are no other factors contributing to the pathology of burns, but certainly there is none so well understood or so practical an aid to therapy as the fluid depletion.

The clinical syndrome of acute adrenal insufficiency as seen in Addison's disease bears a striking resemblance to that present in the other pathologic states which we have discussed. For example, weakness, prostration, rapid pulse, nausea and vomiting, fall in blood pressure, decrease in water content of the blood, increase in blood urea and decrease in the concentrations of chloride and bicarbonate are characteristic. Indeed, Addison in his original description commented on the similarity of the terminal stage to that seen in cholera. Loeb, in our clinic, has shown that in adrenal insufficiency in man, the sodium of the blood is markedly lowered, as Marine and Bauman and also Zwemer had shown in cats. Furthermore, he was able to show that the administration of sodium chloride alleviates to a striking degree the clinical manifestations just described. On the other hand, it is possible to precipitate an acute and alarming attack of adrenal insufficiency by the withdrawal of salt from the diet of patients who are in relatively good clinical condition as a result of salt therapy. It is truly remarkable to observe the difference that 15 Gm. of salt a day will effect in the health and well-being of such a patient. Loeb and I have demonstrated that the decrease in salt content of the blood in adrenalectomized dogs is due to an enormous increase in the excretion of sodium by the kidney. This loss of sodium is accompanied by an augmented but not parallel water output and results in the characteristic picture of dehydration, salt depletion and shock. It seems likely that the mechanism by which salt depletion and dehydration are produced in adrenal insufficiency is different from the disturbances resulting in shock in the clinical conditions described previously. On the basis of the evidence so far accumulated we are inclined to believe that the active principle of the adrenal cortex exerts a controlling influence upon sodium metabolism through the medium of the kidney, and that the breakdown of this regulatory mechanism results in an increased rate of sodium excretion. The regulatory effect of the adrenal cortex upon salt and water metabolism is not its sole function. This seems proved by the fact that adrenalectomized animals eventually succumb although the period of survival may be appreciably prolonged by salt administration.

Clinical descriptions of heat prostration suggest the shock syndrome and the observations made by the Harvard group at Boulder Dam support the suggestion that salt depletion and dehydration play a prominent role in this condition. Replacement therapy in the acute phase has been successful and preventive measures directed to the conservation of base have been valuable.

It has been shown experimentally that the rapid death in shock that occurs in so-called bile peritonitis is due in part at least to dehydration of the body by loss of fluid into the peritoneal cavity. This type of reaction illustrates clearly the fact, at times overlooked, that it is not necessary that the fluid and salt be lost from the body to the external environment in order to initiate the shock syndrome. A sufficient quantity of fluid statically mobilized in the tissues or body cavities will produce the same result because such fluid is no longer available to the circulating blood stream. Most modern workers in the field of traumatic shock feel that exudation into damaged tissues with its removal of large quantities of fluid at the cost of the blood volume is a potent force in causing this type of shock. There is ample experimental evidence to support this point of view.

It is apparent from the foregoing discussion that the loss of water and salt from the body may occur in a variety of ways and result from a number of different physiologic disturbances. Among these we have described loss of base and water by diarrhea, vomiting or surgical drainage, loss of serum by exudation into burnt or frozen tissues, loss of salt in the urine by alterations in the carbohydrate metabolism, loss of salt as a response to acidosis, an excessive urinary excretion of sodium in adrenal insufficiency, and finally, unusual loss of salt and water by the skin following exposure to heat. There is one common denominator to be found in all of these disease conditions when they have reached an advanced state, viz., the shock syndrome.

The train of events by which dehydration and salt depletion ultimately lead to the classical syndrome of shock requires only brief mention. One of the most striking physiologic principles of the body is expressed in its tenacious effort to maintain the salt content of the blood serum and the interstitial fluids at a constant level in the face of adverse circumstances. When salt is lost for any reason, the body sacrifices its previous water stores to protect its sodium concentration. Conversely, the extensive loss of water is almost invariably associated with a considerable loss of salt. Hence, a severe drain of salt or water or both is reflected in the circulating blood, producing in time a decrease in blood volume so great that the state of shock

ensues in much the same manner as in acute hemorrhage.

Let us next turn our attention to those situations in which the state of shock is brought about primarily by a rapid dilatation of the vascular bed rather than by contraction of the blood volume. Since the isolation of histamine by Sir Henry Dale in 1909, physiologists have recognized that large doses of this drug will cause a generalized capillary dilatation, with a drop in blood pressure and collapse. The closest clinical approach to this laboratory experiment is seen following the entry of venom into the body by the intravenous route. It was my privilege some years ago to observe the clinical effect of an intravenous rattlesnake bite. The patient, while extracting venom during his duties at the American Museum of Natural History, was bitten on the back of his hand. In spite of the immediate administration of antivenom serum the patient collapsed in twenty minutes and was brought to the Presbyterian Hospital. On admission he presented an extraordinary picture. His skin was cold and dusky red in color, he was semicomatose, his respirations were shallow, his pulse was rapid and almost imperceptible, his heart sounds were inaudible and his blood pressure was too low to be read. In spite of several saline infusions and a transfusion of 700 cc his blood pressure, which was raised by these therapeutic procedures, soon fell to a critical level again. It was not until 7200 cc of fluids had been given intravenously in the course of sixteen hours that his blood pressure remained normal. The frequently fatal outcome from an intravenous rattlesnake bite results from failure to recognize the fact that the therapeutic attack should be primarily directed against the state of shock. A recent study by Blair of the bite of the black widow spider brings to light many similarities between the effect of the spider toxin and rattlesnake venom on the peripheral vascular bed.

When Laennec, in 1826, described the weakness of the heart sounds in severe febrile conditions, he attributed this change to cardiac failure, a point of view which unfortunately, still continues to dominate medical thought. This is true in spite of the fact that Romberg and Pässler as early as 1899 wrote upon the effect of bacterial products on the vasomotor apparatus of rabbits. These authors were able to show that a state of collapse could be induced by the intravenous injection of pneumococci or other organisms. Furthermore, they pointed out that intravenous salt solution was more effective in treating these animals than was subcutaneous ether, camphor, strychnine or cognac. Romberg at that time suggested the term "toxic shock" for this complication of infectious disease. It is hardly necessary to emphasize the similarity between Romberg's

"toxic shock" and the shock resulting from intravenous injections of histamine or snake venom

A striking confirmation of the shock-producing capacity of the pneumococcus was afforded by a clinical experiment performed upon himself by a member of our staff a few years ago. This individual gave himself a large dose of pneumococcus vaccine, intravenously. There followed an immediate and alarming collapse during which his systolic blood pressure fell to 60 mm of Hg and continued below normal for three days. In conjunction with this he developed numerous petechial hemorrhages of the skin, which would lead one to infer that, in addition to dilatation of the capillaries, there had also been actual damage.

Doubtless you recall in your own experiences with severe infectious diseases, particularly pneumonia and typhoid fever, patients who have presented the picture of falling blood pressure, rapid pulse and collapse. In many instances this serious complication is a manifestation of shock, and probably results from an increase in the vascular bed due to capillary damage. Confusion of this state with cardiac failure will result in misdirected and possibly harmful therapy. The importance of this point of view was indicated by Theodore Janeway in the *New York State Medical Journal* for 1907, when he wrote on "Some Common Misconceptions in the Pathological Physiology of the Circulation and Their Practical Significance." He said, "We must in most cases abandon the idea of cardiac death at the height of acute infectious diseases such as pneumonia, typhoid fever and septic fever. In place of heart failure we must write vasomotor failure." The discussion of this complication of infectious disease in many modern textbooks of medicine offers a discouraging contrast to Dr. Janeway's enlightened attitude.

There is still another mechanism involved in the production of shock through vasodilatation. I refer to the influence of the sympathetic nervous system. Surgeons recognize this influence in the production of primary traumatic shock and it is by this route that the well-known effects of fear and cold are exerted, although the concomitant vasoconstrictor effects via the adrenals make this a complicated physiological problem. In the field of internal medicine, we have come to realize that one of the immediate effects of extensive infarction of the myocardium is a clinical picture of falling blood pressure and collapse, which is identical with shock. It is hard to believe that such a rapidly developing syndrome could result from tissue damage unless it were brought about through a reflex nervous mechanism. Fishberg has made a careful study of this type of shock and his conclusions are of great interest to the cardiologist. He be-

lieves that the development of peripheral vascular failure in cardiac infarction is a fortunate physiologic disturbance because the return flow of blood to the heart is inhibited by the capillary stasis and the contraction in blood volume decreases the burden on the heart. Therapeutic measures to combat such a beneficial complication would naturally be contraindicated. However, other clinicians disagree with this point of view and feel that shock even under these circumstances should be actively treated.

Up to this point I have dwelt upon the occurrence of shock in a variety of clinical conditions, stressing in each instance the mechanism which dominates the picture. In some of these situations shock resulted primarily from a rapid decrease in circulating blood volume, whereas in others the chief factor was vasodilatation. It is only fair to state that this is a diagrammatic visualization of processes which like other biological phenomena are more complex than I have seemed to indicate. For example, even in histamine shock, where the primary disturbance is admittedly due to capillary dilatation, nevertheless capillary dilatation is inevitably accompanied by an increase in the size of the capillary pores which permits large quantities of blood serum to escape into the tissue spaces. Thus the factor of decreased circulating blood volume also plays a part. This effect may naturally be assumed to exist in the case of snake venom and bacterial toxins, or in any other condition in which generalized capillary dilatation is marked.

In diabetic acidosis accompanied by the shock syndrome, I have indicated the importance of dehydration and salt depletion. There are occasional patients in whom the state of shock persists after adequate replacement therapy and after the ketosis has disappeared. Certain experimental evidence suggests that there may be in these cases a factor of capillary poisoning which is responsible for the persistent recurrence of the shock syndrome. Thus it has been shown that a variety of substances which have a chemical similarity to the ketone bodies, such as acetyl acetone and sodium acetate, will produce vasodilatation in animals.

I would like to digress, if it be digression, at this point and introduce briefly the subject of surgical shock. As an internist I am occasionally asked to pass on cardiac competency in relation to a projected operation. I am wholly in agreement with the work done at the Peter Bent Brigham Hospital which showed the surprisingly small effect operations had upon cardiac function. Much of the so-called cardiac and renal failure postoperative is due to shock. We have in this situation many forces leading to dehydration as well as the neurogenic factors producing peripheral vascular paralysis. At the risk of obvious triteness, I would point

out that salt solution is more often needed than digitals. In these cases, as in any others where there is a real problem of differential diagnosis between primary cardiac failure and peripheral circulatory paralysis, observation of the venous pressure is a very helpful aid to discrimination. In shock it is usually within normal limits whereas in a cardiac state severe enough to be confused with shock it is usually elevated. As an exception, I must cite the occasional occurrence of very high venous pressures in pure shock due apparently to constriction of the veins, at least they are greatly contracted wherever visible. This finding is in distinct contrast to the venous distention seen in cardiac failure.

There has been much discussion of the participation of a toxin in the production of the clinical manifestations of intestinal obstruction and indeed substances with histamine-like action have been isolated from damaged loops of gut. To what extent these substances contribute to the total mechanism in producing shock is still problematical. I have pointed out the role of dehydration and salt loss in severe burns but here too it is possible that certain toxic substances are absorbed from the necrosing tissue and may act as capillary poisons. However, one inevitably returns to the fact that the toxins are hypothetical and as yet without therapeutic possibilities, whereas the other factors are well understood and easily treated.

The treatment of shock is more or less independent of its cause. Whether it be due to trauma, toxemia, hemorrhage or dehydration the physiologic problem is the same, namely a disparity between the circulating blood volume and the vascular bed. On one hand there is primarily a decreased blood volume from hemorrhage or fluid loss, on the other, an increased vascular bed resulting from capillary dilatation. The need for immediate measures to increase the circulating blood volume is common to all types.

I think it is reasonable to say that the longer the state of shock is permitted to exist the more difficult it becomes to alleviate it and the higher is the mortality. Consequently delay in initiating therapy is dangerous. As an emergency method the intravenous injection of 50 cc of 50 per cent glucose which may be conveniently kept on hand is of some temporary value, as it will draw fluid into the blood stream from the tissue spaces. Prolonged use of glucose solutions is not only inadequate therapy but actually augments the state of shock by its tendency to cause dehydration. Glucose should be followed promptly by the intravenous injection of 1000 to 2000 cc of normal saline solution. There is among clinicians, a very general belief that the intravenous administration of fluids in large quantities tends to constitute a dangerous

stram on the myocardium. This opinion is derived largely from experiments on animals not in a state of dehydration. Experiments in our clinic by Caughey have shown that a normal man can receive 1500 cc of normal salt intravenously without altering his venous pressure. Dehydrated patients can accept many times this amount with no difficulty. If shock exists and there is no primary cardiac damage the response of the arterial blood pressure may be taken as an indication of therapeutic success. If there be any question as to the cardiac status a venous pressure manometer should be inserted into the infusion apparatus, and a rise in venous pressure used as an index of overload of the venous circulation. As I have just stated above such overload is very rare even when several liters of fluids are necessary for satisfactory replacement.

Although a normal physiological solution of sodium chloride is usually an adequate therapeutic agent, it should be remembered that in many of the conditions that I have enumerated salt depletion is relatively more rapid than fluid loss. Under such circumstances it is wise to use higher concentrations of salt such as 1 to 2 per cent or even 5 per cent, until the restoration of base is complete.

The ideal treatment for advanced shock is a large blood transfusion, and every patient likely to develop shock should have his blood grouped early in the course of his disease. When salt solution has failed, transfusion may turn the tide. The theoretical basis for the fact that blood is more effective than salt solution lies in the assumption that it contains a relatively nondiffusible substance, i.e., serum protein, which makes the influence of added blood a more permanent one. We cannot accept this suggestion without reservation, for it has been clearly proved that in histamine shock whole serum leaves the blood stream. In other words, the capillaries become readily permeable to protein. However there is no denying the greater therapeutic value of blood over all other fluids. In an attempt to find a substitute for blood other colloidal substances have been tried. The most prominent of these is acacia. During the World War, this solution was tried but given up in this country because of the severe reactions which frequently followed its administration. In the past few years, methods of preparation of acacia solutions have been improved, and enthusiastic reports of its action have appeared.

All therapy in severe shock should be intravenous rather than subcutaneous or intramuscular. The rapidity of response is much greater when the intravenous route of administration is employed because the poor peripheral circulation tends to slow subcutaneous absorption tremendously. This applies to hypodermic medication as well as to fluid administration.



The use of vasoconstricting drugs such as adrenalin is not helpful and may, in fact, be harmful. From a physiologic standpoint they are contraindicated because the blood vessels which they affect are already constricted to the disadvantage of the capillary circulation, as has been shown by studies of both the skin and visceral arterioles. Furthermore, experimental work has shown that continuous injection of adrenalin in quantities that are equivalent to the amounts produced by sympathetic stimulation can cause a 14 per cent decrease in blood volume during a two-hour period. Hence adrenalin exaggerates the state of shock, even though it temporarily increases arterial pressure.

In conclusion I would like to express my

pleasure in being offered an opportunity to review this subject before a group interested primarily in cardiac problems, for it is the cardiac consultant who most often has to assume the responsibility for differentiating peripheral circulatory failure and the condition with which it is so commonly confused, viz, cardiac insufficiency. The most satisfactory point of orientation lies in the recognition of the constantly recurring basic physiological pattern, resulting from a disparity between the circulating blood volume and the vascular bed. Although I am aware that much of the ground that I have covered is familiar to you, the lack of emphasis upon this important complication of disease in the most modern textbooks justified, I felt, my making the summary as broad as possible.

## THE ECONOMIC AND SOCIAL ASPECTS OF SOCIALIZED MEDICINE\*

BY IAGO GALDSTON, M.D.†

**T**HE American medical profession is at this time confronted by a social movement which threatens to disrupt the profession's individualist relation to the public. This movement has for its objective the socialization of medicine, and while there is no agreement among its proponents as to the specific form which the socialization of medicine should take, we may assume with certainty that what is contemplated differs radically from the prevailing quid pro quo individual relationship between doctor and patient.

In an objective analysis of the movement for socialized medicine, we must begin by seeking for its origin among social and economic factors. "Why", we must ask, "is there such a strong movement for the socialization of medicine?" The answer in part is, that the movement has arisen in response to needs of an economic and social nature. There is undeniably a great need among our people for additional and more extensive medical services of a curative and prophylactic nature. There is a mountain of testimony available to the effect that this nation suffers much economic loss as well as much misery by the prevalence of preventable and inadequately treated illness.

Together with this realization there is prevalent a strong conviction that by a more effective utilization of the available resources of medical science, the average lifetime could be extended, much illness could be avoided, and much of economic loss saved. This dilemmatic situation raises the pertinent question "Why

does not more of our citizenry receive adequate medical care?"

Among the many answers given to this query, the outstanding one is, that present-day medical service is too costly. "Too costly" may have one of two meanings, either that the return received for the expenditure is of too small a value, or else that the commodity is beyond the means of the potential purchaser.

It is in this second meaning that medicine is complained of as being too costly. The average American family cannot afford to purchase for itself adequate medical care. Pushing our inquiry farther, we may ask "Why cannot the average American family afford to purchase adequate medical care?" The answer to this query is to be found in the records of the distribution of our national wealth and in the distribution of our national income. According to W. I. King\*, sixty-five per cent of the people in the United States own but fifteen per cent of the wealth of the country, the maximum average wealth in this group being less than \$3,500. The remaining thirty-five per cent of the people comprising the middle and rich classes own eighty-five per cent of the national wealth, and in this group two per cent of the people own forty per cent of the total wealth of the country.

Perhaps even more significant, from our viewpoint, is the distribution of our national annual income. According to the National Bureau of Economic Research†, 66.7 per cent of our income-receiving individuals have an annual income of between \$500 and \$1,500. An additional 13.9 per cent have annual incomes ranging between \$1,500 and \$2,000. In other

\*The views expressed herein are those of the author alone and do not in any way represent those of any institution with which he is or has been connected.

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\*Wealth Distribution in Continental United States W. I. King *Journal of American Statistical Association*, June 1927

†Income in the United States National Bureau of Economic Research pp 136-7

words, 88.8 per cent of the people receive but 58.7 per cent of the total income. In contrast we find six per cent of our people receiving roughly forty per cent of the annual national income.

These figures reveal why adequate medical care is too costly for the vast majority of people. These figures reveal also, though they do not tell the entire story, why there is so much preventable illness and avoidable loss of life. These figures explain why, despite the wealth of available medical knowledge and the richness of our scientific resources, so many of our people are without their benefits.

We are thus brought to the realization that the movement for the socialization of medicine arises out of the complexities and imbalances of the prevailing economic system.

Fundamentally, too, we must realize that the socialization of medicine is an attempt to secure adequate medical service for the average man and his family without going through any radical change in the distribution of national income. The only way in which this might be accomplished is by compelling the physician to render more service for proportionately less remuneration. This must be plainly evident to anyone who seriously contemplates the problem. As long as the average income of the average family remains what it is today, only a small portion of that income will be available for the purchase of medical service. No matter how this portion is collected, whether by a system of voluntary taxation, by insurance or by any other method, it will still remain a small per unit volume. By the expenditure of this collective sum only so much medical service is secured today, and by common agreement, this amount of medical service is insufficient. If more medical service is to be secured for our people for the same collective sum this can be accomplished only by lowering the price of medical service.

The problem which the medical profession faces today and which society as a whole faces with regard to medicine, is part and parcel of the larger economic and social problem which enmeshes all of mankind. Its origin is identical with that of the economic disorganization which has imposed a pall of depression upon the entire civilized world. There is little hope that any effective solution of the medical problem will be achieved until the underlying economic factors are set aright. Nor for that matter of fact, is there any hope that we may effectively escape the periodic disruption of our economic existence until a basic readjustment in the distribution of the wealth produced is accomplished.

However, as a profession we are rooted in individualism, but it is an individualism with a large social consciousness. What other communal group can match us in our free gifts

to society, of our toil, of our thought and of our genius? Where other men have exacted the utmost of their so-called due, for their discoveries, their inventions and their contributions, our ethics and traditions have taught us to make freely available to all mankind all of our finds. James Watt patented his steam engine in the same age that Jenner discovered smallpox vaccination. Edison invented and patented the incandescent lamp about the time that Von Behring discovered diphtheria antitoxin. Banting gave the world insulin in the same decade that the DeForest valve made the radio one of the major modern industries. Let history judge which were the greater gifts to mankind, and let it bear witness to the enlightened individualism of the medical man.

We have made a necessity out of a virtue. Charity is not a sabbatical practice with our profession, but our everyday performance, so ingrained in our relations to our fellow men that they largely demand it now as their due.

There is more to this problem than appears on the surface. Thus, it is not pertinent to inquire why do our people require so much medical care? We who are physicians know the effects of economic status upon physical well being. Health is affected by food, clothing, shelter, work, leisure, education and recreation. Is it not possible that the reason why our people require so much medical attention is not because they cannot afford adequate medical service, but rather because they cannot afford adequate food, clothing and shelter, because some are worked too long and too severely, while others are left to disintegrate in idleness because their education is inadequate and too poor, etc.?

It is pertinent to observe that when a man is sick, he has the powerful *vis medicatrix naturae* fending for him. He may get well without the aid of his doctor, sometimes even despite his doctor. But who fends for man in want of food in want of shelter in want of clothing?

Germany has had socialized medicine for fifty years, but the average expectation of life at birth in Germany is about ten years less than in our own country.\* Evidently the socialization of medicine works no miracles.

Hence we come to a point in our consideration where we acknowledge the need for improvement in the medical care of our people, but reject the proposal to socialize, that is, to industrialize medicine, because it offers no promise to remedy the existing defect, because it would involve the disorganization of the profession of medicine, with the loss of so much that is best in it.

When the proponents of socialized medicine tire of harping on the alleged high costs of present-day medical care, they turn historians.

With a majestic sweep, they encompass the story of the ages and they distill the "unquestionable lesson from history" They give utterance to such generalizations as "Everywhere and always, the physician has been a product of his times, and the conditions under which he has practiced have invariably reflected the customs of the period"

The crux of the entire matter appears best expressed in the epitomic statement uttered by those favoring the socialization of medicine as if it were axiomatic, to the effect that "The physician's position in society is never determined by the physician himself but by the society he is serving"

This pseudo-historical dictum needs careful scrutiny To begin with, the question might be asked In society what professional group ever succeeds in determining outright and without opposition its own status in the communal economy? Further, the protagonists of socialized medicine use the term society in an animistic sense, as if society were a corporate thing, possessed of a unique intelligence which understands clearly the relationship of the different groups incorporated within it and is capable of assigning to each its proper rôle and position This animistic concept of society is medieval in character and was discarded more than eighty years ago *The position of medicine in this given society will be determined by whatever pressure those groups can bring to bear upon medicine in whose interest it is to purchase the services of the medical profession at the cheapest and the lowest possible rate and also by the amount of resistance that will be shown by the medical profession to such exploitation*

But disposing of this pseudo-dictum is not enough for our purpose We must pursue the subject farther There was for those that propounded it an end which the dictum served Let us follow to that end The almost syllogistic reasoning ran somewhat as follows "Medicine never determines its position in society, on the contrary, society does that for medicine Our society is determined to socialize medicine, hence, it is foolish for medicine to oppose the inevitable" In the words of Sigerist, "We can oppose the development, we can retard it, but we will be unable to stop it", or, as it is paraphrased by others, "In any final sense, the economic and professional needs of modern medicine call for group payment by the public, group practice by the profession and a conjunction of the two"

We must ask here Who is it that defines the "final sense" and who is it that determines the economic and social needs of modern medicine? Since there is no corporate state no articulate society, who is it that has been pretending to the rôle?

Undeniably the social trend is toward socialization But "trends" have no transcending warrant to exempt them from critical scrutiny Trends can be wrong, too

In this connection it is interesting to note that every age has its shibboleth, has its linguistic gilded calf to which the deluded bow and pay homage The shibboleth of our age is socialism and socialization So powerful and so narcotizing is this term, that even the most arrogant of dictators make use of it Fascism in Italy justifies itself in the name of socialization and Nazism in Germany even goes so far as to call itself National Socialism

And in truth, the word social has a fatal enchantment, for to the unthinking, whosoever is against socialization appears per force, to be for greedy and thoughtless selfishness Few constitute the opposite of socialization to be individualization Nor is it commonly recognized that one may be for the socialization of certain phases and functions of human existence and endeavor, and yet be for unconditional individualization in other respects Total and unconditional reactions are usually associated with juvenility and inexperience Few love or hate so completely as the child or childish adult, and in the widespread embrace of the idea of socialization which, like the conversion manias that swept through Europe in the early centuries, have now involved so many of our vocal thinkers, there is more hysteria than religion, more quest for refuge from perplexity than understanding Because individualism and laissez-faire have brought in their train so much suffering, therefore let us destroy individualism, let us socialize! All of mankind's history has been like the swing of the pendulum, a progression from extreme to extreme, and never has the golden mean of the Greek philosophers guided us in our affairs No man can be insensible to the sufferings for which modern capitalist society is responsible, no man can be so blind as not to see the greatness achieved by the free and unfettered enterprise of the individual entrepreneurs Now, as in all times, in Athens, in Republican Rome, in the free cities of Italy, the greatest ages have been those of individual freedom

Let me not be understood as being opposed to social endeavors, not even to much of that which is properly called socialism Many phases of human existence can best be served by social endeavor Our own profession, that of medicine, though practiced by individuals and in an individualistic manner, is in its studies, in its research, in the inter-relationship of practitioner to practitioner, and the total relationship of the profession to the people, a most highly social profession My protest against the shibboleth of socialization is that it is offered

as a panacea, as an ultimate and final cure all, as an unfailling remedy. Of course it cannot be and is none of these.

The proponents of the socialization of medicine have no adequate understanding of the psychologic nature of man. Their reasoning follows the guidance of a naive materialism. Because the chain belt system of mass production has given us cheap and effective automobiles and radios, sewing machines, farm tools and mail order house products, therefore, they reason, a similar system of mass production and distribution can be as effectively applied to medicine. But they count without the nature of the beast. Man is a gregarious animal. On the least impulse he will flock with his fellow kind. He loves the group and feels strong in the company of his own. But for that very reason he is as strongly in need of periodic affirmations of his singularity of his uniqueness of his individuality. Man can toil in common but save for the ceremonial banquet he prefers to eat alone, or with those very few who are near to him. Man can, to an appreciable degree, sink his ego in the complex organism of the factory, shop, office or community, but only at his peril can he afford to abdicate his birthright of individuality as a lover, father or elder. *One might with warrant generalize that man is a social communal animal as a producer, but an individualist as a consumer.* And in relation to the physician, the patient is ever a consumer.

There is in this struggle between those who urge the socialization of medicine and those who oppose it a deeper cleavage than appears from even a careful pursuit of their arguments.

To me it seems that in this difference between the two groups, there is reflected two fundamentally divergent philosophies, as far apart as those two that motivated Athens and Sparta. It is not merely a question of the socialization of medicine but more it is a question as to which of two lines of pursuit offers economic and social salvation.

Shall it be the state, the patriarchal institution upon whose lap we shall lay the full destinies of the individual, to whom we will look for the regulation of our living manner and the provision of our multiform needs, or shall it be the individual, grown to the stature of a civilized and social being who will as a sovereign carve his own destinies, in the company of with the help of, but at the cost of none of his fellow men?

In other words, shall men rule themselves in all respects of life and be truly democratic or must we turn back to dictatorships?

There is, in the practice of medicine a saving grace which as in the case of the isolated tiller of the soil defends the practitioner against becoming brutified. That grace in both instances is intimate contact with life. The farmer is an

intimate witness of life in the things that grow about him, the physician in the human beings that claim his help. The rest of the world deals with things with goods and money, with machines and figures and books. These two, the physician and the farmer, shall we say, see life in the raw."

It is perhaps for this reason that both agriculturists and physicians are conservative. They hold to their values and are not easily persuaded to exchange them for new script. So even without a knowledge of the lessons taught by history, the physician is an individualist and a democrat, and the profession is well represented among those who fought for the rights of the individual from Servetus to the medical signatory of our Declaration of Independence.

The issue of democracy has been raised once again, and there are some who, like the benighted Athenians, are issuing a call to Philip. The medical profession in its small segment of this matter and in a stammer indeed, is sounding the Philippic warnings of Demosthenes. We distrust the tyrant, even when he comes garbed in the cloak of socialization. We claim for ourselves and for mankind the birthright of suffrage. We say the other way the way of the Caesars leads to Caligula and Nero to the dominance of the barbarians, to the yoke of the Roman Empire. We remember how man kind fought for the Magna Charta, for the Reformation, against the Louis of France and the Georges of England. Our faith then is like that of Pericles with the Demos. This Demos our philanthropist, however, does not understand, nor does he love it truly.\* How simple is his reasoning! Cavalierly he lumps together all social insurance schemes: unemployment, old age disability and sickness, never thinking that the first three are merely matters of compulsory savings, while sickness insurance involves the uprooting of an entire profession and a shifting of the stream bed of motivation that has for so long been fixed between patient and physician. Furthermore it means bureaucracy, that cankerous parasite that always comes into being when human relations become indirect, complicated, and achievable only through intermediaries. *What is there in our history, in our experience that warrants faith in the successful socialization of medicine?* We are a nation of people honest as individuals and often cynically corrupt in the mass. Our history is taught badly or else we would better appreciate the venality of our collective people, for this is the land of graft, collusion and dishonesty. How short is our memory! Carpet baggers, poisoned beef for our Spanish American War soldiers, Tweed Teapot Dome, the banks' navy. Gustavus Meyer's history of great American fortunes the autobiography of John Steffens, and Beard's American History,

should dissuade everyone from faith in the governmental, mass or mob. To this, add our own experiences with workmen's compensation and with communal and government hospitals and the picture is complete.

Lest I be charged with misanthropy, let me hasten to add that no man is to blame who fails, when what is required of him is beyond all limits of his capacity to achieve. Man can love his kin, respect his neighbor and share in the suffrage of his town. Beyond these only the exceptional man can reach. For this reason the Government's post office pen is no one's pen and tax money is a common source of political patronage.

Despite this, there is no doubt but that the agitation for socialization is very intensive. An indication of the economic and social confusion that prevails is to be witnessed in the fact that the socialization of medicine is sponsored by two diametrically opposed economic groups. Socialized medicine is endorsed by the revolutionary groups, and it is sponsored as well by the reactionary groups. The one sees in the socialization of medicine the cutting wedge of their longed-for cooperative commonwealth. The stand-patters see in the socialization of medicine a prop for the present economic system. History, I suspect, will prove both in error.

At this point it is important that we turn the limelight of criticism upon ourselves. Because we are so bitter in our criticism of the proposed schemes for the socialization of medicine, let it not be construed, therefore, that we are without fault.

The medical profession has unquestionably shared in the predatory ideology and practices of present-day society. We may talk of the nobility of our profession and may cite, as I have, numerous individual examples of professional generosity and unselfishness. In fact, it can be argued that few professions have so many such illustrious examples in their membership as does medicine. But the public judges us, and rightly so, not by our illustrious examples, but by common denominators, and these have been confessedly none too good, at least when measured by our pretenses and by our numerous privileges, which impose exceptional obligations upon us. This has been as true of the upper group as of the lower.

Need I at this time remind you that medical education for the undergraduate was until some thirty years ago largely a commercial endeavor, carried on for the profit of the entrepreneurs? Need I point out to you that the solid-

ity and unity of medicine, culturally and otherwise, is disrupted by the existence of numerous small cliques, exclusive societies and the like? We may indulge in the orator's exaggeration and speak of our noble healing cult and of our oath of Hippocrates, and yet, a minority of fortunate physicians have for many years held on to their hospital, dispensary and other positions, concerning themselves but little with the very large number of physicians who are without such opportunities for continued study and training.

It is well to talk of spiritual enslavement and of the submergence of the individual ego, but when one is economically enslaved, when one does not know how to make ends meet, one's so-called birthright appears like a small price to pay for a mess of pottage wherewith to dull the gnawing pains of hunger. Undeniably, even among our own ranks there are many physicians who would be eager to accept the socialization of medicine precisely because therein is the promise of more than they can get out of the "dog-eat-dog" society of today. This circumstance is very unfortunate. One cannot and one must not shut one's eyes to the suffering and deprivation which is about us. We, however, who are physicians, must not "jump at" a remedy which threatens to be worse than the disease.

Whether the agitation for the socialization of medicine will prevail I am unable to say. My guess, which is no better than the next man's, is that the cards are stacked against us. However, be that as it may, if I read history aright, there is a "triumph of the defeated" no less great than the triumph of the triumphant. The effectiveness of opposition is a chapter in history which few appreciate, and the virtue of opposition as a social instrument I recommend for consideration. The Greeks were defeated by the Romans, but the satires of the later-day Roman poets (Juvenal) reveal that the Greek, rather than the Roman, prevailed. Rome was overrun by hordes of barbarians, but the invaders were Romanized. Christianity triumphed over paganism, but some of our customs are witnesses of the triumph of paganism in its defeat.

Our opposition to the socialization of medicine must therefore be persistent. We are bound to triumph even if we are defeated. Our opposition, however, must be discriminatory rather than total, and it is our eternal obligation to deflate the pomposities of the promoters of pet schemes to show up their shallow thinking and their ignorance, even as I hope I've been able to do.

MEMORIES OF A GREAT PHYSICIAN,  
DR. FREDERICK C. SHATTUCK, OF BOSTON

BY JOHN D. HAWES, 2ND, M.D.\*

"HALF life is memory, the other half an anticipation", says Yeats-Brown. Having reached an age when the years crowded with memories far exceed those I may rightfully anticipate, I am hereby jotting down certain very precious recollections of my early medical life and especially those years when it was my privilege to be the assistant to the late Dr. Frederick C. Shattuck of Boston. Dr. Shattuck, then at the height of his career, was professor of clinical medicine at the Harvard Medical School and chief of the Medical Staff at the Massachusetts General Hospital. He was a "doctor of the old school" as was the original of that name so vividly described by Ian MacLaren and who for forty long years gave loving care to the dwellers in Glen Drumtochty. Like him, Dr. Shattuck practiced medicine as an art, making a room brighter by his presence and trials and tragedies easier to bear for those who must bear them. The incidents I am about to describe took place during my first twenty years of practice when I as a young practitioner in Boston, was intimately associated with him first as student and later as his assistant.

Dr. Shattuck was a picturesque figure, handsome and what one might call debonaire. His face, always attractive, lit up on smiling so that it radiated cheer. Strikingly dressed in his waistcoats, invariably of some brilliant plaid have gone down in song and story. A flower in his buttonhole and a cigarette that hung in some miraculous fashion from the corner of his mouth completed a picture that one always looked upon with pleasure.

It was a morning in October just thirty years ago when the shininess of a new brass shingle outside the door of my office on Marlborough Street had had no chance to become dimmed that I was called to the phone and heard Dr. Shattuck's gentle voice asking me to drop down to see him for a minute. Much impressed and filled with curiosity I started out walking—we had no automobiles in those days and I did not consider my bicycle sufficiently dignified for the purpose. His office was small but like the man, sunny, warm and cheerful with a fire burning on the hearth as it always did for at least nine months of the year regardless of weather. He was sitting in his well worn leather armchair smoking as usual. "Come in", he said. "Sit down and be comfortable." I wondered what was coming next. "Hawes", with that quizzical smile I came to know so well, "I'm get-

ting very old and Smith (referring to his then assistant) is getting very busy. I wonder would you be willing to assist me in some of my work?"

Would I be willing to assist Dr. Shattuck? There was no more enviable position in Boston for a young medical man than this and right well I knew it. I do not remember leaving his office but I do recall walking up Marlborough Street on air. It was a wonder that I was not pulled in by the police! Then followed many years of hard but intensely interesting work. The practice of medicine in Boston and the life of the young physician at that time was a very different thing from what it is now. I remember very distinctly consulting two men whom I looked upon as representing all that is finest in medicine as to what I should do and where I should open my office. Each gave me the same advice. "John", they said, "You must be on the staff of the Massachusetts General Hospital and have an office on either Marlborough or Beacon Street. These are the first requirements of a gentleman who wishes to practice medicine in Boston." How often have I thought of their advice with some amusement and yet with much respect. Incidentally, I followed their suggestions!

Getting started on a medical career in Boston was no easy matter for a young doctor with no money. Saturday afternoons, Sundays and holidays were religiously spent at the office hoping for a telephone call or that some medical crumb would fall from the plate of those older and well established physicians whose names and reputations meant so much to us. How clearly incidents of those days stand out in my mind! A beautiful Saturday afternoon in my office to which the sun never penetrated, longing for the golf links or for a row on the Charles, I was reading with some difficulty a German medical magazine when the telephone rang and I heard Dr. Shattuck's voice "Hawes, do you care to make a three-dollar visit in South Boston?" How glad I was to break away from improving my mind! On my faithful bicycle with my doctor's bag hanging on the handlebars across the city I went to earn and well earn my precious three dollars. One of my very first patients was a charming young girl who thought she had something wrong with her chest. Being a thorough and conscientious young man I told her to strip to the waist so that I could examine her and then modestly left the room. A few minutes later I returned to find that she had misunderstood my directions

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and had removed her clothing from the waist down! Blushes on the part of each of us

Again one beautiful Sunday morning I was walking down Beacon Street with an older physician, a splendid Irishman, loved by all of us and with a very large practice in the city. As we strolled along I was deeply impressed by the number of people and particularly the pretty girls to whom he doffed his hat and bowed "My word, Doctor", said I, "What a wonderful practice you must have and what a group of lovely girls you are acquainted with?" "Hush, my boy," was his reply with a wonderful Irish twinkle in his eye "Johnny, my lad, I don't know a one of them but don't you think a pretty face deserves a bow?" Joyous memories!

Another time a classmate and dear friend of mine who lost his life in Flanders—Dr George P Howe—was taking his daily exercise in a wherry on the Charles River. This was before the Esplanade was built and a dam controlled the tides so that rowing at low tide was a bit precarious and one had to watch the channel pretty carefully or else pay the penalty. My friend for some reason always known as "Peter" nearsighted to a great degree, had strayed from the straight and narrow path and found himself stranded on the mud flats where he had to get out and walk. The shells cut his feet and he was in anything but a good humor when a short way off a fellow oarsmen resting in deeper water called out and asked if he could help. To which Peter very logically but not tactfully replied "I don't see what in hell you can do anyway". He was embarrassed and chagrined when he drew nearer and found out that his would-be Good Samaritan was one of his professors and instructors at the Medical School—Dr Elbridge Cutler.

Dr Cutler was a splendid example of the general practitioner of those times. Once he left his practice in my care while he attended a certain medical meeting. It was June so that most of his patients had moved out of town to their summer homes at the North or the South Shore. "Dr Hawes", said he, "I am leaving five or six patients in your care. They are all well along in years and I hope that you will make no radical changes in the treatment I have laid out for them. You see, all that I am doing is to escort them pleasantly to the grave." This remark made a deep impression on me for I was young and believed in a somewhat militant and aggressive form of medicine. As I grew older I realize that more and more the task of us doctors in many cases is to escort our patients as pleasantly as possible to the grave. And I certainly made no changes in those that Dr Cutler left under my care.

Always a gregarious fellowship we young

doctors were wont to foregather at mealtimes, there to forget for the time the dullness and trials of a medical existence. For a good many years there had been at 89 Charles Street a favorite eating place known as the P O T Club which meant "Pay or Travel". One of us, I for one year, well earned the dollar a week deducted from our board by collecting it from the others. We learned from experience how to carve efficiently if not elegantly. Comments on any false move or failure to find the joint were loud and much to the point while vociferous demands for second helpings before the unlucky one elected to preside over the roast had had a chance to help himself stimulated speed and accuracy. A bowl containing marbles marked from one to twenty-five was passed around as a regular ceremony before dinner, each man drawing a marble. If he drew a low number his beer cost him, accordingly while loud indeed were the lamentations of those getting the high numbers. The drawings completed and the money collected, one of us, usually my husky friend, Peter, went around to the corner grocer and returned with the case of beer. Such eating clubs came and went but each left behind delightful memories.

But it was with Dr Shattuck that most of my work was centered and it is of him that my memories are clearest and most cherished. At that time he was constantly being called in consultation to see patients all over New England while in addition during his term of service he made daily visits at the hospital and conducted clinics twice a week for third- and fourth-year medical students. These it was my job to plan and arrange for. There was an immense amount of laboratory work including specimens of all kinds to be examined, reported on and mailed each night before going to bed. Many evenings, tired out from a hard day's work or an equally strenuous party—for doctors do relax at times, I came home only to find a half-dozen boxes and bottles awaiting me which meant weary hours in the laboratory, painfully slow typing, sometimes half asleep, until finally the clank of a letter-box cover told me that I might go to bed. It was hard but interesting work.

The clinics I rejoiced in. Out of his vast experience there was always some new diagnostic point or valuable therapeutic procedure to be gleaned. On these mornings, Henry, Dr Shattuck's coachman and later chauffeur, a familiar figure to all of us in the Back Bay, would drive the victoria and two sleek bays to my door and for the short distance to the doctor's office (and I always wished it were longer) I was quite the King, leaning back nonchalantly in the middle of the seat with a priceless sable robe thrown carelessly over my knees, hoping that some of my friends would see me.

I well remember one day when on reaching the hospital Dr Shattuck said to me, "Hawes, go to the Drug Department and bring me a five-grain capsule of quinine I have a cold." Thus I did and having done so ventured to ask why he took the quinine and what he thought it would do for his cold. I had imagined that the days of quinine, except for malaria, were past. An amused look came over his face as he replied, "I haven't the slightest idea what quinine will do for my cold but I know damn well it will make me more comfortable!" There was much sound common sense in what he said particularly in those days of therapeutic nihilism.

Dr Shattuck was eminently an honest man not only in his medicine but in every other way. He hated subterfuge and short cuts; he was firm in his belief that no special tests or signs could take the place of good thorough work that covered every detail followed by a serious consideration of all the facts in the case. In this way alone was it possible to arrive at a correct diagnosis. John Buchan expressed his feelings very well when one of his characters said, "The peril is that men may be tempted to seek short cuts and the good God does not permit of short cuts in this life of ours." At one clinic the subject of exophthalmic goitre, now called hyperthyroidism, was under discussion. Now in every medical school class there are always at least one or two so-called "bright boys." They occupy front seats listen intently and appear to be and perhaps are deeply interested. They are always ready with some question they believe to be pertinent and resemble the Bandarlog in the Jungle Stories in their desire to attract attention. They constitute a harmless but not a particularly admirable group. This is common knowledge to any doctor. On this occasion while the salient diagnostic points of the case were being demonstrated one of these students leaned forward and asked, "Dr Shattuck is not 'exophthalmos' a pathognomonic sign of this condition?" This was rather in the nature of a red rag to a bull. I waited breathlessly for his answer. Looking at him pityingly, Dr Shattuck replied "Young man Christ said 'An evil and adulterous generation seeketh after a sign and there shall no sign be given to it'." The student collapsed and was heard from no more.

Dr Shattuck believed in speaking the truth but not so as to hurt the patient if it were humanly possible to avoid so doing as shown by the following incident which likewise shows why he was so loved by all who came in contact with him. This occurred when I, as his senior house officer was escorting him through the hospital on his daily visit. On entering one of the wards he pointed to a very pale and evidently extremely sick woman in a nearby bed and asked "Hawes what is the matter with

that patient?" Now the position of senior house officer is a very exalted one and the individual occupying it takes great pride in any rare or unusual case that he is able to demonstrate to his chief. He has not yet learned his lesson. Accordingly, I replied, loud enough for all to hear, "That, sir, is a case of pernicious anemia." A pained look came across his face. "Come here," and he led me across the ward out of hearing. "Primary anemia, please, Hawes, 'pernicious' has a horrid sound to the patient!" I have never forgotten that incident and then and there resolved that for the rest of my life I would deal with human beings and not with "cases" no matter how interesting they might be.

Another time I accompanied him to one of the surgical wards where his opinion was requested concerning a man who had been doing very badly after his operation. He read the history, studied the chart and very briefly looked at the patient who was evidently dying. Every effort in the way of injections of salt solution under the skin and other equally painful procedures as was customary in those days was being made to help him although the case must have been hopeless from the start. I handed him the consultation slip and again looking gravely at the sick man he wrote briefly on it and gave it back to me. "I should put no obstacle in the way of his peaceful departure," is what I read.

Dr Shattuck was always intensely interested in the health and welfare of those associated or working with him. Various times and indeed once in my own case he prescribed vacations for his house officers when even to think of such a thing was the rankest kind of heresy. Rules and regulations were all very well but they held no fear for him and at times were meant to be broken. One of the important duties of an assistant such as I, was to "camp" on certain very sick patients who could afford it and for whom it was felt that the constant attendance of a young doctor on the case in addition to the nurse might be helpful. For three or four days I had been on duty at the bedside of a very prominent man, an intimate and dear friend of my chief who was dying of pneumonia. It had been a constant but a losing battle trying in vain, by subcutaneous doses of morphia, digitalis or strychnia to carry him past the crisis. I had thrown myself into this case most intensely and had just about reached the breaking point myself when Dr Shattuck entered the room carrying a bundle done up in a newspaper. Looking at the patient and then at me, he beckoned toward the bathroom, a favorite consultation place for all doctors. Closing the door softly, he carefully unwrapped his package. "This Hawes is a bottle of Pol Roger, a favorite brand of your patient here. I think it will do him good."



Lovingly he undid the wire, uncorked the bottle and without saying a word took the bathroom glass, filled it to the brim with the champagne and handed it to me "Drink that," he said. Decidedly taken aback I murmured, "No, thank you, sir, not while I'm on duty here." At once he replied, "Hawes, you're working for me and I'm paying your salary. You'll be of no use to me if you break down. Do as I say." And I did. Other camping incidents had their lighter side especially when the patient got well. Once I spent five days and nights in the cellar of a famous Boston banking concern where one of the firm had been taken suddenly sick and could not be moved. In wandering around at night, for there was not much to do, I found a cupboard containing a set of massive silver-mounted hair brushes for each partner with the owner's name engraved—and very awe-inspiring names they were! I amused myself each morning using in turn the brushes of this or that well-known financier until finally my patient was taken home through an opening they made in the wall so that he could be carried out on the level! I learned a great deal about high finance while on duty on this case. Again, late one night when in evening clothes at a party of my own, Dr Shattuck sent me to a club in Boston where a Christmas celebration was being held at which a certain very delightful but somewhat frail old gentleman had collapsed, the cause of which I saw no reason to inquire. A holiday play was being given by the members and directly back of the stage was the bedroom where I found my patient sound asleep. There was high festival held that night with song and laughter accompanied by the popping of what seemed to me innumerable corks, all of which grew louder and louder, finally reaching a magnificent climax with voices not quite so clear and songs less steady, after which gradually the noise died down, leaving only a clatter of dishes as waiters cleared away and then silence. I had been very envious of those who had been having such a good time in front and quite bored with my somnolent patient and was glad when morning came when I took him to his home, both of us still in evening clothes.

Another time Dr Shattuck gave me the somewhat unenviable job of taking a well-known citizen with marked suicidal tendencies by train to a certain institution an hour's ride or so away from Boston. The parlor-car seats were all taken so we sat down together in a crowded day coach. I did not enjoy the trip. Once he tried to escape from me and to jump off the train and again in a very loud whisper he asked me, "Dr Hawes, do you really think I'm going insane?" At this a nice old lady seated directly in front of us got up hastily and scuttled into another car. I was quite relieved when I finally deposited him at the door of the

institution to which he was going. Not a pleasant task but good training.

Dr Shattuck's clinics and lectures were a delight to listen to. For the latest advances in science and the laboratory side of whatever subject he took up he depended on his assistant but the clinical aspect of the case was presented as none but a master could do it, based on years of thorough and thoughtful observation at the bedside of sick patients. A week or so before a given clinic on heart disease, for instance, the telephone would ring and I would hear his distinctive voice saying, "Hawes, I'm talking to the fourth year men on hearts next week. Look up all the latest work on the subject and let me have it, will you?" And up to the Medical Library I would go and wade through all the latest literature on the subject in English, French, German and sometimes Italian until I had collected for him what I knew he needed. Then it all had to be boiled down, typed out and handed in to him. When the time for the clinic came he would use this material as he saw fit but would invariably make it subservient to the clinical and human side of the problem. The comfort of the patient, whether sitting up in a wheel chair or lying in bed, was always his first consideration. No patient ever went back to the ward utterly exhausted and tired out as I have seen happen various times at clinics elsewhere. There was no perfunctory dealing with cold scientific facts. Always in his teaching he dealt with human beings who happened to have this or that disease and never with cases.

After the clinic came the hospital visit which was quite a ceremonial affair. Three or four house officers, senior, junior, "pup" and sometimes the externe, the head nurse, often some visiting physicians and always his assistant accompanied the doctor on his rounds, and—I nearly forgot—most important of all, there was Hans, a very elongated and rather pink dachshund, whom the patients loved to see. Always in some way or other, Dr Shattuck cheered up the ward when he entered it. There was a greeting for every patient and a fund of stories that seemed to fit each case, some proper and some not quite so but always very much to the point. Many times I have watched him regarding with great amusement the mounting blush on the nurse's face as he told one of his stories which was a bit off color, and likewise the smile that lit up the patient's face.

House officers came and went but year after year these visits of Dr Shattuck's continued and left an indelible impression on those of us who were lucky enough to be on his service. One of my cherished memories of this man happened late in his life shortly after I had moved into a little house in Brookline not far from Dr Shattuck's own home where he lived after he

had retired from active practice. A wonderful basket of peaches from his own trees was left at my door with a note, "I don't believe that your own trees have had a chance to grow yet so I am sending you some of my own." A little thing but characteristic of the man.

The science of medicine has made wonderful strides forward since the days of those men for whom I worked and knew so well, but the art of medicine which came from the heart as well as the brain as practiced by those men is rare if ever, equalled today.

COMPARISON OF DISEASE INCIDENCE IN CONNECTICUT WITH 1934  
AND SEVEN YEAR AVERAGE

MONTH ENDING OCTOBER 12 1935

Diseases	1935				Average cases reported for week corresponding to Oct. 12 for past seven years	1934			
	Week ending Sept. 21	Week ending Sept. 28	Week ending Oct. 5	Week ending Oct. 12		Week ending Sept. 22	Week ending Sept. 29	Week ending Oct. 6	Week ending Oct. 13
Amebiasis	—	—	—	—	—	1	—	1	—
Chicken Pox	9	15	16	16	23	14	30	43	22
Conjunctivitis Infectious	1	—	1	—	—	1	—	—	—
Diphtheria	2	3	5	7	8	3	—	—	2
Dysentery Bacillary	18	20	3	2	—	2	5	2	1
Encephalitis Epidemic	—	—	—	—	—	—	—	—	1
German Measles	—	2	5	7	2	—	5	3	1
Influenza	—	8	1	2	6	3	1	2	1
Malaria	1	—	1	—	—	—	—	—	—
Measles	9	9	31	37	12	9	17	17	18
Meningococcus Meningitis	—	—	—	1	—	—	1	—	1
Mumps	2	7	16	11	12	4	9	15	9
Paratyphoid Fever	1	2	—	—	—	—	1	—	—
Pneumonia (Broncho)	7	11	3	3	12	8	14	12	9
Pneumonia (Lobar)	8	9	11	8	17	10	7	10	8
Poliomyelitis	33	33	22	18	9	—	1	—	—
Scarlet Fever	37	13	27	24	22	8	9	11	16
Streptococcus Sore Throat	1	1	—	1	1	—	1	1	—
Tetanus	—	—	1	—	—	—	1	1	—
Trichinosis	—	—	—	—	—	—	—	—	1
Tuberculosis (Pul.)	26	21	40	19	21	27	35	34	14
Tuberculosis (O. F.)	2	2	1	—	1	—	2	1	2
Typhoid Fever	6	5	2	1	4	3	1	—	—
Undulant Fever	1	1	1	1	—	—	3	3	—
Whooping Cough	26	23	26	16	31	34	32	53	34
Gonorrhea	35	28	59	24	30	63	43	30	68
Syphilis	55	39	70	39	38	26	48	45	44

Remarks: No cases of Asiatic cholera, glanders, plague or yellow fever during the past seven years.

# CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C CABOT, M.D

TRACY B MALLORY, M.D., *Editor*

CASE 21441

## PRESENTATION OF CASE

A ten months old baby girl was admitted because she had passed a bloody stool two weeks previously

The patient was born at full term. There were no convulsions or any other postnatal disturbances. The child was breast fed for two months and since then had been on an adequate diet. She had received cod liver oil and orange juice every day since the second month, and cereals and puréed vegetables since the sixth month.

Approximately two weeks before entry the patient passed a large dark red stool. Tarry stools were passed that day and the following day, but the feces were not increased in amount. Following this incident she became irritable, weak and appeared to lose her appetite. She became quite pale. There was no history of vomiting, diarrhea, foreign body ingestion or jaundice.

Physical examination showed a well-developed and nourished, extremely pale infant who was quiet and observant. The skin had a slight icteric tint. There were no purpuric spots seen on the skin or mucous membranes. There were no hemangiomas apparent. The mucous membranes were very pale. The lungs were negative. The heart was not enlarged, the sounds were strong and there was a loud blowing systolic murmur over the entire precordium. The abdomen was soft. The liver edge could be felt just below the costal margin. The spleen was palpable but not very large.

The temperature was 100.8°, the pulse 160. The respirations were 34.

Examination of the urine was negative. The blood showed a red cell count of 1,760,000, with a hemoglobin of 30 per cent. The white cell count was 14,950. A smear showed achromia and variation in the size and shape of the red blood cells. The bleeding time was normal. The clotting time by capillary tube method was normal. Six stool examinations showed strongly positive guaiac tests. The stools were fairly well formed and brownish in color. There was

little or no mucus present. No amebae could be found.

On the evening of admission she was given a transfusion of 150 cubic centimeters of citrated blood following which she showed marked improvement in spite of a mild transfusion reaction. Iron ammonium citrate 25 per cent, two drams twice a day, was given. On the third day she had a large formed stool, the center was gray and was surrounded by reddish black material. For the next two days the stools were tarry. Iron by mouth had been discontinued. Proctoscopic examination was negative. She was given another blood transfusion on the fourth day after her second hemorrhage. Her red blood cell count on the sixth day was 4,100,000, with a hemoglobin of 52 per cent. The white cell count was 29,500. The child at no time seemed to have acute pain. At times she seemed to be suffering from mild abdominal discomfort, to judge from her irritability and crying. She did not vomit while in the hospital. Her temperature was normal throughout the preoperative course in the hospital, except on admission and for a few hours following each of the two transfusions.

X-ray examination of the gastro-intestinal tract after a barium feeding was negative. A flat abdominal film was negative.

Approximately two weeks after entry, operation was performed.

## DIFFERENTIAL DIAGNOSIS

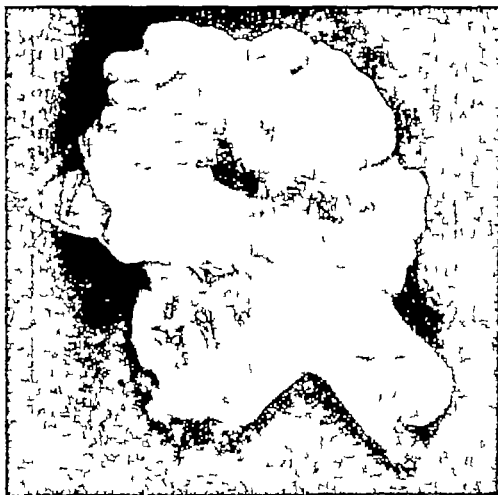
DR THOMAS H LANMAN\* A discussion of bleeding by rectum in this age group must include a number of conditions. From the history and physical examination we can rule out anything of an inflammatory nature such as ulcerative colitis which is rare, although we have seen cases under a year in our hospital. I think that tuberculosis can also be ruled out. There is, also, the question of some blood disease—one of the purpuras. That again I think can be ruled out by the normal clotting and bleeding time, the absence of purpuric spots and also to some degree by the suddenness of the onset. Another cause would be polyps in the intestinal tract. These are commonly found in the region of the rectum and it is unusual for them to give evidence of such massive hemorrhage as this child has had, or to produce a red count as low as that, although we have seen cases of long duration in which the red count dropped pretty low. Intussusception high in the intestinal tract does occur, but is quite rare and also is quite unlikely to give signs of sudden and massive hemorrhage. A large amount of blood loss such as she had on the first occasion is against intussusception. She is in the age group when the so-called idiopathic type of intussusception occurs. In our cases of this type of intussusception about 90

\*Associate Visiting Surgeon Children's Hospital Boston.

per cent occur under a year. A point against its being a polyp is the fact that the rectal type of bleeding is much more likely to result in blood on the outside of the stool rather than mixed with it. In intussusception it would be very unusual for her to have as massive hemorrhage as this without the clinical symptoms characteristic of acute intestinal obstruction. We do get subacute or chronic forms of intussusception in this age group, but here while bleeding does occur it is usually small in amount. Bleeding in the acute type is a result of marked interference with return of circulation. I do not believe you can get as much

cause I do not find any sign of peritonitis or of any obstruction. The discomfort that she complains of may be due to blood in the bowel itself. We have had cases where the blood was known to give a palpable mass. It is not uncommon for a Meckel's diverticulum to be the advancing point of an intussusception, but if intussusception were present in this case I should expect it to be incidental. I should expect to find a bleeding Meckel's diverticulum.

DR. HAROLD L. HIGGINS: We felt quite definitely that the blood was not coming from the large bowel because of the absence of mucus. We also were inclined to feel that the child



bleeding as this without pretty obvious signs of obstruction. It would be extremely unusual for intussusception to go on for the two weeks with that amount of hemorrhage and not have pretty obvious signs. The x ray moreover is against it.

I think my guess would be that she probably bled from a Meckel's diverticulum. This occurs much more frequently than we formerly thought. We have seen a large number of cases in the past two years the youngest two months of age, where bleeding by rectum was a presenting sign. In our series of forty-five Meckel's diverticula we have seen bleeding in seventy per cent of the cases, and in a great many of these the hemorrhage has been quite massive in amount. Recently we have found the red count below two million in a case where there was a perforation of an ulcer in a Meckel's diverticulum. I doubt if this case was perforated. The white cell count was 30,000, which might suggest diverticulitis associated with it. I doubt if there was perforation be-

cause I do not have a duodenal ulcer. Babies do get duodenal ulcers and I have seen several such cases. They usually are in undernourished children, and the bleeding is scant rather than profuse.

#### PREOPERATIVE DIAGNOSIS

Ulcer of Meckel's diverticulum

DR. THOMAS H. LANMAN'S DIAGNOSIS

Bleeding from Meckel's diverticulum

#### PATHOLOGIC DIAGNOSIS

Ulcer of Meckel's diverticulum

#### PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY: At operation a typical Meckel's diverticulum was found. The two clamps in the photograph are placed upon the ends of the resected segment of ileum and the short and rather fat diverticulum projects between them. The second picture shows the inside

of the diverticulum after it had been opened. The deeply punched-out linear ulcer is very evident and also the difference between the thick velvety mucosa lining the diverticulum and the thinner, glossier mucosa of the ileum can be distinguished. The reason for this difference in gross appearance became at once evident when the microscopic sections were examined. The mucosa in the diverticulum was very complicated in structure showing an irregular intermixture of gastric and upper intestinal types of epithelium, the latter, however, predominating. The ulcer could be easily shown to have formed in the areas of intestinal mucosa rather than of gastric.

This case is very typical of many that have been reported. When ulcers are present in Meckel's diverticulum gastric mucosa of the fundic type can always be found, but the ulcers occur in the neighboring islands of intestinal epithelium. The interpretation of the pathogenesis as true peptic ulcer formation from the erosive action of gastric secretion unneutralized by bile, pancreatic juice, the secretions of Brunner's or pyloric glands can hardly be questioned and the evidence presented by these cases has, of course, been used by Lindau\* and others as a strong inferential argument for the theory of hypersecretion as the basis of ulcer formation in the stomach and especially the duodenum.

The ulcer in this case was histologically typical of the active stage of peptic ulcer as one sees it in either stomach or duodenum or in the jejunum following gastroenterostomy. The so-called "fibrinoid necrosis" a brilliantly eosinophilic hyaline layer at the base of the ulcer which Buchner has emphasized was particularly well marked. At its deepest point the ulcer had penetrated the muscularis and only a millimeter of slightly thickened serosa lay between the base of the ulcer and the peritoneal cavity.

DR LANMAN: When Dr Henry Hudson looked up our cases he found gastric mucosa in seventy per cent, which was quite striking to us. I suppose we must have missed a lot. They go into collapse with sometimes a very massive hemorrhage, like a gastric ulcer. I was interested in looking it up and found that frequently in the last two or three years the red cell count had been below three million.

DR HIGGINS: I referred to Abt's System of Pediatrics, published about 1927 and found there no mention of bleeding from a Meckel's diverticulum. The recognition of this condition is recent, certainly within the last fifteen years.

A PHYSICIAN: Is this condition ever seen in adults?

DR MALLORY: Yes, several have been reported by Lindau.

\*Lindau, A. and Wolff, H. The peptic genesis of gastric and duodenal ulcer. Surg. Gyn. Obst. 53: 621 (Nov.) 1931.

## CASE 21442

### PRESENTATION OF CASE

A fifty year old white married American attorney entered complaining of pain in the left lower quadrant, and constipation.

Six years before entry he became ill with a vague aching pain in his left lower quadrant, localized for the most part midway between the left anterior superior iliac spine and the umbilicus. This was accompanied by loose watery stools. An x-ray at this time was reported as showing a large diverticulum which was causing obstruction. An operation was done following which there remained a fecal fistula. This healed spontaneously after about three months but one year later it reopened. Because of a suspected chest condition no surgical intervention was advocated. He was hospitalized, however, and with palliative care the fistula again healed. The suspicion of pulmonary disease was not confirmed. One and a half years later the patient went to his physician voluntarily for instruction in bowel management and a general check-up. Thereafter he remained quite well with only slight abdominal distress concomitant with upper respiratory infections. Four months before admission he again developed rather constant dull aching pain in the left lower quadrant, somewhat more severe than that of the initial episode. A protrusion of the operative scar appeared and gradually increased in size. Two months later he began to have pain in the region of the bladder and also in the right upper quadrant. This discomfort became progressively greater in intensity and particularly sharp just prior to bowel movement. One month previous to his entry he became nauseated and vomited everything ingested. This continued for two days and thereafter he remained well for three weeks, when he had another attack of vomiting which again persisted for two days. His bowel movements throughout his illness were irregular to the extent that he frequently went one or two days without going to stool. At times he had one or two scanty movements consisting of hard formed stools which were followed by a large soft formed stool. His appetite became quite poor during the last part of his illness. He had a great deal of flatus and complained of feeling "gurgling" in his abdomen.

At twenty years of age a septal operation was performed and five years later a double hemorrhaphy was done. He had "chronic bronchitis" for years which became much worse during the winter.

His father died at seventy-eight of prostate trouble. His mother died of liver disease at the age of fifty-five. One brother died of tuberculosis.

Physical examination showed a well-developed

and nourished middle-aged man who seemed to be quite comfortable. There was pyorrhea of the lower teeth and the upper teeth were absent. The heart and lungs were negative. The blood pressure was 130/80. In the left lower quadrant there was a small scar two centimeters in diameter which protruded so that a projecting mass about the size of a tennis ball was formed. This mass was very tender and loops of bowel were felt within it. The abdomen was held moderately rigid and tenderness was elicited generally with deep pressure. In the left lower quadrant only moderate pressure produced pain. The remainder of the examination was negative.

The temperature was 99.6°, the pulse 95. The respirations were 23.

Examination of the urine was negative. The specific gravity was 1.028. The blood showed a red cell count of 5,390,000, with a hemoglobin of 80 per cent. The white cell count was 18,900. The stools gave a positive reaction to the guaiac test. A Hinton test was negative. The non-protein nitrogen of the blood was 45 milligrams per cent.

The patient remained quite comfortable for the first few days in the hospital. On the fourth day he began to vomit everything ingested. The tenderness in the lower abdomen increased and the temperature rose to 101.5°. He improved somewhat after this but since a mass was then palpated in the region of the old operative scar a surgical approach was deemed advisable. One week after admission under gas and ether anesthesia a partial repair of the incisional hernia and incision and drainage of a peritoneal abscess were done. On the following morning the patient went into profound shock with a thready pulse of 160 and a blood pressure of 88/70. Despite intravenous injections and a whole blood transfusion the patient did not rally and died on the ninth hospital day.

#### DIFFERENTIAL DIAGNOSIS

DR. HORACE K. SOWLES: "An x-ray was reported as showing a large diverticulum which was causing obstruction." That is what we might expect from the clinical symptoms.

We presume that operation was a laparotomy with drainage of an abscess or drainage of the inflamed area due to perforation of a diverticulum.

We have as yet no indication whether the protrusion of the operative scar was a hernia, or possibly a recurrence of an abscess, except that he did not give any story of increased temperature at that time.

Pain in the bladder of course is consistent with an inflammatory process in the pelvis. The pain in the right upper quadrant is not so easily explained except that it is well known that obstruction of the left colon often causes

extreme distention in the cecum and in the right colon.

"He had a great deal of flatus and complained of feeling 'gurgling' in his abdomen." I think that particular sort of complaint is pathognomonic of interference in the lumen of the intestinal tract. It is consistent with chronic obstruction.

The examination of the protruding mass in the left lower quadrant seems to rule out a superficial abscess since it contained loops of bowel.

Our findings still seem to point to an inflammatory process more in the pelvis and left lower quadrant but somewhat throughout the rest of the abdomen.

The temperature is not high, but the pulse is abnormally high and here we might bring out the point that the pulse in acute abdominal conditions or in intestinal obstruction is often a much better indicator of the patient's reaction or toxic condition than the temperature.

The white blood count is exceedingly high, which would seem to be evidence of inflammatory reaction.

Evidently it was felt now that it was necessary to drain what I assume to be an abscess. Of course we cannot rule out malignancy even though he had a diverticulitis six years ago. He may have continued to have an inflammatory process in his sigmoid since that time but we cannot absolutely rule out a malignant disease. He has had no gross bleeding although the guaiac test is positive at the present time.

Twenty-four hours is a little late for what we consider acute surgical shock. Rapid pulse and low blood pressure might suggest hemorrhage but it is hard to conceive of a massive hemorrhage from this condition. I should think it would be more apt to indicate a fulminating and acute peritonitis secondary to the drainage of the pelvic abscess.

Although we cannot rule out malignant disease I think this patient had a primary diverticulitis with intermittent intestinal obstruction and an inflammatory process in his pelvis, or that secondary to malignant disease he developed a pelvic abscess which was drained, and I should assume that as a result of the operative procedure he developed acute fulminating peritonitis which was the cause of his pronounced shock.

DR. TRACY B. MALLORY: Dr. McKittrick, will you tell us what you found at operation?

#### CLINICAL DISCUSSION

DR. LELAND S. MCKITTRICK: We assumed that he had a recurrence of an old diverticulitis. He had a perfectly definite hernia in the old scar with the palpable loops of bowel as described here, moderate obstruction clinically, and he had obviously a fairly extensive inflammatory process. We were disturbed about

the recurrence of what we assumed to be his diverticulitis in relation to his old hernia because that made it pretty complicated to get at. He quieted down pretty well at first but when he flared up again it seemed imperative that we drain what we assumed to be an abscess. We went in medially to the old scar, not because we wanted to but because that was the point where he persistently had his maximum tenderness. Posteriorly there was very little tenderness that one could make out. While the desire was to go in lateral to the scar and posteriorly, we went in medially because we could not overlook his maximum tenderness. That took us directly into the abdominal cavity. Why he had the tenderness there, I do not know. We had gone over him a number of times and it had persisted. The abdomen was then carefully walled off and a large abscess lateral to the old scar and pointing at its posterior margin was drained from behind. It was simply necessary to break the adhesions posterior to the hernia, where we drained a large abscess. Nothing else was done but approximate the wound to a slight degree and he was given what was considered to be ample drainage.

DR SOWLES: You did not do what was suggested here, a left hernia repair?

DR MCKITTRICK: No, to close the wound it was necessary to free the edges up a little bit.

#### CLINICAL DIAGNOSES

Diverticulitis of the sigmoid with abscess  
Peritonitis?

#### DR HORACE K. SOWLES' DIAGNOSES

Diverticulitis with abscess or malignant disease with abscess  
Acute peritonitis

#### ANATOMIC DIAGNOSES

Multiple diverticula of the descending colon and sigmoid  
Acute diverticulitis  
Peritonitis, acute, generalized  
Pulmonary congestion and edema  
Atelectasis, partial, lower lobes  
Cyst of the right kidney, solitary, congenital  
Abscess, left flank  
Operative incisions: Exploratory laparotomy, incision and drainage of flank abscess  
Operative scar: Bilateral hernioplasty

Arteriosclerosis, aortic, moderate  
Perisplenitis

#### PATHOLOGIC DISCUSSION

DR TRACY B. MALLORY: What was found at postmortem was a very extensive diverticulosis of the descending colon and sigmoid. The great majority of the diverticula were entirely free from any inflammatory change, but in a localized zone at just the upper end of the sigmoid there were numerous obviously inflamed diverticula on all sides of the gut. The omentum had become firmly adherent to the exposed peritoneal surfaces of some of these and this mass of thickened omentum about the large bowel formed a pretty considerable tumor mass in the left lower quadrant.

I presume the point of tenderness overlaid one of these diverticula which had been successfully walled off by the omentum. Another diverticulum on the posterior surface had actually perforated and a frank abscess was found in the retroperitoneal tissues, into which led the drain which Dr McKittrick had inserted. We found a very slight but diffuse general peritonitis. All of the serosal surfaces were reddened and covered with a very thin film of fibrin. There was nothing else that could account anatomically for death, so I am inclined to agree with Dr Sowles' assumption that a very acute peritonitis was probably the most significant immediate factor at death. It would not be possible anatomically, of course, to rule out an element of shock.

A PHYSICIAN: When the first exploratory incision was made was the possibility considered of closing that and making a second incision laterally?

DR MCKITTRICK: Because of the hernia the wound could not be closed without freeing the bowel and omentum laterally and this brought us into the abscess.

DR SOWLES: I should like to ask if he had anything to account for the right-sided pain?

DR MCKITTRICK: No, I was not over on the right side at all.

A PHYSICIAN: Is it possible to drain them by a retroperitoneal operation rather than opening the peritoneal cavity?

DR MCKITTRICK: Yes. I think frequently you can get in from behind but you have to have some lead. You cannot go in unless there is tenderness or something there that would lead you to make that incision.

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## STERILIZATION AND THE PSYCHOSES

The rapid increase of mental disease in this country has been the subject of many recent articles. It has been stated that the birth rate of people with subnormal intellects is so much greater than that of normal people that racial degeneration is inevitable. One way of solving this problem is to sterilize the unfit. Is such a procedure to be advised?

This question has been studied by a committee appointed in May 1934 by the American Neurological Association, assisted by a grant from the Carnegie Foundation. The committee, consisting of Doctor Abraham Myerson, Chairman, Doctors J. B. Ayer, Tracy J. Putnam, Clyde E. Keeler and Leo Alexander, has recently published a preliminary report. The conclusions are at such variance with the popular ideas on this subject that they deserve careful consideration.

The committee states, to begin with, that there is no valid evidence that mental disease

and mental defects are on the increase. Commitment to hospitals and asylums is increasing, but this, as the committee points out, is a factor which operates against propagation. The mentally sick, diseased and defective show less tendency to marry and among those who do marry the birth rate is low.

The contributions bearing on heredity made by the study of genetics do not support the contentions of the eugenicists for research has shown, according to Riddle, that "the specific conditions under which a gene or factor operates and develops have an equal value with the germinal factors in the appearance of anything that can be called heredity. Heredity is controlled whenever and wherever an aspect of development is controlled." The committee goes on to state "His whole thesis, which seems to us to be extremely pertinent to the problems of psychiatry, is that by manipulating both the external environment and the internal environment of the individual, first, the characters of the individual may be altered from their otherwise normal hereditary pattern, more importantly, that there is work to show that the germplasm itself may be modified."

Only two psychoses have a hereditary significance—manic-depressive and dementia praecox. Of the two, the former is more definitely hereditary. Factors of heredity exist in feeble-mindedness but it is not a simple recessive Mendelian character.

Interesting experiments have been carried out as to the relative values of heredity and environment in relation to intelligence. Some of these experiments, summarized in the committee's report, appear to prove quite conclusively that environment especially in the early years of life plays an important part in the development of the child's intelligence.

As regards the inheritability of epilepsy, the committee accepts the statement that epilepsy occurs more frequently in the descendants of epileptics than in the descendants of non-epileptics, but does not believe that there is any single recessive Mendelian character which can explain its incidence.

The committee comments favorably on Lange-Eichbaum's study of genius and heredity. "Enough evidence is adduced to indicate that sterilization might readily cut off from the race some of its most valued and valuable members." Concerning the inheritance of criminal tendencies most writers agree that while there may be a constitution, the effort to breed it out by any eugenic measures is in the present state of our knowledge not to be recommended.

In concluding its study of sterilization, the committee expresses its views as follows:

"First Our knowledge of human genetics



has not the precision nor amplitude which would warrant the sterilization of people *who themselves are normal* in order to prevent the appearance, in their descendants, of manic-depressive psychosis, dementia praecox, feeble-mindedness, epilepsy, criminal conduct or any of the conditions which we have had under consideration. An exception may exist in the case of normal parents of one or more children suffering from certain familial diseases, such as Tay-Sachs amaurotic idiocy.

*Secondly* Particularly do we wish to emphasize that there is at present no sound scientific basis for sterilization on account of immorality or character defect.

*Thirdly* Nothing in the acceptance of heredity as a factor in the genesis of any condition considered by this report excludes the environmental agencies of life as equally potent and, in many instances, as even more effective."

As a result of these conclusions, the committee recommends that any law concerning sterilization passed in the United States under the present state of knowledge should be voluntary and regulatory rather than compulsory, and should apply to patients in private institutions and at large as well as to those in State institutions. Other recommendations are made concerning the machinery for administering sterilization laws, after which the committee states that it can recommend sterilization only in selected cases of certain diseases and with the consent of the patient or of those responsible for him. These diseases, arranged in the order in which sterilization would appear to be indicated, are as follows:

"(1) Huntington's chorea, hereditary optic atrophy, familial cases of Friedreich's ataxia, and certain other disabling degenerative diseases recognized to be hereditary

- (2) Feeble-mindedness of familial type
- (3) Dementia Praecox (schizophrenia)
- (4) Manic-depressive psychosis
- (5) Epilepsy"

The report emphasizes the need for further research along this line, and recommends the appointment of a permanent committee for this purpose. The concluding paragraph summarizes the views of the committee on the present status of sterilization:

"Furthermore, it is to be emphasized that no great or radical change in the complexion of society can be expected from any such sterilization program as we recommend, nor from any justifiable legislation. We do not believe that society needs to hurry into a program based on fear and propaganda. Although the problem of mental disease and defectiveness is enormous, there is no new social or biological emergency."

## NUTRITION AND DEPRESSION

A STUDY of 5,000 city children between the ages of six and nine years, made during five years of depression by the United States Public Health Service, shows that the weight of those from depression-poor families has inclined definitely downward.

These children were divided into three groups: those whose families had remained in comfortable economic circumstances, those whose families remained poor, and those whose families, originally comfortable in 1929, had become poor during the depression. The relative weight line for the first group remained approximately level; the line for the second group inclined definitely downward, and the line for the third group inclined somewhat upward—which reminds one of the old saying that God takes care of the poor and the rich take care of themselves.

## THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

DAYTON, NEIL A. M.D. Ohio State University College of Homeopathic Medicine 1915. Director, Division of Mental Deficiency, Division of Statistics, Rockefeller Research Project in Mental Diseases and Defect, Massachusetts Department of Mental Diseases. Instructor in Psychiatry, Tufts College Medical School. His subject is "A New Method of Calculating Discharge Rates in Mental Diseases with Special Consideration of the Age Factor." Page 841. Address: Room 167, State House, Boston, Mass.

GOLDWATER, LEONARD J. A.B., M.D. New York University, University and Bellevue Hospital Medical College 1928. Instructor in Medicine, New York University College of Medicine. Clinical Assistant Visiting Physician, Third (N.Y.U.) Medical Division, Bellevue Hospital. Director, Student Health Service, New York University College of Medicine. Address: 53 East 82nd Street, New York City. Associated with him is:

STEINBERG, ISRAEL. A.B., M.D. Harvard University Medical School 1928. Assistant Visiting Physician, Third (N.Y.U.) Medical Division, Bellevue Hospital. Instructor in Medicine, New York University College of Medicine. Address: 103 East 84th Street, New York City. And:

MOST, HARRY. B.S., M.D. New York University, University and Bellevue Hospital Medical College 1931. Clinical Assistant Visiting Physician, Third (N.Y.U.) Medical Division, Bellevue Hospital. Assistant in Medicine, New York University College of Medicine. Address: London School of Tropical Medicine, Keppel Street, London, W.C.1 England. And:

CONNERY, JOSEPH E. M.D. New York University, University and Bellevue Hospital Medical College 1914. Associate Professor of Chemical Pathology, New York University College of Medicine. Visiting Physician, Third (N.Y.U.) Medical Division, Bellevue Hospital. Address 75 East 55th Street, New York City. Their subject is "Hemoptysis in Trichiniasis." Page 849

KING M. K. M.D. Medical College of Virginia 1930. Passed Assistant Surgeon, United States Public Health Service. In charge of Surgical Service, United States Marine Hospital, Savannah, Georgia. His subject is "Uncinariasis and Appendicitis." Page 851. Address: United States Marine Hospital, Savannah, Ga.

COGAN, DAVID G. A.B., M.D. Harvard University Medical School 1932. Clinical Assistant in Ophthalmology, Massachusetts Eye and Ear Infirmary. Assistant in Ophthalmology, Harvard University Medical School. Address 61 Phillips Street, Boston, Mass. Associated with him is

COGAN, FRANCES C. A.B., M.D. Johns Hopkins University School of Medicine, 1934. Address 81 Phillips Street, Boston, Mass. Their subject is "Cataracts and Dimetrophenol." Page 854

WHITAKER, LESTER R. M.D. Harvard University Medical School 1923. F.A.C.S. First Assistant Visiting Surgeon, Massachusetts Memorial Hospitals, Boston. Associate Member Evans Memorial for Clinical Research and Preventive Medicine. Instructor in Surgery, Boston University School of Medicine. His subject is "Electrosurgical Appendectomy." Page 856. Address 41 Bay State Road, Boston, Mass.

FRENCH, RALPH W. A.B. M.D. Harvard University Medical School 1910. F.A.C.S. Surgeon, Truesdale Hospital, Fall River, Mass. His subject is "Primary Abscess of the Omentum." Page 857. Address 151 Rock Street, Fall River, Mass.

ATCHLEY, DANA W. S.B., M.D. Johns Hopkins University School of Medicine 1915. Associate Professor of Medicine, Columbia University College of Physicians and Surgeons. Associate Visiting Physician, Presbyterian Hospital, New York City. His subject is "The Role of Peripheral Circulatory Failure in Clinical Medicine." Page 861. Address: Presbyterian Hospital, 620 West 168th Street, New York City.

GALDSTON, IAGO B.S., M.D. Fordham University School of Medicine 1921. Secretary, Medical Information Bureau, New York Academy of Medicine. Consultant in Health Education, National Tuberculosis Association. His

subject is "The Economic and Social Aspects of Socialized Medicine." Page 868. Address 2 East 103rd Street, New York City.

HAWES, JOHN B., 2ND. A.B., M.D. Harvard University Medical School 1903. Formerly, Assistant Visiting Physician, Massachusetts General Hospital, Director, Pulmonary Clinic and Non-Pulmonary Clinic, Massachusetts General Hospital, Consultant, Diseases of the Lungs, New England District, United States Veterans Bureau, and Secretary, Massachusetts Tuberculosis Commission. Now, President, Boston Tuberculosis Association, Director, Massachusetts Tuberculosis League, Rutland Cottage Sanatoria and National Tuberculosis Association. Consultant, Beth Israel Hospital, Jordan Hospital, Plymouth, and Henry Heywood Memorial Hospital. His subject is "Memories of a Great Physician, Dr. Frederick C. Shattuck, of Boston." Page 873. Address 330 Dartmouth Street, Boston, Mass.

## The Massachusetts Medical Society

### SECTION OF OBSTETRICS AND GYNECOLOGY\*

C. J. KIRKHAM, M.D., Chairman 524 Commonwealth Ave., Boston, Mass.	R. S. TITUS, M.D., Secretary 473 Commonwealth Ave., Boston, Mass.
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#### THE TREATMENT OF VOMITING OF PREGNANCY

There is probably an underlying physiologic disturbance as a basis for all vomiting of pregnancy, although the importance of superimposed psychic disturbances in many cases is not to be denied. So-called "toxic" vomiting probably does not differ from "non-toxic" vomiting except as regards the severity and persistence of emesis. The pathology of the disease may be adequately accounted for on the basis of starvation alone, provided one includes deficiency of vitamins with the water, mineral, and other food deficiencies of starvation.

For the purpose of outlining treatment, patients who vomit may be arbitrarily divided into three groups as follows:

#### I "Physiologic" vomiting

The nausea and morning vomiting which frequently occur for a few weeks after the first missed period require no especial treatment other than reassurance, mild doses of sedatives in apprehensive patients, and the suggestion that the patient take a glass of milk or cup of coffee some twenty minutes before arising in the morning.

A series of short selected articles by members of the Section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the Section.

II *Mild Hyperemesis* includes patients who persistently vomit a significant portion of the normal food and fluid intake. However, they retain enough food so that clinical dehydration, marked weight loss, and acidosis (i.e., persistent acetone and diacetic acid in the urine) are absent.

In the treatment of these patients, intelligent management of the frequent causes of psychic disturbances in the home is often an important factor. Disturbing elements in the environment should be removed when possible. It is advantageous temporarily to dispose of "helpful" friends and relatives. Excitement should be avoided, and the mind occupied with matters other than the vomiting. Moderate doses of barbiturates (i.e., phenobarbital gr  $\frac{3}{4}$  to  $1\frac{1}{2}$  B I D) aid in the control of nervousness and seem to allay nausea. The bowels should be kept open with mild catharsis or enemata. The nausea often seems to be brought on or aggravated by hunger, hence six small meals daily instead of the three usual ones are helpful. The elimination of fats from the diet temporarily is also helpful. The diet should be easily digestible, rich in vitamins and minerals, as well as adequate in carbohydrate and protein. Empirically, many patients seem to improve after liberal doses of vitamin B complex. Coated tablets of Brewer's yeast concentrate are made by several pharmaceutical houses.

Most patients will respond to these measures. Those who do not improve promptly should be watched daily for signs of dehydration and acidosis.

### III *Severe Hyperemesis*

This group includes patients who retain less than half of the normal diet and show marked weight loss, dehydration and acidosis. Mild cases of patients who vomit but who fail to respond to a few days' treatment as outlined above, and those whose vomiting is severe when first seen should be removed to a hospital.

On admission the patient should be isolated, and no visitors allowed until vomiting has been controlled. She should be left alone except for strictly necessary visits of physician and nurse. No emesis basin or equipment reminiscent of vomiting should be visible. The T P R should be recorded every four hours, and the twenty-four hour urine volume measured. Admission and daily urine specimens should be examined routinely, particular attention being given to testing for acetone, diacetic acid and bile.

The initial physical examination should include careful inspection of the mouth for sore tongue and search for evidence of peripheral neuritis, findings which suggest vitamin B complex deficiency.

On admission the patient should have an enema following which a liberal dose of a bar-

biturate may be given by rectum (i.e., pentobarbital gr iv ss). The deficient water, salt and carbohydrate should be corrected immediately by hypodermoclysis of normal saline (2000-3000 cc) and 10 per cent glucose solution, 500 cc given slowly intravenously. Rectal taps sometimes aggravate nausea and vomiting. Saline clyses and intravenous glucose are repeated at frequent intervals in sufficient quantities to maintain a daily urine volume of over 1200 cc free of acetone and diacetic acid. The pentobarbital is repeated in 3 grain doses at intervals of six to twelve hours. Nothing is offered the patient by mouth until vomiting has ceased for eighteen to twenty-four hours. She is then given fluids hourly, such as milk, ounces VI, orange juice ounces VI, and water ounces VI alternating for fourteen hours of the day. When the hourly fluids have been taken for two days without significant vomiting, the patient is offered frequent small meals of attractive easily digestible solid food. A daily bowel movement is important throughout treatment, and should be secured if necessary by enema.

An occasional patient will continue to vomit in spite of this régime. The responsibility for such patients, as well as for those whose condition is poor when first seen, should be shared with a competent obstetrician before the condition becomes desperate. Of particular significance in evaluating the state of affairs are the following signs: persistent pulse of 110 or over, persistence of acidosis, the appearance of bile in the urine, early signs of peripheral neuritis, mental confusion, and other peculiarities of behavior.

If by any means, a well-balanced nutritious diet with large doses of vitamin B complex can be given to such patients, therapeutic abortion is seldom indicated. Feedings through the duodenal tube by constant drip of a liquid diet reinforced with large doses of vitamin B complex have been successful in a group of such patients in whom other methods had failed. A Levine tube is passed through the nose after liberal sedation with a barbiturate, and manipulated into the duodenum if possible. The stomach is washed with dilute bicarbonate solution and a liquid diet is fed at body temperature through the tube by drip. Feedings are given hourly for twelve hours daily and the rate of the drip is regulated so that each feeding runs in in thirty minutes. The diet consists of milk ounces IV with a heaping teaspoon of Brewer's yeast concentrate (Harris), orange juice ounces IV sweetened with corn syrup, and eggnog ounces IV, alternating for twelve hours daily. The tube is withdrawn an hour after the last feeding, to be replaced the following morning. A small amount of the feeding is sometimes regurgitated at first but all patients as yet so treated have retained the bulk of the food. Feedings are continued through

the tube from two to five days depending upon the severity of the condition

However, if a patient is encountered who is refractory to all measures, and therapeutic abortion is considered, it is important to get obstetrical consultation before the condition is desperate. Of patients who have progressed to the point of persistent rapid pulse, mental aberration or signs of peripheral neuritis the mortality is high regardless of whether therapeutic abortion is performed

It is advisable in the after care of severe vomiters to give a rich source of vitamin B complex in addition to a well balanced high vitamin diet for some weeks after vomiting has ceased. Also, although hemoglobin and red blood cell estimations are high during the vomiting due to blood concentration many of these patients on recovery have a relatively severe secondary anemia for which the exhibition of iron is beneficial

### THIRD ANNUAL POSTGRADUATE MEDICAL EXTENSION COURSE

The following sessions have been arranged by the Committee for the week beginning November 3

#### *Barnstable*

Sunday November 3, at 4 00 P.M. at the Cape Cod Hospital Hyannis. Subject Lung Diseases (a) Differential Diagnosis and Treatment of Lobar Pneumonia. (b) The Surgical Problems of Empyema. Instructors J H Pratt and J W Strieder J L B Vail Chairman

#### *Bristol South (Fall River Section)*

Monday November 4 at 4 00 P.M., at the Stevens Clinic of the Union Hospital Prospect Street, Fall River Subject Pediatrics The Neonatal State and its Diseases Medical and Surgical Aspects Instructors W R Sisson and P J Mahoney Eugene A. McCarthy Chairman

#### *Essex North*

Friday November 8 at 4 00 P.M., at the Hotel Bartlett 95 Main Street, Haverhill Subject Neurological Aids in the Diagnosis and Treatment of Disease from the Medical Viewpoint. Problems of History and Examination with Special Reference to (a) Neurosyphilis Multiple Sclerosis and Other Degenerative Conditions. (b) Diseases with Acute Onset, such as Meningitis and Cerebral Accidents Instructor J B Ayer Francis W Anthony Chairman

#### *Essex South*

Tuesday November 5 at 4 00 P.M. in the Nurses Home of the Salem Hospital Salem. Subject Immunology Latest Developments in Immunization Smallpox Typhoid Measles,

Scarlet Fever Diphtheria, Whooping Cough and Infantile Paralysis Instructor R F Feemster Walter G Philippen Chairman.

#### *Hampden*

Thursday November 7 at 4 00 P.M., at the Academy of Medicine, Professional Building 20 Maple Street, Springfield, and at 8 00 P.M. at the Holyoke City Hospital Holyoke. Subject Cancer of Breast and Uterus Sarcomas of Bone Lymphoma and Leukemia, Their Early Diagnosis Discussion of Life History of Cancer and Grades of Malignancy Instructors E M Daland and G G Smith. George L Schadt and George D Henderson Chairmen.

#### *Hampshire*

Wednesday November 6 at 4 15 P.M., in the Nurses Home of the Cooley Dickinson Hospital Northampton Subject Immunology Latest Developments in Immunization Smallpox, Typhoid Measles, Scarlet Fever Diphtheria, Whooping Cough, and Infantile Paralysis Instructor W W Lee Robert B. Brigham Chairman

#### *Middlesex East*

Wednesday November 6 at 4 00 P.M. at the Melrose Hospital Melrose. Subject Psychiatry Management of Psychic States in the Care of General Diseases, Especially Chronic Disorders Subpsychotic States. Instructors G C Caner and Maurice Fremont-Smith. Joseph H Fay Chairman

#### *Middlesex South*

Tuesday November 5 at 4 15 P.M. at the Cambridge Hospital, Cambridge. Subject Kidney and Bladder Diseases, A (Surgical) Hematuria Its Significance in Surgical Diseases of Kidney and Bladder Instructor F H Colby Edmund H. Robbins Chairman

#### *Norfolk South*

Monday November 4 at 8 30 P.M. at the Quincy City Hospital Quincy Subject Pediatrics Abdominal Disease in Childhood Medical and Surgical Aspects Instructors P H Sylvester and H W Hudson Jr David L Belding Chairman.

#### *Plymouth*

Tuesday November 5 at 4 00 P.M. at the Brockton Hospital Brockton. Subject Pediatrics Abdominal Disease in Childhood Medical and Surgical Aspects. Instructors J L Morse and W E. Ladd W H Pulsifer Chairman

#### *Worcester North*

Friday November 8, at 4 30 P.M. at the Burbank Hospital Fitchburg Subject Kidney and Bladder Diseases. B (Surgical) Prostatism and Related Diseases. Cystitis and Pyelitis. Instructor B C Wheeler Edward A. Adams, Chairman.

## MISCELLANY

ANTERIOR POLIOMYELITIS CASES FOR 1935  
WEEKLY LIST, OCTOBER 21-26

City or Town	
Fall River	2
Plymouth	1
Brockton	2
Dedham	1
Framingham	1
Boston	4
Cambridge	1
Chelsea	8
Lexington	1
Malden	1
Medford	2
Needham	1
Newton	1
Revere	1
Watertown	1
Andover	3
Peabody	1
Salem	2
Fitchburg	1
Hudson	1
Worcester	2
Holyoke	1
Springfield	1

PHYSICIANS REGISTERED BY EXAMINATIONS  
HELD JULY AND OCTOBER, 1935THE COMMONWEALTH OF MASSACHUSETTS  
BOARD OF REGISTRATION IN MEDICINE  
JULY 11, 1935

Kenneth L Stout, Massachusetts General Hospital, Boston, Mass	
Ruth Burr, 56 Commonwealth Avenue, Boston, Mass	
Kerwin Kinard, Wenham Hamilton, Mass	
John B Dineen, Monson State Hospital, Palmer, Mass	
Felix M Brown, 163 Hillside Avenue, Arlington, Mass	
Siegfried J Thannhauser, 1101 Beacon Street, Brookline, Mass	
Hollis E Vernon, 49 Cherry Street, Spencer, Mass	
Arthur B Serino, 462 Putnam Avenue, Cambridge, Mass	
Nathan Epstein, Boston Floating Hospital, Boston, Mass	
Louis S Chase, 140 Harvard Street, Everett, Mass	
Alphonse F Popoli, 6 Bellevue Road, Quincy, Mass	
Arie C van Ravenswaay, 198 Commonwealth Avenue, Boston, Mass	
Joseph G Cutler, 43 Bow Street, Beverly, Mass	
Herbert M. Williams, New York Hospital, New York City	

Charles Meinhardt, 340 West Kinney Street, Newark, N J	
Warren D Thomas, Mercy Hospital, Springfield, Mass	
John B Zielinski, 473 Hillside Avenue, Holyoke, Mass	
Jacob J Klar, St Luke's Hospital, Newburgh, N Y	
Maxon H Eddy, Middlebury, Vt	
Edmund L Carey, 59 South Street, Quincy, Mass	
Gordon A Saunders, 47 Horne Road, Belmont, Mass	
Timothy H McSweeney, North Creek, N Y	
Hans Fulder, Boston City Hospital, Boston, Mass	
Dana L Farnsworth, 228 Main Street, Williamstown, Mass	
Edward N Anderson, 27 Egmont Street, Brookline, Mass	
John D Maloney, 31 Wave Avenue, Wakefield, Mass	
Philip Faraci, 30 Pilling Street, Haverhill, Mass	
John J Cincotti, 39 Cooper Street, Boston, Mass	
George H. Boynton, 20 Grove Street, West Medford, Mass	
Folke W Wiklund, 15 Moultrie Street, Dorchester, Mass	
Charles L. Buono, New Casualty Hospital, Washington, D C	
James S Stillman, Turkey Shore Road, Ipswich, Mass	
Hirsh W Sulkowitch, Massachusetts General Hospital, Boston, Mass	
Charles H Kelley, Beverly Hospital, Beverly, Mass	
Charles R. Lord, Jr, 83 High Street, Ipswich, Mass	
Frank A Mahoney, Jr, 42 Crescent Avenue, Chelsea, Mass	85
James J Bradley, 43 Oak Avenue, Belmont, Mass	
Albert M Bond, New England Sanitarium and Hospital, Melrose, Mass	
Oscar Feinsilver, 48 Jones Road, Beachmont, Mass.	
Bernard B Brass, 62 Orange Street, Chelsea, Mass	
Robert H Atkins, 612 Merrick Avenue, Detroit, Mich	
Joseph H Nicholson, 497½ Hampshire Street, Lawrence, Mass	
Sydney S Deutch, 93 Watertown Street, Watertown, Mass	
Samuel B Biller, 184 Orchard Street, Watertown, Mass	
Henry M Bernhardt, 100 Kilsyth Road, Brighton, Mass	
Samuel M Tarnower, 1573 East 10th Street, Brooklyn, N Y	
Daniel J Mullane, 71 Spring Park Avenue, Boston, Mass	
Edward A Abbot, Mercy Hospital, Springfield, Mass	
Edward F Lawlor, Jr, 33 Tremont Street, Lawrence, Mass	
William C Gould, Jr, 63 Russell Street, Worcester, Mass	
John F Healy, St. John's Hospital, Lowell, Mass	
Reuben H Frogel, 187 Callendar Street, Dorchester, Mass	

William C Carey 173 Newton Street Meriden Conn.  
Viado A. Getting 25 Charles Street, Dorchester Mass.  
Emerson A. Read, 55 Dixwell Avenue Quincy Mass  
Eugene F Smith, St. Luke's Hospital, New Bedford Mass.  
Alice Ettinger 25 Bennet Street, Boston, Mass.  
Matthew J Bachulus 978 Main Street Walpole Mass.  
William R. Hill, 108 Butler Avenue Providence R. I.  
Robert Dutton, 33 Avon Street, Wakefield Mass  
Ralph A. Ross 1769 Commonwealth Avenue Brighton, Mass.  
Hyman Heller 252 Main Street, Webster Mass  
Francis H. Higgins 9 Lord Street, Waltham Mass  
Reginald S Hunt, 80 East Concord Street Boston Mass.  
Leo Koretsky Springfield Hospital Springfield Mass  
Peter B Hagopian 50 Oak Street, Lawrence Mass  
Jeremiah E. Greene 85 Dudley Road Newton Mass  
William J Devlin 42 Arborway Jamaica Plain Mass  
Blanche C Allen 1401 State Street, Springfield Mass.  
Joseph J Michaels, Boston Psychopathic Hospital Boston, Mass  
Theophane M Poirier 15 Royal Street Plymouth Mass  
Robert McCastline Northfield Mass  
Michael Peters Hahnemann Hospital Philadelphia, Penn  
Arthur L. Wallace, 196 Main Street Nashua, N H  
Harry A. Warren, Peter Bent Brigham Hospital Boston, Mass  
Harry Levine 12 Grove Street, New York City  
Samuel F Marshall Henry Ford Hospital Detroit, Mich.  
Willard W Wall Norfolk County Hospital Brain tree Mass.  
Hugo V Ascolillo 19 Garden Street, Somerville, Mass  
Lawrence P Bowser 33 Cedar Street, Stoneham Mass  
Raymond F Halling 146 East Main Street Chicopee Falls Mass  
Julius Rubin, 4 McLean Street, Boston Mass.  
  
OCTOBER 1 1935  
John W Zeller Massachusetts General Hospital, Boston, Mass  
Benjamin Spritz, 127 Shurtleff Street Chelsea, Mass.  
Wilmer C Smith, c/o The Two Companies, Enfield Mass  
Louis H. Cohen Worcester State Hospital Worcester Mass.  
Miriam J Hosmer 280 Washington Street, Woburn Mass  
Jacob Brem 16 Hansborough Street, Dorchester Mass

Samuel B Kirkwood 52 Garden Street, Cambridge Mass  
Joseph L. Campbell, Cotuit, Mass  
Karl J Thomson 55 Lanack Road Brighton Mass  
Mandel E. Cohen, Massachusetts General Hospital Boston Mass  
John D Stewart, Massachusetts General Hospital Boston Mass.  
Joshua C Droker Boston City Hospital, Boston, Mass.  
Edwin J Gills, 16 Holland Avenue, Pittsfield Mass.  
Olin C Hendrix, 249 River Street, Mattapan Mass  
Medora V Eastwood, Box 57 Plymouth Mass  
Arthur J Gavigan Worcester State Hospital Worcester Mass  
Richard J Alt, Beverly Hospital Beverly Mass.  
Robert F Cahill, 25 Division Street, Brockton, Mass  
John E. Cahill 25 Division Street, Brockton, Mass  
Lewis C. Donahue 3 Marshall Street, Needham Mass

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## NOTICES

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### LECTURES BY DR. S J THANNHAUSER

Dr S J Thannhauser formerly Professor of Medicine and Director of the Clinic of the University of Freiburg, Germany is giving a course of clinical lectures on Saturday mornings at 9 A M at the Boston Dispensary The subjects for November are as follows

November 2—Diabetes  
November 9—Diabetes.  
November 16—Liver Disease  
November 23—Peptic Ulcer

Practitioners in any part of New England are cordially invited. This course is made possible by a grant from the Bingham Associates Fund for the Advancement of Rural Medicine.

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### MEDICAL CLINIC AND STAFF ROUNDS AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 P.M. on Thursday November 7 in the amphitheater of the Peter Bent Brigham Hospital, Dr Henry A. Christian, Physician-in-Chief, Hersey Professor of the Theory and Practice of Physic in the Harvard Medical School, will give a medical clinic. To it are cordially invited practitioners and medical students

On Saturdays in the wards of the Peter Bent Brigham Hospital from 10 to 12 staff rounds will be conducted by Dr Christian.

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### HARVARD MEDICAL SCHOOL COLLOQUIUM

Luncheon meetings of the Harvard Medical School Colloquium will be held again this year in the Bowditch Room of Vanderbilt Hall on Thursdays at 1 P.M. These meetings are for the purpose of bringing medical students and teachers into closer con-

tact with their own several departments and also with the University as a whole The meetings in November will be as follows

November 7—Studies of the Circulation of Pregnant Women Dean C S Burwell

November 14—The Ethiopian Situation Dr C S Coon

November 21—Where Medicine is Going Assistant Professor D V Brown

### MASSACHUSETTS DEPARTMENT OF EDUCATION

#### UNIVERSITY EXTENSION COURSE

#### Mental Hygiene for Adults

Gardner Auditorium, State House, Boston

This course offers an unusual opportunity to hear outstanding leaders in the mental hygiene movement discuss in simple nontechnical language principles and mechanisms of mind that control our everyday lives Rich in stimulating suggestions and valuable advice for better and wiser living, these lectures appeal universally All, regardless of age, position, financial standing, or education, will be interested in the personal applications of these lectures The course will be particularly suggestive for nurses, teachers, social workers, doctors and parents,—those directly responsible for the welfare of others

The course is offered in coöperation with the Massachusetts Society for Mental Hygiene It may be taken either (1) as a series of lectures which entails no class work but simply attendance at meetings, or (2) as a credit course which requires class work, collateral reading, and a final examination Certificates will be awarded by the Massachusetts Department of Education to those who complete the requirements for the credit course

#### PROGRAM

##### Course Leader

Henry B Elkind, M D, Medical Director,  
Massachusetts Society for Mental Hygiene

November 5 Keeping Mentally Fit—Joseph Jastrow, Ph D, formerly Professor of Psychology, University of Wisconsin.

November 12 The Management of Disease in Childhood in Relation to Mental Health — Bronson Crothers, M D, Assistant Professor of Pediatrics, Harvard Medical School

November 19 The Child and the Modern World—Lawson G Lowrey, M D, Director, Institute for Child Guidance, New York City

December 3 How Psychiatry Can Aid in Meeting Problems of Modern Life—Donald Gregg, M D, President, Massachusetts Society for Mental Hygiene

December 10 Current Ethical Trends — James J Walsh, M D, Professor of Physiological Psychology, Cathedral College, and Extension Lecturer, Fordham University, New York

December 17 Adult Problems "The Blues" and Fatigue States—Karl M Bowman, M D, Associate Professor of Psychiatry, Harvard Medical School

January 7 Psychoanalysis and Mental Health—Jacob Kasanin, M D, Clinical Director, State Hospital for Mental Diseases, Howard, R I

January 14 Adults in Difficulty — A. Warren Stearns, M D, Dean, Tufts College Medical School

Register now

This class will meet weekly on Tuesday evenings at 7 45 P M, beginning November 5, 1935 Enrollment may be made at the University Extension Office, Room 217, State House, or at the first meeting of the class Charge \$4 for auditors, \$6 for credit students, text material extra

### NOTICES OF MEETINGS

#### BOSTON UNIVERSITY SCHOOL OF MEDICINE SURGICAL CLINIC AT THE BOSTON CITY HOSPITAL

Friday, November 1, 12-1, Cheever Amphitheatre  
Dr Irving J Walker, Clinical Professor of Surgery, Harvard Medical School, will talk on "Jaundice"  
Physicians and medical students are invited

Friday, November 8, 12 1, Cheever Amphitheatre  
Dr William R Morrison, Associate Professor of Surgery, Boston University School of Medicine, will present the following cases

- 1 Ileosigmoidostomy
- 2 Resection of Stomach for Adenocarcinoma,  
Using Von Petz Sewing Clamps
- 3 Femoral Hernia

Physicians and medical students are invited

#### BOSTON DISPENSARY

ASSEMBLY HALL, 25 BENNET STREET

Medical Conference Program

9 10 A M, November, 1935

November 1, Friday—Ward Cases Dr S J Thannhauser

November 2, Saturday—Diabetes Dr S J Thannhauser

November 4, Monday—Nephritic Clinic Dr R W Buck

November 5, Tuesday—"Diagnosis of Spinal Conditions" Dr J D Adams

November 6, Wednesday—Ward Cases Dr S J Thannhauser

November 7, Thursday—"Revision of Interpretation of Laboratory Tests for Syphilis" (Continued)  
Dr W A Hinton

November 8, Friday—Ward Cases Dr S J Thannhauser

November 9, Saturday—Diabetes (Continued) Dr S J Thannhauser

- November 12, Tuesday—Report on the Results of Short Wave Therapy in the Past Year Dr P Hoefler
- November 13 Wednesday—Ward Cases Dr S J Thannhauser
- November 14 Thursday—Recent Observations on the Functional Properties of the Vascular System and on the Hemodynamics in Arterial Hypertension Dr Soma Weiss
- November 15 Friday—Ward Cases Dr S J Thannhauser
- November 16 Saturday—Liver Disease Dr S J Thannhauser
- November 18 Monday—Blood Clinic. Dr William Dameshek.
- November 19 Tuesday—Back Strain—Sciatica Dr F R Ober
- November 20 Wednesday—Ward Cases Dr S J Thannhauser
- November 21 Thursday—"Interviewing a Patient" Prof Elton Mayo
- November 22, Friday—Ward Cases Dr S J Thannhauser
- November 23 Saturday—Liver Disease (Continued) Dr S J Thannhauser
- November 25 Monday—Heart Clinic Dr S H Proger and Mrs C Janeway
- November 26 Tuesday—X Ray Demonstration Dr A. Ettinger
- November 27 Wednesday—Ward Cases Dr S J Thannhauser
- November 29 Friday—Ward Cases Dr S J Thannhauser
- November 30 Saturday—Peptic Ulcer Dr S J Thannhauser

## HARVARD MEDICAL SCHOOL

THE GEORGE W GAY LECTURE ON MEDICAL ETHICS  
Amphitheatre C at 5 P.M.  
Thursday November 7—Dr James B Herrick of Chicago

## LECTURES ON "THE CARE OF THE PATIENT"

Amphitheatre C at 5 P.M.  
Thursday November 14—Dr Arthur R. Crandell of Taunton.  
Thursday, November 21—Dr David D Scannell of Boston.

## FAULKNER HOSPITAL CLINICAL MEETING

The next clinical meeting at the Faulkner Hospital will be held on Thursday November 7 at 5 00 P.M. In addition to the usual clinical pathological conference Dr Chester M Jones will talk on "Enteritis Symptomatology and Diagnosis". All physicians are invited.

## ESSEX SOUTH DISTRICT MEDICAL SOCIETY

The regular meeting of the Essex South District Medical Society will be held Wednesday November 6 1935 at the Beverly Hospital  
Clinic at 5 P.M. Dinner at 7 P.M.

Speaker Dr Charles E Mongan of Somerville President of the Massachusetts Medical Society who will talk on "Matters of Interest to the Medical Profession."

HARTFORD CARVILL, M.D., *President*  
R. E. STONE, M.D. *Secretary*

## BARNSTABLE DISTRICT MEDICAL SOCIETY

THURSDAY NOVEMBER 7 1935

Business Dinner 12 30 at Bill Cox's Sea Grill Hyannis Park.

Scientific Meeting 2-4 P.M. at Cape Cod Hospital  
Dr Henry Pinkerton—Results of Tumor Research at Falmouth Institute

Mr Walter Hughes—The Sex Factor in Cancer  
Dr Samuel M Beale—Clinical Experiences  
Discussion opened by Dr Shields Warren.

J L B VAIL, M.D., *Secretary*

## WILLIAM HARVEY SOCIETY

The next meeting of the William Harvey Society will be held Friday November 8 in the Auditorium of the Beth Israel Hospital Boston at 8 00 P.M.

## PROGRAM

Speaker Dr Harold E. B. Pardee Assistant Professor of Clinical Medicine, Cornell University Medical School.

Subject "Arteriosclerotic Heart Disease."

Chairman Dr Cadis Phipps, Professor of Medicine Tufts College Medical School

## THE ATLANTIC DERMATOLOGICAL CONFERENCE

This meeting will be held in Boston, Mass. Saturday November 9 1935

Clinical Meeting at the Boston City Hospital

1 30 P.M. Luncheon at the Boston City Hospital in complement to the conference by the Board of Trustees

2 15 P.M. Demonstration of 30 cases

4 00 P.M. Discussion of the cases with complete freedom of thought guaranteed under the Constitution of the Conference which is revered by all but has been preserved by none

Dinner at the Hotel Kenmore 490 Commonwealth Avenue

7 00 P.M. "Be large in mirth anon we'll drink a measure the table round" Macbeth III 4

7 30 P.M. Sit down and feed and welcome to our table As You Like It, II 7

Newell Bent, Jr., Explorer Naturalist and Photographer will show motion pictures and chat of his trip which he made alone from Cape Town to Cairo. He climbed the snow-capped volcano Killimajaro he hunted big game with his camera and he consorted at times with cannibals

The conference is limited strictly to its members.

J HARTER BLAISDELL, M.D., *Secretary*



## HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held in the Peter Bent Brigham Hospital Amphitheatre (Shattuck Street Entrance), Tuesday evening, November 12, at 8 15 P M

## PROGRAM

## Presentation of Cases

Recent Studies in Yellow Fever—A Virus Disease  
By Dr Frederick F Russell, Lecturer in Preventive Medicine and Hygiene, Harvard Medical School  
MARSHALL N FULTON, M D, Secretary

SOCIETY MEETINGS, CONGRESSES  
AND CONFERENCESCALENDAR OF BOSTON DISTRICT FOR THE WEEK  
BEGINNING MONDAY, NOVEMBER 4, 1935

## Monday, November 4—

- \*9-10 A M Boston Dispensary, 25 Bennet Street, Boston Nephritic Clinic Dr R W Buck

## Tuesday, November 5—

- \*9-10 A M Boston Dispensary, 25 Bennet Street, Boston "Diagnosis of Spinal Conditions" Dr J D Adams
- 2 30 P M Pediatric Ward Vist. Massachusetts Eye and Ear Infirmary
- 7 45 P M Gardner Auditorium, State House, Boston "Keeping Mentally Fit" Dr Joseph Jastrow

## Wednesday, November 6—

- \*9-10 A M Boston Dispensary, 25 Bennet Street, Boston Ward Cases Dr S J Thannhauser
- †12 M Clinico-Pathological Conference Children's Hospital

## Thursday, November 7—

- \*8 30-9 30 A M Clinic Surgical Staff of the Peter Bent Brigham Hospital, at the Peter Bent Brigham Hospital
- \*9-10 A M Boston Dispensary, 25 Bennet Street, Boston "Revision of Interpretation of Laboratory Tests for Syphilis" (Cont'd) Dr W A Hinton
- \*3 30 P M Medical Clinic at the Peter Bent Brigham Hospital
- 5 P M Clinical Meeting, Faulkner Hospital
- 5 P M Harvard Medical School The George W Gay Lecture on 'Medical Ethics'

## Friday, November 8—

- \*9-10 A.M. Boston Dispensary, 25 Bennet Street, Boston Ward Cases Dr S J Thannhauser
- 12 M Clinical Meeting of the Children's Medical Staff. Ether Dome Massachusetts General Hospital
- \*12-1 Boston University School of Medicine Surgical Clinic at the Boston City Hospital (Cheever Amphitheatre)
- 8 P M. William Harvey Society Auditorium, Beth Israel Hospital, Boston

## Saturday, November 9—

- \*9-10 A M Boston Dispensary, 25 Bennet Street, Boston Diabetes (Cont'd) Dr S J Thannhauser
- \*10-12 Staff rounds at the Peter Bent Brigham Hospital
- 1 30-4 P M The Atlantic Dermatological Conference, Boston City Hospital 7 P M. Hotel Kenmore

\*Open to the medical profession

†Open to Fellows of the Massachusetts Medical Society

November 1—Boston University School of Medicine Surgical Clinic at the Boston City Hospital See page 890

November 1 30—Boston Dispensary, Medical Conference Program See page 890

November 2, 9, 16, 23—Lectures by Dr S J Thannhauser See page 889

November 5 - January 14—Massachusetts Department of Education Mental Hygiene for Adults See page 890

November 7—Medical Clinic at the Peter Bent Brigham Hospital See page 889

November 7—Harvard Medical School The George W Gay Lecture on 'Medical Ethics' See page 891

November 7—Faulkner Hospital Clinical Meeting See page 891

November 8—William Harvey Society See page 891

November 8—Boston University School of Medicine Surgical Clinic at the Boston City Hospital See page 890

November 9—The Atlantic Dermatological Conference See page 891

November 12—Harvard Medical Society See notice elsewhere on this page

November 14—Harvard Medical School Lecture on "The Care of the Patient." See page 891

November 21—Harvard Medical School Lecture on "The Care of the Patient" See page 891

## DISTRICT MEDICAL SOCIETIES

## BARNSTABLE DISTRICT MEDICAL SOCIETY

November 7—See page 891

## ESSEX NORTH DISTRICT MEDICAL SOCIETY

November 7—Censors Meeting at the Hotel Bartlett, Main Street, Haverhill, at 4 P M

## ESSEX SOUTH DISTRICT MEDICAL SOCIETY

November 6—See page 891

## FRANKLIN DISTRICT MEDICAL SOCIETY

Meetings are held on the second Tuesday of November January, March and May at the Weldon Hotel, Greenfield, at 11 A.M.

CHARLES MOLINE, M D, Secretary

## HAMPDEN DISTRICT MEDICAL SOCIETY

November 7—Censors Meeting in the rooms of the Academy of Medicine, 20 Maple Street, Springfield, at 4 P M

## SUFFOLK DISTRICT MEDICAL SOCIETY

November 7—Censors' Meeting will be held at the Boston Medical Library, 8 Fenway, at 4 P M

December 11—Joint Meeting with the New England Heart Association at the Boston Medical Library "Constrictive Disease of the Pericardium," Dr Charles Sidney Burwell Discussion Dr Edward D Churchill and Dr Paul D White

January 29, 1936—Joint Meeting with the Boston Medical Library at 8 Fenway "Observations Around the World," Dr Walter B Cannon

March 18, 1936—Meeting at the Boston Medical Library "The Laboratory and Clinical Story of Fatigue," Dr Arlie V Bock and Dr David B Dill Discussion Dr Donald J McPherson and Dr Augustus Thorndike, Jr

April 29, 1936—Annual Meeting at the Boston Medical Library "The Treatment of Septicaemia," Dr Champ Lyons "The Pleurality of Scarletinal Streptococcus Toxin," Dr Sanford B Hooker Discussion Dr Hans Zinsser

The medical profession is cordially invited to attend all of these meetings

ROBERT L DeNORMANDIE, M D, President,  
CHARLES C LUND, M.D., Secretary,  
FRANCIS T HUNTER, M D,  
Boston Medical Library

## WORCESTER DISTRICT MEDICAL SOCIETY

November 7—Censors Meeting will be held in the Library Rooms of the Worcester District Medical Library, Inc., 34 Elm Street, Worcester, at 4 30 P M.

November 12—Wednesday evening Grafton State Hospital, North Grafton, Mass Dinner and scientific program. Subjects of program to be announced later

December 11—Wednesday evening St. Vincent Hospital, Worcester, Mass Dinner and scientific program Subjects of program to be announced later

January 8, 1936—Wednesday evening Worcester City Hospital, Worcester, Mass Dinner and scientific program Subjects of program to be announced later

February 12, 1936—Wednesday evening Worcester State Hospital, Worcester, Mass Dinner and scientific program Subjects of program to be announced later

March 11, 1936—Wednesday evening Memorial Hospital, Worcester, Mass Dinner and scientific program Subjects of program to be announced later

April 8, 1936—Wednesday evening Hahnemann Hospital, Worcester, Mass Dinner and scientific program Subjects of program to be announced later

May 13, 1936—Wednesday afternoon and evening Annual Meeting of Society Time, place and details of program to be announced in an April issue of the Journal.

ERWIN C MILLER, M.D., Secretary

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## THE MODERN TREATMENT OF CRANIOCEREBRAL INJURIES WITH ESPECIAL REFERENCE TO THE MAXIMUM PERMISSIBLE MORTALITY AND MORBIDITY\*

BY DONALD MUNRO, M.D.†

**INTRODUCTION** Ever since John Abernethy<sup>1</sup> protested 125 years ago against the "propriety and necessity of trephining the cranium under various circumstances consequent upon injuries of the head" as then advocated by "the members of the Academy of Surgery in France and Mr Pott in England" the treatment of craniocerebral injuries has been under dispute. At that time the pathological background was provided by the terms "concussion" or "commotio cerebri," "contusion" and "compression." These were still the diagnostic criteria 100 years later<sup>2</sup> at which time operation in the form of a subtemporal decompression was again the therapy of choice. A major step in the comprehension of the physiology involved had been taken, however by virtue of Cushing's completion of Kocher's work<sup>3</sup>. This led directly to the division of the old stage of "compression" into four parts and a demonstration of the fact that the symptoms produced at that time were caused by varying degrees of failure of the cerebral circulation<sup>4</sup>. Treatment, aside from the subtemporal decompression still included venesection. Lumbar puncture though new and therefore dangerous was being mentioned. Compound and depressed fractures and meningeal hemorrhage were then and had been for fifty years legitimate excuses for operative interference<sup>5</sup>.

After the World War the further and final steps elucidating the physiology of the cerebrospinal fluid were taken by Weed<sup>6</sup> and Dandy<sup>7</sup>. These led directly to the introduction of a new method of treatment, dehydration<sup>8</sup>, and the renewal of interest in and finally the adoption of an older one, lumbar puncture<sup>9</sup>.<sup>11, 12</sup> The subtemporal decompression was reserved for use in those cases whose intracranial pressure could not be lowered by repeated lumbar punctures and the other old indications for operative interference were confirmed<sup>13, 14</sup>. The pathological rather than the physiological

changes associated with head injury were coming to be recognized as the proper basis for treatment<sup>14, 15</sup>. The old terms "concussion," "contusion" and "compression" like the newer and more popular all inclusive "fractured skull" began to be abandoned.

This phase also is now coming to an end. Cerebral physiology as a whole rather than as a function of the cerebrospinal fluid mechanism or the individual corticospinal connections is more comprehensible thanks in great part to the work on cerebral circulation from Cobb's laboratory<sup>16</sup>. Exploratory trephine for diagnosis has been introduced and has justified its use<sup>16, 17</sup>. Today methods of treatment of craniocerebral injuries should be fairly standardized and for the most part beyond further discussion at present. Yet there are still those who refuse to heed the experience of others. Decompression operations are still being advocated<sup>18</sup>, the degree of unconsciousness of the patient on admission to the hospital is still being used as an exclusive diagnostic and prognostic indicator<sup>19, 20</sup>, the efficiency of increased intracranial pressure as a method of controlling traumatic cortical hemorrhage is still stated as a fact<sup>21, 22, 23</sup>, and morphin is still used as a method of treating impending respiratory paralysis<sup>22</sup>. It is not surprising therefore that, in the face of these disagreements among those who write as experts, the general surgeon should be confused. Being confused he refuses to adopt new methods until the entire situation has been clarified further. As Abernethy wrote in 1811 "many material points seem to one to require still further elucidation".

In this paper I propose to present for your consideration what I believe to be the rational pathologic basis for the detailed diagnosis of craniocerebral injuries to indicate the justifiable methods of treatment arising therefrom, and to set up a series of maximum mortality rates in accordance with the pathology under consideration. These figures are based on recent personal experience with about 900 cases of craniocerebral injury extending over a period of five years. They do not apply in any sense to other

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This Week's Issue" page 235.

than the acute injuries. Consideration of late so-called posttraumatic effects seems to me to be futile until the earlier diagnoses are standardized and the treatment of the acute stage is based upon a pathologic rather than a symptomatic or emotional background. As well attempt to predict the number of five year cures in a series of tumors of the breast without knowledge of either the percentage of malignancy or the methods used in the treatment of them.

*Diagnosis* It is universally acknowledged that the only reason for making a diagnosis is to provide a foundation upon which a rational method of treatment can be based. As an aid in establishing such a basis a knowledge of the normal anatomy and physiology of the diseased part is essential. Destructive organic lesions with resultant variations from this physiological norm constitute the pathology of the disease or injury under consideration. From this point of view it is obvious that the diagnosis of a given injury must be a word picture which shall describe the damage done to all the organs immediately involved. The physiologic abnormality, per se, indicates only necessary variations in the technique of treatment after the diagnosis is established. For example a diagnosis of increased intracranial pressure is equally applicable to both a lacerated brain and a cerebellar tumor. Yet reduction of this pressure by lumbar puncture may be curative in the former and fatal in the face of the latter pathologic entity. So, too, the incompleteness of "fractured skull" as a diagnosis intended to cover craniocerebral injuries in general is obvious when the medical examiner demonstrates an untreated subdural hematoma which has been an unrecognized and unmentioned companion of the break in the bone. Nor should the surgeon consider his pathological diagnosis complete enough to justify treatment until he has made use of all available and practical methods of investigation at his command. It is as handicapping to be without accurate data on the variations in cerebrospinal fluid pressure in a given case as it is to be without an x-ray examination. Both may well be immediately essential in the recognition of a rupture of a middle meningeal artery. In a compound fracture of the skull with possible involvement of a frontal sinus, however, the result of an

x-ray examination is infinitely more important therapeutically than the information obtainable by lumbar puncture. Furthermore in the presence of surgical shock neither examination can be carried out, nor is either one immediately practical or essential. Finally it must be constantly borne in mind that in craniocerebral injuries similar symptoms may be produced by widely divergent or overlapping pathologic changes. It is therefore safer for the patient if the surgeon, in the interests of accuracy, will be always ready to supplement the simpler diagnostic methods by actual operative exploration.

Treatment based on such a diagnostic background must of necessity be fundamentally correct. What variations there are will come in the technical aspects. Ultimate tests of its success will depend upon adequate statistical studies. These, to be of any value, must be founded upon a sufficiently large series of cases and must propound end results in mathematical terms rather than as individual opinions. "Ex cathedra" statements condemning or criticizing in "glittering generalities"<sup>18 20</sup> any therapeutic procedure cannot be too strongly condemned. On the other hand any method of treatment that is soundly conceived and that can produce a mathematically improved mortality or morbidity rate must supersede all previous methods.

*Non-Operative Treatment Group* Craniocerebral injuries can be properly divided into three groups in accordance with the operative or non-operative requirements of treatment and as complications of the fundamental conditions which have been already classified. The first of these is made up of the injuries whose pathology is such that non-operative treatment is indicated. It includes cases of concussion, edema and congestion, and contusion and laceration of the brain (Table 1). As a group these form about 70 per cent of all craniocerebral injuries. Under the methods of treatment outlined below the immediate mortality has been kept at about 12 per cent. This is figured on the entire group without regard to the time of death after admission. It tends to be high rather than low because with the formation of a specialized service in a general hospital the drift of severely injured or obscure

TABLE 1  
NON OPERABLE CASES

Ratio of Occurrence		Living	Dead	Total	Mortality %
70 5%	Non Operable Cases	545	76	621	12 0
0 9%	Concussion	8	0	8	0
23 2%	Edema and Congestion	204	1	205	0 4
46 3%	Contusion	237	12	249	4 8 } 39 6 }
	Laceration	96	63	159	
Total Series		724	156	880	17 72

cases admitted on the general surgical or medical sides is toward this service. This is evidenced by the fact that in 1930, which was the first year of the formal organization of the neurosurgical service at the Boston City Hospital, there were twenty-two compound fractured skulls admitted to the hospital. One half or eleven were treated on the general surgical side. In 1934, however, out of the same number (twenty-two) of the same injury admitted throughout the hospital, only two were treated on the general surgical side, the remaining twenty being either admitted directly for neurosurgical care or transferred there for treatment immediately after admission on the general surgical services.

**Concussion.** The primary and simplest form of craniocerebral injury is true concussion. The term has been widely used to cover all forms of brain injury regardless of the pathology present. It should be restricted solely to those cases in whom a blow on the head has produced some degree of unconsciousness but who on recovery present no residual symptoms or signs whatsoever. Upon it as a foundation are built the complicated and more serious succeeding brain injuries. It is probable that the primary unconsciousness practically always associated with craniocerebral injuries is due to this concussion.

The pathology of concussion is unknown and as a diagnosis it has to be made after the fact. Many theoretical explanations of it have been advanced however. Kral<sup>14</sup> quoting Hauptmann summarizes them as follows. First, the molecular disintegration theories with a negative anatomical background, secondly, the theories that predicate anatomical changes as the cause and thirdly, the theories that circulatory damage is the underlying factor though these last fail to answer the questions as to whether reflex or direct mechanical stimulation is the fundamental process and whether in its turn anemia or hyperemia is produced. The first of these is obviously impossible of proof or disproof. I merely wish to draw attention to the fact that since it was originally promulgated in the second half of the 18th century (Pettit by Kral<sup>14</sup>) there has been a considerable advance in physics beyond the molecular stage and any such theory today must include a disposition of not only molecules but also of ions and electrons. Chief among the second group must be classed Cassana's<sup>15</sup> theory of damage to subcortical vessels by pressure from a fluid wave. This is supposedly set up in response to a change in shape of the skull. It involves a movement inward by cerebrospinal fluid from the subarachnoid space along perivascular to perineuronal spaces with resulting hemorrhages and cell damage. It has been popularized by Martland<sup>16</sup> as the explanation of the condition known as 'punch drunk'. A violent histological insult to the

brain must be predicated to produce such changes. This is not compatible with the requirements of the definition that residual signs and symptoms must be absent after recovery of consciousness. Furthermore Cobb<sup>17</sup> states that the flow of cerebrospinal fluid is normally toward the subarachnoid space and is limited in its freedom of entrance therein by the tight collar of pia arachnoid which surrounds each vessel at the point of its entrance to or emergence from the surface of the brain. A reversal of this flow must include tearing of this collar with the strong probability of surface hemorrhage and cortical damage. These would prove to be adequate causes of post-concussion symptoms. It must be admitted, however, that as far as we know the compression malformation of the skull caused by severe blows may of itself produce the alterations associated with loss of consciousness. Here, however, microscopic and macroscopic changes are evident and post-concussional symptoms are frequent. The third or 'vascular change group' of theories finds more support. A usual cause of syncope or unconsciousness is a dilatation of the arterial side of the peripheral intra-cortical vascular bed. This is associated with a drop in blood pressure, pallor, sweating, nausea, etc. These vessels have been shown by Cobb<sup>18</sup> and others to be all interconnected and are not end arteries. They are moreover provided with vaso-dilator and vasoconstrictor nerves. This dilatation has been shown to result from the so-called 'vasovagal reflex'<sup>19</sup> in which stimuli reach these vessels along the vasodilators. Such a reflex can be set up by pressure on the abdominal carotid sinus<sup>20</sup>, as an accompaniment of surgical shock<sup>21</sup>, by direct experimental stimulation of the vagus nerve<sup>20</sup> as the result of experiencing great pain suddenly<sup>22</sup> and by an increased carbon dioxide content of the blood<sup>21</sup>. More recently in association with Faulkner and Maddock I have shown that a direct blow on an experimental animal's head will duplicate these signs and symptoms<sup>23</sup>. These experiments are as yet unfinished, however. Finally Weiss<sup>24</sup> has postulated a 'centre of consciousness,' damage to which produces unconsciousness in nontraumatic syncope, and Kral<sup>14</sup> adduces considerable inferential evidence to show that the mechanism controlling sleep is the seat of the changes which produce the primary unconsciousness in all cases of craniocerebral injury. On purely theoretical evidence then it seems to me to be probable that the original unconsciousness of craniocerebral injuries may be due in part to a 'vagal' reflex set up in response to the blow on the head. This dilates the arterial side of the intra-cortical capillary bed, produces anoxemia and throws out of gear the cerebral mechanism that keeps intact the state we know as consciousness. This mechanism may be in Weiss's seat of consciousness or in

the region given over to the initiation of sleep or in some other at present unknown point. If this abnormal reflex activity is corrected at this point, consciousness is regained, the patient complains of no symptoms and searching examination reveals no signs of residual cerebral pathology. Under these conditions and only under these can the patient be said to have suffered from *concussion*.

The pathology being unknown, treatment must be inefficient and inaccurate. Fortunately patients do not need treatment to recover. If any were indicated it should be at present such as would cause a contraction of the dilated arteries, interrupt the vagal reflex and raise the blood pressure. Cases of true concussion occur in about one per cent of the hospital type of craniocerebral injuries. In the population at large the occurrence is doubtless much greater. True concussion is probably never fatal.

The following histories illustrate true concussion.

No 1167. A child of four years tripped and hit her head on the pavement. She was unconscious and dazed for twelve hours. There was no vomiting, paralysis, seizures or bleeding externally. She was brought to the hospital at the end of eighteen hours for check up although she complained of no symptoms. Neurological and physical examinations were normal. Lumbar puncture showed clear, colorless fluid with a pressure of 150 mm. water, a protein of 22 mg. per cent and a negative gold sol and Wassermann. The patient was kept under observation for two weeks and was discharged well.

No 1755. A child of eleven years was struck by an automobile and knocked unconscious twenty minutes before admission. On admission he complained of no symptoms and neurological and physical examinations were completely normal except for a puncture wound in the centre of a right parietal hematoma. Lumbar puncture done at once showed a pressure of 90 with clear, colorless fluid with normal chemistry. X-rays showed a fracture of the squamous portion of the right temporal bone. The wound was healed and the patient discharged well fourteen days after admission.

*Edema and Congestion*—The next more serious type of craniocerebral injury that responds to non-operative therapeutics is edema and congestion or, as it is commonly referred to, cerebral edema. In it the pathology peculiar to this lesion is superimposed upon a concussion although the more primary condition is not usually included in the diagnosis. The pathology is well understood when it is present as an accompaniment of the more serious succeeding brain injuries but is not commonly seen as an entity because it rarely proves fatal per se. In its pure form it consists of an increase in brain volume caused by an overdilatation of the perivascular and perineuronal spaces. This is due to leakage from the arterial side of the intracortical capillary bed. In addition the absorption of the cerebrospinal fluid is impeded due

to the venous congestion which, in its turn, may go on to the point of rupture of the intracortical veins and the formation of perivascular hemorrhages. From the descriptions and photographs it is probable that Cassasa's<sup>25</sup> and Martland and Beling's<sup>26</sup> cases of perivascular hemorrhages belong in this category. When the dilation of the cortical arteries set up in response to the theoretical "vagal" reflex described above or as the result of some at present unknown factor continues beyond an indeterminable critical point, the normal relationship existing between the capillary arterial hydrostatic pressure and the colloid osmotic pressure of the perivascular and perineuronal fluid is altered.<sup>45</sup> The intravascular hydrostatic pressure is raised<sup>34</sup>, fluid escapes into the tissue spaces and the perivascular colloid osmotic pressure there is lowered in relation to that of the blood plasma. As this perivascular pressure drops the amount of fluid escaping from the capillaries increases. As a result the venous limb of the capillary loop becomes compressed.<sup>44</sup> This elevation of intravenous pressure interferes with the normal absorption of the tissue fluids which back up and thus make more pressure on the veins. Tissue anoxemia and further alterations from the normal colloid osmotic relationships between blood plasma and tissue fluids ensue.<sup>34</sup> This process is one that quickly influences the whole venous side of the cerebral vascular tree.<sup>27</sup> It will rupture small veins with resultant intracortical and subpial hemorrhages<sup>35, 36</sup> even without any preexisting injury. As a side effect, and because the absorption of the cerebrospinal fluid depends upon an essentially equal pressure in both ventriculoarachnoidal and cranial venous systems, the intracranial pressure may be raised. Through this lack of absorption in the face of continued production the cerebrospinal fluid backs up into the ventricles and cisternae until finally the majority of the cerebral subarachnoid reservoir is closed off by direct pressure of the surface of the swollen brain against the overlying dura. Recently Connors and Wright<sup>21</sup> have stated that such edema does not occur within forty-eight hours of the injury and are even skeptical of its late occurrence. They reason that they have never seen it at autopsy and further debar themselves from recognizing it in non-fatal cases by the inadequacy of their diagnostic criteria. On this basis and in consideration of an abundance of other evidence<sup>46</sup> their contention can be dismissed as incorrect.

The diagnosis of edema and congestion in addition to concussion and possibly including perivascular hemorrhage is made on the following evidence. There is a history of a blow on the head sufficiently severe to produce some degree of unconsciousness. This is followed on return to consciousness by either subjective symptoms

such as headache, dizziness or nausea or objective signs varying from a single cranial nerve palsy to hemiplegia with convulsions. The cerebrospinal fluid will be normal as to cell count and chemistry and free of blood. If the intracranial pressure is measured during the period of congestion it will be found to be above normal providing the patient is not dehydrated. Having in mind the pathology it is evident that treatment directed either toward shrinking the brain by dehydration or looking to removal by lumbar drainage of the excess backed up cerebrospinal fluid will be successful. Dehydration may be obtained by hypertonic glucose solution intravenously, magnesium sulphate by rectum or according to the method of Fay.<sup>3</sup> Its efficacy and indication should be checked by measurement of the intracranial pressure while it is being used however. Lumbar drainage is obtained by the removal at lumbar puncture of enough cerebrospinal fluid to reduce an abnormally high pressure to normal limits. Such a procedure should be repeated every twenty-four hours until two successive normal pressure measurements have been obtained previous to the withdrawal of any fluid.

Cases of edema and congestion make up about 23 per cent of all hospitalized cranio-cerebral injuries. This as in concussion, is probably low when considered in relation to its occurrence among the population at large. The mortality should never exceed  $\frac{1}{2}$  of 1 per cent. The associated presence of a bony injury alters neither the diagnosis nor the prognosis.

The following synopses illustrate different types of traumatic edema and congestion.

No 1267. A child of twelve years was struck by a sled while coasting and rendered unconscious for at least thirty minutes. On recovering consciousness she complained bitterly of a severe headache. Physical examination revealed a swelling over the left parietal region and neurological examination slight vertigo and past pointing of the left hand. Lumbar puncture on admission showed a pressure of 165 with clear colorless fluid and negative chemistry. Six days later the pressure was 200 mm. water and five days after that 140. The first lumbar puncture completely relieved her headache and she was discharged well sixteen days after admission.

No 1351. A forty year old man complaining of severe headaches and dizzy spells especially when active was admitted two and one half weeks following a head injury sustained during a homicidal attack. At that time he was unconscious for two hours with subsequent amnesia for twenty-four hours. He was in the hospital for one day and then home in bed except for meals for the balance of the time. His headaches which were severe were his only symptom. On admission his physical and neurological examinations were entirely negative. Lumbar puncture that day and the two following showed clear colorless fluid with a protein of 34 mg per cent and negative gold sol. Fifteen cc. of fluid was removed at each puncture. The pressures were respectively 200, 250 and 190

mm water. His headache was relieved at this time. Check up punctures six and eleven days after admission were normal. The patient was discharged well twenty days after admission.

No 1550. A forty three year old man was admitted one week after an injury to the head sustained in an automobile accident. This injury was superimposed on a shrapnel wound of the head sustained seventeen years before, another automobile accident fourteen years before some type of epileptic seizure with convulsions of the head one year before, multiple sclerosis and drug poisoning. Following the last accident he was unconscious one hour and during the following week took almost no fluids or food. On admission both legs and arms showed marked weakness with Babinski on the right, absent abdominal reflexes and a divergent squint all antedating his last accident. New signs were extreme emaciation and dehydration difficulty in swallowing urinary incontinence and drowsiness. Lumbar puncture showed a pressure of 60 mm. water or less with clear colorless normal cerebrospinal fluid except for a chloride of 600. In spite of fluids by vein and parenterally his coma increased his temperature rose to 103 and he died twenty-four hours after admission. An autopsy performed through the courtesy of the medical examiner demonstrated multiple minute perivascular hemorrhages of the brain with no other recent pathology and in addition to the clinical condition of advanced toxic dehydration.

**Contusion and Laceration.** If the cerebral pathology resulting from a relatively slight blow on the head as described above is complicated by the addition of a bruise of the surface of the brain with a rupture of one or more cortical vessels there is contusion of the brain. If the severity of the injury is sufficiently great actually to tear the cortical surface in addition, the condition is spoken of as a lacerated brain. These merge one with the other and any distinction except in the extreme cases is a purely arbitrary personal one. They are both associated with concussion with edema and congestion and almost certainly with subcortical hemorrhages. They both have free blood in the cerebrospinal fluid varying in amounts from a few hundred cells in the mildest contusion to pure blood in the most severe laceration. The increased intracranial pressure that is basically present because of the edema and congestion associated with interference with the absorption of cerebrospinal fluid from the high cranial intravenous pressure is further increased. This additional increase is from backing up of spinal fluid which is prevented from escaping by the mechanical plugging of the normal outlets in the arachnoidal villi by the free red blood cells.<sup>4</sup> This latter will be least marked and of little effect in the mild contusion case but on the other hand will be the chief cause in the bad laceration. In the severely injured patients anemia of the medulla follows the development of high intracranial pressure to be succeeded in its turn by a spread of the cerebral edema to this region with resultant respiratory failure and death.

The diagnosis of contusion or laceration is made on the following data. There is a history of a severe blow on the head which has in most cases produced a definite period of unconsciousness. In the more severe injuries this period may be prolonged for days and is as has often been stated<sup>19, 23</sup> an indication of the severity of the injury. With the coma may go loss of sphincter control, and especially in moribund cases a general flaccidity with absent tendon reflexes. Respiratory irregularity, sudden dilatation of the pupils, sudden increase in pulse rate and temperature occur just prior to death. If the injury is less severe the unconscious period will be succeeded by a varying degree of disorientation often accompanied by active delirium. Nausea and vomiting, particularly at first, are common. Headache and retrograde amnesia are almost invariable while any degree or form of somatic or cranial nerve palsy can

make up approximately 50 per cent of all hospitalized cranio-cerebral injuries. This is probably abnormally high when applied to the population at large. Under proper treatment the group mortality should not exceed 18 per cent. The presence of an associated bony injury tends to decrease the patient's chances of survival, not because the break in the bone is of itself necessarily lethal, but because the blow that produced it must have been applied with greater force. Either contusion or laceration or both may or may not be associated with any of the specialized forms of bone injury or any type of meningeal hemorrhage. These latter conditions, however, will be characterized by their own additional pathological peculiarities and must therefore be considered as separate diagnostic and therefore therapeutic entities.

*Operative Treatment Group* (Table 2) The group of cranio-cerebral injuries whose path-

TABLE 2  
OPERABLE CASES

Ratio of Occurrence			Living	Dead	Total	Mortality %	
92.1%	29.4%	Operative Cases	179	80	259	30.8	
	2.5%	Extradural Hematomas	9	13	22	59.0	
	4.6%	Depressed Fractures	39	2	41	4.8	
	10.5%	Compound Fractures	64	29	93	31.1	
	11.7%	Subdural Hematomas	67	36	103	34.9	
	70.5%	Non Operative Cases	545	76	621	12.0	
	Total Series		724	156	880	17.72	

occur. Surgical shock is an invariable accompaniment of the more seriously injured. The intracranial pressure is high providing the patient is neither dehydrated nor in surgical shock. The cerebrospinal fluid contains free blood, the amount varying in accordance with the severity of the damage to the brain surface. Because of the multiplicity of signs and symptoms the diagnosis is finally made on the history together with the cerebrospinal fluid findings as outlined.

Treatment is best carried out by a judicious combination of dehydration and lumbar drainage. However the surgeon should never lose sight of the fact that dehydration alone in these cases is inefficient in exact ratio to the amount of free blood in the cerebrospinal fluid. This is due, as pointed out above, to the mechanical blockade of the arachnoidal villi by the free red blood cells. The technique of both types of treatment is the same as described under the previous heading. Operative decompression as a therapeutic measure is contraindicated. Exploratory trephination however, can be properly employed as a diagnostic measure whenever the patient fails to improve after a suitable interval of properly executed non operative treatment such as outlined above.

ology is such that treatment must be through operative interference includes the cases of sub- and extradural hemorrhages and compound and depressed fractures of the skull. As a group they make up about 30 per cent of all cranio-cerebral injuries. Their mortality is high, 31 per cent, but doubtless will be lowered as we become more willing to operate earlier and as our operative technique improves. These injuries are all associated with, and complicated by their presence, the fundamental brain pathology that has been discussed above. In general, treatment must be such as will properly care for this latter condition as well as being so carried out as to avert sepsis, control otherwise fatal hemorrhage and obviate later epilepsy without undue risk to the patient. Ordinary diagnostic methods should be supplemented by bilateral exploratory trephinement without hesitation.

*Subdural Hemorrhage* The commonest member of this group is not as might be supposed from the textbooks the extradural hemorrhage but rather the subdural hemorrhage. These are practically always associated with one of the forms of brain pathology noted above when there has been an antecedent injury to the head. The exception under these conditions occurs in connection with trivial injuries which produce

Cases of contusion and laceration of the brain

no concussion even, but which do rupture a "bridging vein" as it crosses the subdural space. There are, of course, other sources for these clots unassociated with any injury as, for example, in the presence of scurvy or as an extension from a subarachnoid hemorrhage originating in cerebral vascular disease. H. Houston Merritt and I<sup>10</sup> have shown that the clots are formed from a mixture of blood and cerebrospinal fluid incarcerated within the subdural space. These divide themselves into three groups. The first and classical group is made up of those collections that consist of pure blood. These are completely encapsulated lesions, that may remain unrecognized for years and can be accurately placed as to age up to two to four months. The diagnosis may be made before operation but ordinarily the clot is found in the course of an exploration for tumor, after a ventriculogram, or while investigating the etiology of some previously unexplained epilepsy. This type is non-expandable. The second group is made up of solid clot mixed with blood dissolved in cerebrospinal fluid. Expansion takes place by dialysis up to three months after formation. After that they remain fixed in size as a freely movable collection of subdural fluid. They can be accurately placed as to age up to four months by a study of the protein content of the fluid portion and in my experience are finally diagnosed only by exploration. This is usually carried out for the purpose of determining why the patient is not improving under adequate non-operative treatment. The third group contains those that originate as a solution of blood in cerebrospinal fluid and that have no solid clot. They also slowly expand by dialysis up to one month after formation, and the diagnosis is again made only at exploratory craniotomy. They can be placed accurately as to age only up to three weeks but are known to remain for as long as seven years. The later stages of these second and third groups have been shown to be associated with symptomatology which is at present classed under the general heading of posttraumatic syndrome or neurosis. The early symptoms are those of the associated brain lesion. The cerebrospinal fluid is usually but not necessarily bloody. The intracranial pressure will be high in the early cases and during the expansion of the hematoma. After this process is completed, however, adjustments within the skull are gradually made and the intracranial pressure returns to normal levels. This is particularly true in groups two and three.

All types of clots are prone to be bilateral. As a result the major symptomatology may apparently appear as either ipsi or contralateral to the lesion. They are diagnosable only by bilateral exploratory temporal trephinement or other exploratory operative procedure. This is indicated whenever a patient suffering from

the varied pathology caused by a blow on the head fails to improve under adequate non-operative treatment such as outlined above. As a class subdural hematomas occur in about 12 per cent of all craniocerebral injuries. The present mortality of this group should not be over 35 per cent and probably can be reduced still further. For descriptive case reports the reader is referred to the paper on subdural hematomata by the writer.<sup>11</sup>

*Compound Fracture of the Skull* Compound fracture of the skull may be linear, comminuted or depressed. It may involve cranial venous sinuses or the frontal air sinuses. It often is associated with a severe type of brain pathology leading in the worst cases to actual loss of brain substance by extrusion onto the scalp. Whether considered from the point of view of mortality or immediate morbidity a compound fractured skull is a problem in sepsis and nothing else. All other considerations must go by the board. A detailed study of eighty-nine such cases has been recently completed<sup>12</sup> and demonstrates that if principles looking toward, on the one hand the avoidance of the spread of infection and on the other, toward the surgical excision of those bacteria already present, are followed the operative mortality and morbidity can be kept within reasonable figures. These principles include a diagnosis by palpation through the scalp wound, rigid avoidance of any cleansing of the scalp or scalp wound until just before starting the major operative procedure, operation after twenty-four hours and before forty-eight hours after the receipt of injury in an adequately equipped operating room, 100 per cent debridement including all layers and especially the bone and brain elimination of packs or drains in the wound except where the frontal sinus or supra-orbital ridge is involved, and complete closure of the scalp with two layers of fine silk sutures followed by scarification in the regions adjacent to the suture lines. Complicating sub or extracranial hematomata may occur and should be dealt with as required. In the same way the associated brain injury should be appropriately treated. Depressed portions of the fracture should be considered therapeutically only from the point of view that regards them as possible harborers of infection. The symptomatology is that of the underlying brain injury and may be modified by signs of an early meningitis or other type of cerebral infection. The cerebrospinal fluid findings are also those commonly seen in association with the uncomplicated cases of cerebral pathology. The gross mortality of this group of cases is about 32 per cent but if properly handled should be about 23 per cent. The present morbidity (largely from sepsis) is 23 per cent. This can and should be reduced to not over 5 per cent. Compound



fractures make up about 11 per cent of all craniocerebral injuries

It is significant that if the surgeon will assume the care of the cases of uncomplicated brain pathology together with those cases of subdural hematoma and compound fractures that go with them he will be treating 92 per cent of all craniocerebral injuries. Furthermore if this therapeutics is founded on diagnoses made from a pathologic point of view his mortality should be between 17 and 18 per cent. It is probable also that as he becomes more skillful in his operative work, he can even reduce this figure to the neighborhood of 15 per cent.

*Depressed Fractures of the Skull* Depressed fractures of the skull uncomplicated by any additional scalp, bone or meningeal injury occur in about 5 per cent of all craniocerebral injuries. It should not be forgotten, however, that such a fracture is invariably accompanied by some type of brain injury. The pathology of the bony injury itself is simple and varies from the "celluloid ball" type of depression in the soft skull of the infant, to the immovably locked fragmented depression seen in the adult. The symptoms and signs are those of the associated brain injury. The diagnosis is best made by stereoscopic x-rays. Palpation is notoriously inaccurate. It is impossible to differentiate a true depression and a subperiosteal hematoma. All depressed fractures except those in the region of the foramen magnum require operative elevation. This must usually be combined with a wide opening of the dura beneath the depression so that the surgeon can be sure that there is no subdural hemorrhage present. As little bone as possible, consistent with a complete elevation and exploration locally, should be removed. Particular care should be exercised to see that such a pure depressed fracture is never operated upon until the increased intracranial pressure resulting from the associated brain pathology has been permanently reestablished at normal. There is no necessity inherent in the bony deformity itself that calls for an emergency operative procedure. If operative interference is undertaken before the congestion of the cranial venous circulation is corrected, the technical aspect of the procedure is made infinitely more complicated. This is on account of the free bleeding. Under such circumstances a fatality from air embolus or operative hemorrhage may occur, particularly if a large venous sinus has been involved in the injury. The mortality rate certainly should not exceed 4 per cent and if the cases are properly handled ought to be zero.

*Extradural Hemorrhage* Extradural hemorrhage is the last of the ordinary craniocerebral injuries that requires treatment by operation. It is the classical example and has served for

years as the model upon which the symptomatology of all brain injuries were based. It is almost always an expanding lesion with a constantly growing blood clot lying between the skull and the dura. The source of the clot is found in a rupture of any part of the middle meningeal artery or one of the large cranial venous sinuses. The clots are commonly unilateral and cerebral though they may occur simultaneously on both sides of the cerebrum or singly over the cerebellum. They are always associated with some degree of brain injury. This latter is the cause of the primary period of unconsciousness in the typical history. If the original brain injury is relatively mild—as for example, concussion or mild edema and congestion—the patient regains consciousness and may even be subjectively normal before the slowly forming extradural clot has reached a size large enough to produce coma on its own account. Such a period of consciousness represents the second stage of the typical history. As the clot increases in size more and more brain deformity takes place, and the patient slowly gets confused and drowsy. Paralysis and convulsions may or may not be present. The final period of unconsciousness now appears. This will terminate in death if the condition is not promptly relieved. This so-called pathognomonic succession of events is not by any means constant. It does not occur for example, when the associated brain pathology is so severe as to keep the patient unconscious until the clot has reached such a size as to produce coma of its own accord. If the dura is loosely attached to the inner side of the skull, so the spread of the bleeding is little if at all impeded, such an enlargement of the clot may proceed at a very rapid pace indeed, and induced coma becomes a question of minutes rather than one of hours.

Blood in the cerebrospinal fluid may or may not be present, again depending upon the degree of brain injury. The intracranial pressure will be high. Roentgenological examination of the skull of these patients is extremely important. Although lateral stereoscopic films are preferable, a single film of the suspected side is better than none. The suspected presence of a clot will be sufficiently verified to justify operative interference if a fracture line can be shown to cross any part of the middle meningeal artery or a cranial venous sinus. It should be mentioned in passing that the x-ray films are useless unless they show both the fracture line and the vascular groove. The general symptomatology in these cases is extremely variable and cannot be depended upon from a diagnostic point of view except as confirmatory evidence which supports a suspicious history, positive x-ray films or adequate cerebrospinal fluid data.

The making of this diagnosis presents in my opinion the most difficult problem of any associated with the entire group of craniocerebral injuries. A pathognomonic history with a positive roentgenogram in the presence of a hemiplegia with or without aphasia or convulsions, and verified by clear cerebrospinal fluid at a high pressure can mean only one thing. This fortunate combination is, however, contrary to the general opinion, extraordinarily rare. His tones are more apt to be completely absent or at best inadequate or grossly inaccurate. Hemiplegias and convulsions occur only when the clot is thickest over the motor cortex and mathematically the chances are against the clot being commonly centered at that point. Furthermore it is not unknown in the late stages of the slowly developing clots to have a shift of hemiplegia to the ipsilateral side with a complete reversal of the ordinary expected reflex responses. In children hemiplegia and convulsions may also be associated with uncomplicated cerebral edema. The added presence of a severe cerebral contusion or laceration or surgical shock will completely alter the cerebrospinal fluid picture. In deed, I am convinced that the final diagnosis in many of these cases, just as in subdural hemorrhages, can be made only after exploratory trephination.

Treatment is operative at the earliest possible moment. At operation three things should be done in any event. The clot completely removed, the bleeding point identified and either ligated or clipped if arterial, or closed with muscle stamp graft if venous, and the dura opened sufficiently to provide a decompression. Postoperative transfusion will frequently be necessary not only to combat shock but also to correct actual blood loss. Postoperative malignant edema as in the subdural hematomas is prone to occur and must be rigorously combated by active dehydration, lumbar punctures, etc. Extradural hematomas occur in about 25 per cent of all craniocerebral injuries. They carry, in spite of earliest treatment, far and away the highest mortality. The rate in my series is 59 per cent and is exceeded only by that of complicating meningitis.

**Complications** Complications of craniocerebral injuries fall into three great classes

The first covers associated general bodily conditions and includes surgical shock and toxic dehydration. The second group is made up of conditions that are associated with infection in the cranial cavity other than compound fractures, and the third consists of non-specific linear fractures of the vault and base. From a practical point of view it has been impossible in this series of cases to determine the occurrence rate of any except toxic dehydration and intracranial sepsis, this last in the form of meningitis. These conditions occurred either singly or together in a total of 31 per cent of the cases with a mortality of 28.5 per cent.

#### COMPLICATIONS DUE TO ASSOCIATED GENERAL BODILY CONDITIONS

**Surgical Shock** The most important complication of a craniocerebral injury when it is present is surgical shock. This differs in no way from the surgical shock seen in other major surgical injuries except for an increased preponderance of associated coma. It is either actually or potentially present in all the major craniocerebral injuries. It is ordinarily characterized by a falling systolic or persistently low pulse pressure, pallor, cyanosis, sweating, subnormal temperature, high pulse and rapid respiratory rate. If unconscious the patient will have absent reflexes and often relaxed sphincters. If conscious, moderate disorientation associated with apprehension will frequently manifest itself. The cerebrospinal fluid pressure except in the cases of massive injury will be well below normal and may be zero. The fluid will usually be bloody because of the associated contusion or laceration of the brain. The diagnosis is provisionally made in the presence of any severe craniocerebral injury and confirmed by blood pressure, pulse and temperature readings and if necessary by the measurement of the cerebrospinal fluid pressure. The best treatment in my hands has been repeated small transfusions of blood (125-250 cc), and absolute prohibition of any diagnostic or therapeutic procedure that might or dinarily be used to treat the associated injury or injuries. If compatible blood is not available for transfusion (and it usually is not) 50 per cent glucose given intravenously in 100 cc. doses for adults is a satisfactory substitute until a donor can be obtained. Luminal in

TABLE 3  
COMPLICATIONS

Ratio of Occurrence		Living	Dead	Total	Mortality %
	Complications (Calculable)	35	13	38	34.2
31% { 26%	Dehydration	19	4	23	17.5
0.56% { 0.56%	Meningitis	1	4	5	80.0
	Cerebrospinal Fluid Fistula	2	3	5	60.0
5.0%	Justifiable Postoperative Infection	0	2	2	100.0
	Arteriovenous Aneurysm	1	0	1	0
	Aerocoele	2	0	0	0
	Total Series	724	150	880	17.72

small doses by mouth and caffeine sodiobenzoate intravenously are also of aid. In addition, of course, the customary general therapeutic measures are used.

**Toxic Dehydration** Toxic dehydration is commonly unrecognized as a complication of craniocerebral injuries. I know of no test which will accurately demonstrate its presence or absence, the diagnosis depending upon clinical evidence only. It characteristically occurs within the first three or four days or between the tenth and fourteenth days of the receipt of the accident. It should be suspected whenever the patient becomes more and more stuporous with a rising temperature and at the same time can be shown to have a subnormal intracranial pressure. This suspicion will be strengthened if one can ascertain that there has been vomiting, profuse sweating, overheating from too many blankets and intentional or accidental limitation of fluid intake especially in unconscious patients. Its presence will be confirmed when the patient's symptoms improve after the administration of 12,000 cc of fluid over a period of forty-eight hours. This is particularly true if coincidental with the improvement, the intracranial pressure rises to normal or over, and a fluid intake and output chart demonstrates an approximation rather than a separation of the two graphs. In the ten to fourteen day type the dehydration will usually be found to have a therapeutic basis. I have seen it develop at this time in association with too vigorous use of intravenous hypertonic glucose, magnesium sulphate solution by rectum and injudicious restriction of fluid intake. It is particularly apt to occur in young children and after ether anesthesia in operated cases. Here, too, symptomatic relief follows adequate hydration and is associated with a normal or rising intracranial pressure. This condition occurred in this group of cases twenty-three times or at the rate of 2.6 per cent. It is not necessarily a serious or fatal complication but it may prove so if unrecognized or if allowed to go on untreated. The mortality in this series was 17.8 per cent. The case history below is one of a typical case of toxic dehydration.

No 1675. This sixteen year old male was injured on January 16, 1935. He was in severe shock, vomited, had two convulsions and was treated with intravenous hypertonic glucose during four days. On January 20, a lumbar puncture showed bloody fluid under 120 mm of pressure. He was incontinent of urine, mildly irrational at times and for the rest unconscious and without localizing signs. His fluid under 120 mm of pressure. He was in compound fracture of the jaw and many contusions and had bled from his ears, nose and mouth. On January 22 his cerebrospinal fluid pressure was 60 mm water and the following day it was zero. His pulse remained as before as did the other signs. His fluid intake was raised to 5,600 cc on the 21st, 5,420, 9,040, 7,900, 9,000, 10,080, 10,090, 10,050, 7,700, 7,400, 7,100, and 6,200, respectively,

for the succeeding ten days after which it was kept at this level until discharge ten days later. On January 25 he was explored on account of a persistently slow pulse. A shrunken dry brain with an empty subarachnoid space  $\frac{1}{2}$  to  $\frac{3}{4}$  inch below the inner surface of the skull was demonstrated. On the 29th his pulse rose to 70 and his lumbar puncture showed a pressure of 30 mm water with xanthochromic fluid. On February 3, ten days after operation and with his fluid intake stabilized between 6,000 and 6,500, his cerebrospinal fluid pressure was 100, he was rational and cooperative and, except for his fractured jaw, was normal on examination. X-rays showed no fracture of the skull but a positive fracture of the jaw, his pulse ranged between 70-80, an electrocardiogram was normal and he was out of bed. He was discharged to the dentist, well of his cerebral complaints on February 14, 1935, twenty-three days after admission.

**Intracranial Sepsis** In this group are gathered those cases of intracranial sepsis—all as meningitis—that were neither associated with compound fractures as described above nor with any other operative procedure. They occurred in the course of the routine treatment of the cases of pure brain pathology. They differed in no way from purulent meningitis from any other cause. There were five cases in all, one of which survived,—a mortality of 80 per cent. This ratio of occurrence was slightly over  $\frac{1}{2}$  of 1 per cent. The case that recovered had a contusion of the brain with a complicating fracture of the middle and anterior fossae and localized meningitis. The other four were as follows, all being associated with contusion and laceration of the brain.—A fracture into the temporal bone with extension of infection from the ear, a fracture of the cribriform plate with extension from the nose, a fracture unspecified with influenzal meningitis and pneumococcus meningitis with no demonstrable fracture.

#### COMPLICATIONS DUE TO NON-SPECIFIC LINEAR FRACTURES OF THE VAULT AND BASE

**Non-Complicating Linear Fractures** Non-complicating linear fractures are perhaps the most common associate of craniocerebral injuries. They still serve as the focal point of medicolegal attention in the litigated portion of these injuries. It is only recently that there has been any inclination on the part of the medical profession to abandon their use as a diagnostic yardstick. Indeed I fear that the much beloved classical but useless distinction drawn between fractures of the vault and fractures of the base will never be given up. In general they may be distinguished from the complicating linear fractures by the fact that they are so located as to be completely outside the accessory para-nasal sinuses and the cavities of the ear and mastoid. Aside from the fact that their presence constitutes objective evidence that the bone containing the fracture has come forcibly in contact with some stationary or moving object, their significance lies in the damage they cause to vessels and nerves.

which have been in direct contact with them at the time of their formation. Of course it is also fair to assume that such a fracture in the base of the skull will have been caused by a greater application of force to the head than a comparative one in the vertex. The most commonly involved of those vessels and nerves is the middle meningeal artery followed in point of frequency by any one of the cranial venous sinuses. Such involvement practically always results in either sub or extradural hemorrhage and has been sufficiently discussed above. Other structures that may be damaged in this way are certain of the cranial nerves including the optic, the trigeminal and in certain instances the facial. The diagnoses in these cases are all too obvious and the treatment purely symptomatic. Finally the internal carotid artery and cavernous sinus may be torn in association with a plain linear fracture. This may produce an arteriovenous fistula. One such case occurred in this series and has been relieved of the worst of his symptoms by fractional ligation of the ipsilateral carotid arteries.

It should never be forgotten that the certain presence of a linear fracture can never be determined short of a postmortem examination. X rays are notoriously inexact even under the best conditions and it is well known that venous markings in the skull may at times mimic fracture lines to a remarkable degree. For these various reasons no attempt has been made in this series of cases to determine the ratio of occurrence of linear fractures of the skull.

**Complicating Linear Fractures.** Those linear fractures that involve the region of the ear and mastoid or the para nasal sinuses and cribiform plate present a different problem however. Perhaps the most common are the fractures of the temporal bone which extend into some part of the ear either with or without involvement of the mastoid also. Their presence permits communication between the sterile meningeal spaces and the possibly infected ear cavities. This communication is certain if cerebrospinal fluid escapes from the ear and is probable if there is any amount of bleeding from the same source. There may be associated damage to the 7th and 8th cranial nerves, the drum or the labyrinth. Symptoms may include dizziness, unsteadiness, nystagmus, loss of hearing, facial palsy and loss of the sense of taste. Any one of these may be either transitory or permanent. Meningitis by direct extension is a possibility at any time up to two weeks. Treatment is to avoid all treatment of the ear and especially to avoid plugging or irrigating the canal. If there is an escape of cerebrospinal fluid it is vital to provide enough drainage by early and frequent lumbar punctures. This permits collapse of the subarachnoid space adjacent to the menin-

geal tear. It is a fallacy as any one can demonstrate for himself, to suppose that these acute cerebrospinal fistulae exist except in the presence of and on account of a higher than normal intracranial pressure. These patients *do not* decompress themselves. It has proved impossible to determine the number of such fractures as well as the number of patients who had a temporary flow of cerebrospinal fluid from the ear. In one case, however, the flow did last long enough to justify the belief that a fistula had formed. This case recovered, the fistula closing of itself. Meningitis also occurred only once as the result of this type of fracture.

Fractures involving the cribiform plate or para nasal sinuses while less common are much more serious. In either case communication with the nose is established. The diagnosis is made by x ray, by the escape of cerebrospinal fluid from the nose with or without blood or by the demonstration of air inside the skull. By far the most dangerous cases are those with the cerebrospinal fluid rhinorrhea. The chances of successfully treating this by repeated lumbar punctures are extremely remote. Yet if it is not stopped promptly, meningitis is an inevitable certainty. The best opinion today seems to be that an early operative exposure of the fracture and upper end of the fistulous tract followed by plastic closure of the dural tear is essential. This should be undertaken as soon as the patient's condition warrants and with a full appreciation of its magnitude. I have done this three times with only one recovery. Of the other two, one, a child in whom the rhinorrhea had been present a year, died of surgical shock and inanition three days after the operation. The other died, as proved by autopsy, of exsanguination from the rupture of an aberrant artery in the sphenoidal sinus, the cause for which could not be determined. There was one other case which died unoperated as the result of a pneumococcus meningitis.

The abnormal presence of air in the skull is extremely rare and associated usually with a fracture of one frontal sinus. The air may not appear for some days and then only after a sneeze or an attempt by the patient to blow his nose. Its presence indicates a communication between the nose and the meninges and as such in all probability calls for operative interference. My personal experience is limited to two cases, however, both of which recovered completely with non operative therapeutics.

**Comment.** I cannot leave this detailed discussion without commenting on certain pernicious habits of thought and practice that seem to be immortal. I have discussed them in some detail in previous papers<sup>11</sup> and have shown that they arise from ignorance of the fundamental well recognized principles of cerebral physiology.

The first is the assumption that a decreased intracranial pressure will cause more cortical or intracortical bleeding. Such an assumption is obviously false when the close relationship between intracranial and intravenous pressure is realized. It is indisputable that increased intracranial pressure in craniocerebral injuries leads directly to cortical and intracortical hemorrhage. The way to prevent or lessen this hemorrhage is to lower—not raise—the intracranial pressure. Ignorance or disregard of this fundamental physiopathological fact is inexcusable on the part of any surgeon that accepts the responsibility of treating craniocerebral injuries.

The other matter that calls for emphatic discussion is the use of morphin in craniocerebral injuries. This procedure has been denounced over and over again but still persists. As is well known to anyone with experience in this type of case the cause of death following cerebral damage is respiratory paralysis. It should be equally well recognized that morphin is or may be a respiratory depressant. The folly therefore of treating an individual who is already in grave danger of dying from depressed respiration by the administration of a respiratory depressant is all too obvious. Morphin in any form should never be used where an increase in the intracranial pressure is either suspected or proved.

*Methods of Treatment* While methods of treatment of the fundamental pathology of craniocerebral injuries vary greatly in the hands of each individual surgeon, there are certain fundamental facts that stand out. The first is that subtemporal decompression as a method of relief of increased intracranial pressure per se is practically universally disapproved. Dandy<sup>18</sup> and in certain instances Coleman<sup>42</sup> are among the few who still insist on its efficacy. Extradural hemorrhage, depressed fractures and most compound fractures are generally agreed upon as imperative indications for operative interference. Subdural hematomas are neither generally recognized nor treated in the acute form nor will they be until the principle of exploratory transtemporal trephination as advocated by Coleman<sup>16</sup> and me<sup>17</sup> is more generally accepted. When recognized in the so-called chronic state their presence is also considered an indication for operation. For the rest, methods of treatment in general revolve around three principles. The first and simplest is that which advocates leaving the patient thoroughly alone except for keeping him in bed. This is no more than an overdone negativistic reaction to the indiscriminate operating that characterized the first part of this century. It is being rapidly abandoned as surgeons in general arrive at a better understanding of the problems involved. The second would have as a basis of

treatment, and, in most cases as the only treatment, the principle of dehydration. Fay is the chief exponent of this principle and has recently published a summary of his methods and results<sup>37</sup>. Despite his protestation to the contrary it is apparent that even in his hands dehydration alone cannot be depended upon and on p. 157 and following in his reprint he gives full directions for the treatment of his patients by "daily lumbar drainage" for from seven to ten days. To be sure, dehydration is carried out up to three months after discharge in an attempt to obviate posttraumatic syndromes, so-called, but this should constitute an entirely separate problem. In any event his "dehydration treatment" is only partly dehydration and his early results may as well be due to the "associated daily spinal drainage" as to the predicated shrinkage of the brain. The third general principle involves the use of decompression by lumbar drainage as the prime requisite. This may or may not be associated with added dehydration. It is not yet universally accepted as either safe or adequate<sup>21, 20, 19</sup> although it is by no means without authoritative supporters<sup>43, 22</sup>. I have shown by a study of parallel series of cases that its use definitely lowers the mortality rate<sup>41</sup>. It is generally conceded that the fear of causing a herniation of the cerebellum through the foramen magnum, previously justly ascribed to it on the basis of experience with tumors, is unjustified in these acute injuries. The most outspoken of its opponents is Dandy<sup>18</sup> who condemns it completely and utterly but quotes no figures to support his contention.

If one summarizes these apparently diverse views it is now becoming apparent that, in general, treatment of the acute craniocerebral injuries is coming to be based upon the pathology present and not upon the preconceived notions of any one surgeon. The dehydrationists are using lumbar puncture and the advocates of lumbar puncture use dehydration, while the "do nothings" as Fay has aptly called them are rapidly disappearing by way of "delayed glucose injections with insulin" or delayed lumbar drainage after 6 days<sup>21</sup>. While I do not for a moment contend that this "combination treatment" as outlined above is the final word, it is a long step beyond universal subtemporal decompression, and an equally long step beyond masterly inactivity. Furthermore it can be expected to lead to even greater efficiency through the more universal adoption of the exploratory transtemporal trephination.

*The General Surgeon's Responsibility in Craniocerebral Injuries* Swift<sup>44</sup> states that the approximate number of fractures of the skull which occur annually in the United States is around 112,000. Such figures emphasize what is well known, that the problem of

the craniocerebral injury belongs to the general surgeon. That does not mean that the specialist whether neurologist, or neurosurgeon, will not frequently prove indispensable to him, nor does it mean that in accepting these privileges the general surgeon can ignore the responsibilities that go with them. The first and most important of these responsibilities is as pointed out above, to acquire the habit of making a diagnosis on the pathology present rather

cotton and above all, an efficient suction machine. Without these minimum requirements the surgery of these accident cases is fraught with too much danger to the patient and it is safer in the long run to move him to a more fortunate community regardless of the urgency of the surgery and the dangers of transportation.

*The Maximum Permissible Mortality Rate in Craniocerebral Accidents (Table 4)* Mor-

TABLE 4  
MAXIMUM PERMISSIBLE AND COMPARATIVE MORTALITIES

	All Cases		Non-Operable		Operable		Complications	
	Total	Mor- tality	Total	Mor- tality	Total	Mor- tality	Mor- bidity	Total Mor- tality
Permissible Maximum		15.17%		10-12%		25%	5%	34%
Average from those below	119,734	24.1%						
Swift <sup>14</sup>	112,000	25%						
Munro <sup>15</sup>	1,450	17.5%	1211	11.6%	239	47.3%		
Hospital A <sup>16</sup>	1,173	39.5%						
Kennedy and Wortis <sup>17</sup>	1,000	37.8%			37	62%		
Munro	880	17.7%	621	12.0%	259	30.8%	23.4%	38.34.2%
Collected <sup>18</sup>	800	26.0%						
Connors and Wright <sup>19</sup>	798	20.3%						
Coleman <sup>20</sup>	696	18.5%						
Fay <sup>21</sup>	528	20.0%	363	18.4%				
Munro <sup>22</sup>	505	15.6%	376	10.3%	129	29.4%		
Dandy <sup>23</sup>	1	20%						

than on any presenting symptom. If this is done as accurately and completely as possible the efficiency of the appropriate treatment will depend only on the surgeon's knowledge of normal craniocerebral anatomy and physiology. Secondly, sufficient records must be kept and reviewed often enough to prove that treatment as instituted will keep the mortality rate below the maximum permissible limits. I am well aware that no such limits are at present available and propose therefore to set up an arbitrary but not necessarily final standard in the last section of this paper. It is sufficient to state here that at present the mortality of any numerically worth while all inclusive series of craniocerebral injuries should under no circumstances exceed 17 per cent.

If the general surgeon elects to treat only the non-operable type of craniocerebral injury his only other duty is to see to it that a competent trained surgeon is at hand to take over the care of the odd 30 per cent that do require operation. If on the other hand he should elect to treat all cases whether operable or not, he assumes the further duty of seeing that the hospital in which he works provides him with essential and proper equipment. This will include an adequately trained operating room force, such special instruments as a Hudson drill, a De Vibuss forceps, a silver clip outfit, ventricular needles, rongeurs, fine silk, fine curved needles and appropriate needle holders, adequate supplies of bone wax and sterile

tality rates for this type of injury have varied the past seven years between 39.5 and 15.6 per cent. I have taken the sum of ten series of 500 or more cases each as a basis for the average rate as it exists at present. This is in the neighborhood of 24 per cent on nearly 120,000 cases. Although published much less frequently, there are certain other data also available which demonstrate that a large share of this mortality lies among the operated cases or those that should have been operated upon and were not. It is in this group that the greatest improvement in the mortality rate can be looked for. Fortunately such a decrease will involve greater accuracy of diagnosis all around which will tend to improve the figures in the other group also. However, no change of any kind can be looked for unless an arbitrary standard of excellence is set up. Being arbitrary it can be lowered for cause at any time. Being a standard, figures that do not approximate its levels point inevitably to the fact that something has been wrong with the work in back of them. This should lead to frequent wholesome revision of methods of diagnosis and treatment. Such an arbitrary standard maximum permissible mortality is offered in the accompanying table. The figures are divided in accordance with the grouping suggested in the body of this paper. They apply only to the acute cases of craniocerebral injury and include all cases regardless of the time of death after admission to the hospital or

the onset of treatment They are in no sense final and I have reason to believe that they will be easily surpassed in the near future Until they are, however, opinions in regard to the efficacy of any given treatment that are not backed up by as good or better statistical evidence must be looked at askance

## SUMMARY

- 1 Fourteen out of twenty craniocerebral injuries do not require operation as a method of treatment
- 2 Of these fourteen, one will die
- 3 Of the remaining six, two will die—but *all* should be treated by operation
- 4 One case out of forty will be sufficiently dehydrated to be toxic from that cause
- 5 One out of 200 unoperated cases will have complicating intracranial sepsis almost certainly in the form of meningitis
- 6 One out of twenty operated cases will have justifiable postoperative sepsis either in the form of meningitis or cortical abscess
- 7 Modern treatment of the acute stages of craniocerebral injuries requires that both the diagnosis and therapeutics must be based on the pathology present
- 8 Any method of treatment based on these requirements is suitable providing the mortality and morbidity rates are kept within the permissible maximum limits arbitrarily set up as described above
- 9 A method of treatment combining dehydration, lumbar decompression, exploratory trephination and appropriate reparative operative procedures is outlined

## REFERENCES

- 1 Abernethy John Surgical Observation on Injuries of the Head and on Miscellaneous Subjects Philadelphia Thomas Dobson 1811
- 2 Keen's Surgery Volume 3 p 182 et seq Philadelphia and London W B Saunders Co 1916
- 3 Cushing Harvey Some experimental and clinical observations concerning states of increased intracranial tension Am J M Sc. 124: 375 1902
- 4 Warren, J Mason Surgical Observations with Cases and Operation, Boston Ticknor and Fields 1867
- 5 Da Costa J C Modern Surgery Edition 5 Philadelphia W B Saunders Co p 703 et seq 1907
- 6 Weed L H Studies on cerebro spinal fluid II The theories of drainage of cerebro spinal fluid with an analysis of the methods of investigation J M Research 26: 21 1914-15 III. The pathways of escape from the sub-arachnoid spaces with particular reference to the arachnoid villi J M Research 26: 51 1914-15 IV The dual source of cerebrospinal fluid J M Research 26: 93 1914-15
- 7 Dandy W E Experimental hydrocephalus Ann Surg 70: 129 1919
- 8 Foley F E B Clinical uses of salt solution in conditions of increased intracranial tension Surg Gynec. Obst 33: 126 1921
- 9 Weed L H and Hughson W Intracranial venous pressure and cerebrospinal fluid pressure as affected by intravenous injection of solutions of various concentrations Am J Physiol 68: 101 1921
- 10 Jackson H Management of acute cranial injuries by early exact determination of intracranial pressure and its relief by lumbar drainage Surg Gynec. Obst. 34: 494 1922
- 11 Munro D Therapeutic value of lumbar puncture in treatment of cranial and intracranial injury Boston M & S J 193: 1187 1925
- 12 Munro D Cranial and intracranial damage in the new born end-result study of 117 cases Surg Gynec. Obst. 47: 622 1928
- 13 Munro D Indications for operation in injuries involving brain Boston M. & S J 188: 342 1922
- 14 Connors J F Management of intracranial injuries with or without fracture Ann Surg 81: 901 1925
- 15 Forbes H S Cerebral circulation observation and measurement of pial vessels Arch Neurol & Psychiat. 19: 751 1928 and succeeding papers by Cobb S Lennox, W G Wolff Harold G Putnam T J etc
- 16 Coleman C C Chronic subdural hematoma diagnosis and treatment Am J Surg 28: 341 1935
- 17 Munro D Diagnosis and treatment of subdural hematomata report of 62 cases New Eng J Med 210: 1145 1934
- 18 Dandy W E Diagnosis and treatment of injuries of head J A M A 101: 772, 1933
- 19 Jefferson, Geoffrey, and others Acute head injuries Lancet 2: 815 (Aug) 1933
- 20 Craig W McK Physiology pathology and treatment of craniocerebral injuries New Eng J Med 212: 777 1935
- 21 Connors J F and Wright, L T Fractures of skull review and summary of 30 years experience Ann Surg 100: 996 1934
- 22 Crutchfield W Gayle Management of acute head injuries South Med & Surg 97: 74 1935
- 23 Russell W Ritchie Cerebral involvement in head injury A study based on the examination of two hundred cases Brain 55: 549 1932
- 24 Kral A. Zur Pathophysiologie der Commotiocerebri Med Klin Berlin 31: 876-880 1935
- 25 Cassassa Charles S B Multiple traumatic cerebral hemorrhages Proc N Y Path Soc N S 24: 101 1924
- 26 Martland H S Punch drunk J A. M. A 91: 1103 1928
- 27 Cobb Stanley Cytology and Cellular Pathology of the Nervous System Wilder Penfield Editor Section XII Edition I. New York Paul B Hoeber p 577
- 28 Weiss Soma Syncope and Related Syndromes Accepted for publication by the Oxford System of Medicine
- 29 Capps R. B Ferris E B Munro D and Weiss Soma The carotid sinus syndrome In preparation
- 30 Forbes H S and Wolff H. G Cerebral circulation. III. The vasomotor control of cerebral vessels Arch. Neurol. & Psychiat. 19: 1057 1928
- 31 Wolff H. G and Lennox, W G Cerebral circulation. XII. The effect on pial vessels of variations in the oxygen and carbon dioxide content of the blood Arch Neurol. & Psychiat. 23: 1097 1930
- 32 Faulkner J M. Maddock, S J Merritt H H and Munro D Experimental concussion Unpublished work
- 33 Martland H. S and Beling, C C Traumatic cerebral hemorrhage Arch Neurol & Psychiat. 22: 1001 1929
- 34 Fishberg Arthur M Hypertension and Nephritis Second Edition Philadelphia Lea and Febiger p 86 et seq 1931
- 35 Cobb Stanley and Hubbard J P Cerebral hemorrhage from venous and capillary stasis report of five cases with autopsy Am J M Sc 178: 693 1929
- 36 Byers R K. and Hass G M Thrombosis of the dural venous sinuses in infancy and in childhood Am J Dis Child 45: 1161 1933
- 37 Fay Temple Treatment of acute and chronic cases of cerebral trauma by methods of dehydration. Ann. Surg 101: 76 1935
- 38 Cushing Harvey Studies in Intracranial Physiology and Surgery Oxford Medical Publications London Oxford University Press 1926
- 39 Merritt H H. and Munro D The surgical pathology of subdural hematomata A study of 105 cases Accepted May 27 1935 for publication by the Arch Neurol & Psychiat.
- 40 Munro D The treatment of compound fracture of the skull. A study of 185 cases New Eng J Med 213: 551 (Sept 19) 1935
- 41 Munro D The diagnosis treatment and immediate prognosis of cerebral trauma an introductory study of 1494 cases New Eng J Med 210: 287 1934
- 42 Coleman Claude C The management of acute brain injuries with special reference to the indications for operation. J A. M. A. 97: 1696 1931
- 43 Kennedy Foster and Wortis S B How to treat head injuries and appraise them J A. M. A. 98: 1552 1932
- 44 Swift, G W Cerebrocranial injuries review of 190 cases West. J Surg 40: 343 (July) 1932
- 45 Rand C W Histologic studies of the brain in cases of fatal injury to the head. I. Preliminary report Arch. Surg 22: 738 1931
- Ibid with Courville C B II. Changes in choroid plexus and ependyma 23: 357 1931
- Ibid III Reaction of microglia and oligodendroglia Arch Neurol & Psychiat. 27: 605 1932
- Ibid IV Reaction of the classic neuroglia 27: 134 1932
- Ibid V Changes in the nerve fibres 31: 527 1934

THE PROGNOSTIC SIGNIFICANCE OF A SPONTANEOUS  
DIURESIS IN ACUTE OR SUBACUTE  
DISEASE OF THE LIVER\*

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IT has been known for some years that there exists an intimate relation between the movement of water in the body and hepatic activity. Until recently a disturbance of this relationship has been recognized largely as occurring in cases of portal cirrhosis and rarely in biliary cirrhosis, with the production of free fluid in the peritoneal cavity. The explanation of the formation of such collections of ascitic fluid has largely concerned itself with the existence of a mechanical portal vein obstruction. Textbook articles dealing with diseases of the liver have paid scant attention to such a disturbance in body fluid except when dealing with chronic diseases of the organ although occasional mention has been made of the appearance of ascites during the course of acute yellow atrophy. In recent years scattered case reports have appeared in the literature directing attention to the fact that in the presence of acute or subacute liver disease not only may the formation of ascites be observed but also the abnormal accumulation of fluid in the subcutaneous tissues and in the pleural cavities. With rare exceptions however, attention has been directed mainly to the existence of ascites and only casual mention has been made of the abnormal collection of fluid elsewhere in the body.

Among the earlier observations, Jones and Minot<sup>1</sup> described the occurrence of ascites in a patient suffering from a severe, prolonged case of catarrhal jaundice. Similar cases were reported by Bauer<sup>2</sup>, Meyer and Learner<sup>3</sup>, Root and others<sup>4</sup>. Ascites and edema were noted by Umber<sup>5</sup>, Adler<sup>6</sup>, Halbit<sup>7</sup>, Voisin<sup>8</sup>, Fiesinger and Walter<sup>9</sup> and others, in cases of acute yellow atrophy of unknown origin. An interesting group of cases was reported by Lederer<sup>10</sup> in which jaundice and anuria were associated with what appeared to be an acute pneumococcus infection. Scattered clinical observations have mentioned oliguria in simple jaundice occasionally resulting in the collection of water in the tissues and Adler<sup>6</sup> has commented on the concentration of the urine and oliguria occasionally seen in cancer of the liver and hepatic cirrhosis. Weiss<sup>11</sup> noted that the administration of salyrgan to a group of normal individuals produced a much smaller urinary output and a much less marked loss of weight

than in patients suffering from liver disease. Bauer<sup>2</sup>, Weir<sup>12</sup>, Butsch<sup>13</sup>, Poindexter and Greene<sup>14</sup> and others report cases of toxic damage to the liver from arsenic, carbon tetrachloride, cinchophen, and other toxic substances, again reporting ascites as one of the significant findings. For the most part observers have paid less attention to the occurrence of edema than to the presence of ascites although a few authors, such as Damany<sup>15</sup>, have pointed out the fact that even in cases of cirrhosis peripheral edema may appear long before the appearance of ascites. We have had frequent examples of this clinical fact. Experimentally, Bollman and Mann<sup>16</sup> have reported the production of ascites in animals where liver injury was produced by toxic agents or by operative procedures, and the subsequent use of a diet rich in meat or meat extractives.

In addition to the above observations, attention has been paid to the beneficial results following the production of diuresis by one or another drug in the presence of liver disease. In an apparently forgotten textbook article Van Noorden<sup>17</sup> in 1888 described the increased secretion of urine seen in patients recovering from catarrhal jaundice. Joslin<sup>18</sup> also noted such an occurrence following the use of large amounts of bile salts in cases of biliary obstruction. For the most part, however, such interest has been directed toward patients suffering from chronic diseases of the liver and therapeutic measures have attempted to bring about a diuresis only when ascites existed. The successful production of diuresis following the use of such drugs as the mercurial or caffeine diuretics has been considered of good prognostic significance in most instances. There is little doubt that in such chronic cases the occurrence of ascites has been properly interpreted as evidence of disturbed liver function and the successful establishment of diuresis by one of various methods usually has been associated with at least a partial restoration to normal function. It has long been known by experienced clinicians that even in cases of severe chronic liver disease, ascites may disappear spontaneously without the use of diuretics. In such instances this occurrence has almost always been followed by a return to normal hepatic function. It has been obvious in such cases that the establishment of a collateral circulation offered a logical explanation for the disappearance of a mechanically produced ascites and edema in a certain proportion of cases. What has been less obvious is the fact that other factors were involved if one would attempt to explain sat

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isfactorly the disappearance of ascites and edema, not only in the chronic cases but in the more acute conditions affecting the liver. One important factor which is receiving attention at present is the level of serum protein and the ratio of serum albumin and serum globulin. It is frequently true in the more chronic forms of liver disease that this ratio is seriously disturbed with an associated tendency to the abnormal accumulation of fluid in the tissues and serous cavities. Other factors such as a reduced liver glycogen content, increased capillary permeability, possibly the low blood urea and interference with proper bile salt absorption, are probably operative in the production of edema, ascites, or hydrothorax, as these conditions occur in the more acute liver diseases. As yet no satisfactory explanation has been offered which adequately correlates the abnormal physical findings and the known physicochemical changes which take place in the presence of disturbances in liver physiology.

In the present paper we wish particularly to stress the prognostic importance of a spontaneous diuresis occurring in acute or subacute diseases of the liver in the presence of obvious ascites, edema, or hydrothorax, and even in cases where there is no demonstrable evidence of an abnormal accumulation of fluid in the body. Case reports such as those referred to above have paid little attention to minimal accumulations of fluid in the tissues in hepatic disease and little or no attention has been paid to the prognostic significance of diuresis occurring in patients with such disease in the absence of specific drug therapy.

CLINICAL OBSERVATIONS

The clinical material forming the basis of the observations recorded in this communication was for the most part collected from the records of ward patients in the Massachusetts General

Hospital. The cases were selected only in so far as we attempted to procure records in which there was a fairly adequate measurement of fluid intake and urine output as noted on the hospital chart. Fifty cases seen in recent years were thus selected and included patients suffering from infectious (catarrhal) jaundice, acute or subacute toxic jaundice due to arsenic or cinchophen, one case of subacute liver injury due to antimony poisoning, acute and subacute yellow atrophy of unknown origin, cases of obstructive jaundice due to mechanical blocking of the common bile duct and finally, cases of cirrhosis with an acute exacerbation of jaundice, presumably due to excessive amounts of alcohol. All of the cases included in this group were definitely jaundiced inasmuch as it was felt that this symptom, except in cases of mechanical common duct obstruction, indicated definite parenchymatous hepatic disturbances which probably involved the function of the entire organ. The diagnosis in each instance was an obvious one or was substantiated by operation or by necropsy. For the most part they represented instances of acute or subacute liver injury due either to infection or to specific toxins. In practically every instance the usual laboratory studies were made but are not reported here. Table 1 indicates the duration of jaundice, and the presence or absence of ascites, edema, or hydrothorax. Treatment in every instance consisted of complete bed rest, a diet high in simple carbohydrates, and intravenous glucose injections in the patients who were most severely ill. Obviously any specific toxin known to be associated with the condition was withdrawn. Salyrgan was used in an attempt to produce a diuresis in a few cases which we will comment upon. The majority of the patients were seriously ill and in a certain number of cases a fatal outcome ensued as a direct result of the hepatic insufficiency. (See table 1.) For

TABLE 1

ANALYSIS OF 50 CASES OF ACUTE AND SUBACUTE DISEASE OF THE LIVER WITH SPECIAL REFERENCE TO THE APPEARANCE OF ABNORMAL ACCUMULATION OF FLUID IN THE TISSUES AND THE OCCURRENCE OF SPONTANEOUS DIURESIS

Diagnosis	Duration of Jaundice	Ascites	Edema	Hydrothorax	Spon-taneous Diuresis	Outcome
Catarrhal Jaundice	33 days	0	0	0	++	Recovered
"	27 days	0	0	0	+++	"
"	42 days	0	0	0	++	"
"	21 days	0	0	0	0	"
Catarrhal Jaundice—Diabetes	21 days	0	0	0	++	"
Catarrhal Jaundice	14 days	0	0	0	++	"
Catarrhal Jaundice—Alcoholism	29 days	0	+++	?	+	"
Catarrhal Jaundice—Diabetes	14 days	0	0	0	++	"
Catarrhal Jaundice	28 days	0	0	0	+	"
"	6 days	0	0	0	+	"
Catarrhal Jaundice—Diabetes	30 days	0	0	0	++	"

TABLE 1 (Concluded)

Diagnosis	Duration of Jaundice	Ascites	Edema	Hydrothorax	Spontaneous Diuresis	Outcome
"	34 days	0	0	0	+	"
Catarrhal Jaundice	5 days	0	0	0	0	
"	34 days	0	0	0	+	
"	33 days	0	+	0	+	"
Catarrhal Jaundice—Diabetes	18 days	0	0	0	++	
Catarrhal Jaundice	46 days	0	0	0	0	
Arsenical Jaundice	50 days	0	0	0	++	"
"	26 days	0	0	0	+	
"	35 days	0	0	0	++	"
"	35 days	0	0	0	+	
"	35 days	0	0	0	++	
"	77 days	0	0	0	+	
"	35 days	0	+	0	+	
"	35 days	?	0	0	++	Slightly improved
"	30 days	0	0	0	++	"
"	56 days	0	++	0	+	
"	21 days	0	0	0	+	Recovered
Subacute Yellow Atrophy—Arsphenamine	50 days	"	0	0	++	
Subacute Yellow Atrophy—Cause Unknown	40 days	0	0	0	++	
Subacute Yellow Atrophy—Streptococcus Septicemia	126 days	+	+	?	Salyrgan Diuresis	Died
Acute Yellow Atrophy—Cholelithiasis	62 days	+	++	0	0	
Acute Yellow Atrophy—Cause Unknown	40 days	+	+	0	++	Little change
Subacute Yellow Atrophy—Cinchophen	58 days	+	+	Pulmonary edema	+++	Recovered
Acute Yellow Atrophy—Cause Unknown	35 days	0	0	0	++	Died
Acute Yellow Atrophy—Cinchophen	14 days	0	0	Pulmonary edema	++	
Subacute Yellow Atrophy—Arsphenamine	55 days	0	0	0	+++	Recovered
Subacute Yellow Atrophy—Cinchophen	42 days+	0	0	0	+++	"
Acute Yellow Atrophy—Toxic Cirrhosis	28 days	++	+	Pulmonary edema	0	Died
Subacute Yellow Atrophy—Toxic Cirrhosis	35 days	0	0	0	++	Recovered
Acute Yellow Atrophy—Alcoholic Cirrhosis	80 days	++	++	0	Salyrgan Diuresis	Died
Toxic Cirrhosis						
? Acute Yellow Atrophy	105 days	+	+	?	0	"
Acute Yellow Atrophy—Alcoholic Cirrhosis	28 days	++	+	0	0	
Pylephlebitis	56 days	0	0	0	0	"
Obstructive Jaundice—Carcinoma Pancreas	120 days	0	0	Pulmonary edema	+	Unimproved
Obstructive Jaundice—Cholelithiasis	20 days	0	0	0	0	Relieved
"	78 days	0	0	0	+	Relieved
Cholangitis—Cholelithiasis	22 days	0	0	0	++	Relieved
Subacute Yellow Atrophy—Alcoholic Cirrhosis	80 days	+	+	+	+++	Recovered
Alcoholic Cirrhosis—Subacute Yellow Atrophy	150 days	++	+	+	+++	Recovered

the purposes of this communication we shall content ourselves with commenting upon the presence or absence of abnormal accumulations of fluid in the individual patients and the occurrence of a spontaneous diuresis during the course of the disease. It will be noted from table 1 that ascites was present in ten of the fifty patients. Peripheral edema was noted in fifteen cases and hydrothorax, unilateral or bilateral, in four cases. Spontaneous diuresis was observed in more than two-thirds of the patients studied.

Some explanation is needed at this point concerning the expression, spontaneous diuresis. With the exception of a few patients who were followed on the metabolism ward, routine measurements of fluid intake and urine output by student nurses were accepted as accurate figures. Such an assumption of accuracy is obviously unwarranted as anyone who is familiar with routine ward work will testify. At best the figures are only approximations of actual values, inasmuch as the estimations are made by different individuals during the course of a patient's illness and by nurses of varying degrees of ability. It is the purpose of the paper to point out that even with such approximate measurements there was a frequent finding of increased urinary output which took place at some point in the course of the disease in those cases which progressed favorably. For purposes of practical clinical use it seems justifiable to emphasize the importance of such gross estimations of changes in water content of the body as a simple method of determining hepatic function. In a few instances patients were observed on the metabolism ward where extremely accurate measurements were made and these were found to agree consistently with the observations made in the general wards. It was considered that a diuresis occurred when the twenty-four hour volume of urine appeared to be at least eighty per cent of the estimated fluid intake. In many instances the urinary output was far in excess of fluid taken by mouth and administered by clysis. In patients suffering from milder forms of liver damage, evidence of diuresis might be observed only for a matter of one or two days but in the more severe cases, particularly in the presence of ascites, edema or hydrothorax, it persisted for a much longer period of time and was associated with the disappearance of the abnormal accumulation of fluid. It was an interesting clinical fact that in many instances a very marked diuresis occurred in patients showing no clinical evidence of edema or ascites. With the exception of four patients who were suffering from an acute exacerbation of a long-standing cirrhosis any diuresis noted occurred without the use of salyrgan or other diuretic drugs. It was present just as frequently in those patients who were treated with a high carbohydrate diet

alone as in those patients who received glucose intravenously as an additional therapeutic measure. Progress in the individual cases was determined by observation of the patient's symptoms, the appearance or disappearance of an abnormal accumulation of fluid, the presence or absence of a mousy breath (due to acetamid), variation in the intensity of the jaundice, with corresponding changes in the color of the urine and stools, relief of various gastrointestinal symptoms, such as nausea and vomiting, and improvement in appetite, as well as by periodic laboratory tests such as the quantitative estimation of serum bilirubin and the excretion of bromsulphalein. Routine notes by interns stating that the patient was improved were accepted in many instances as the first evidence of clinical improvement although many of the patients were observed by us personally throughout the course of the disease. With rare exceptions the occurrence of a spontaneous diuresis was associated with definite improvement in the patient's condition. Frequently it preceded any noticeable clinical improvement by several days and at times the patient remarked that he was beginning to feel better even though there was no measurable diminution in jaundice or other evidence of improvement in hepatic function. In practically every instance where a spontaneous diuresis of any degree was noted the case progressed to a favorable outcome as far as the immediate attack was concerned. Those patients failing to show a diuresis fall into two distinct groups—the first, those who were only moderately ill and who from the day of admission to the hospital failed to exhibit signs of extreme liver insufficiency, secondly, those who died as a result of the disease involving the liver. Where ascites, edema, or hydrothorax existed these invariably disappeared as clinical improvement progressed. Some of the more striking observations are given below as illustrating the findings in the group under discussion.

#### CASE 1 Female Aged fourteen years Diagnosis Catarrhal Jaundice

**Present Illness** Four days before admission acute onset of headache, malaise, nausea and vomiting. Two days later the urine became dark and stools light colored. There was some epigastric pain associated with meals.

**Past History** Irrelevant.

**Physical Examination** Moderately jaundiced, palpable liver and spleen, tenderness along the edge of the liver, no ascites or edema.

**Laboratory Tests** Urine contained bile for seventeen days. Bile present in stools throughout course of the disease. Quantitative van den Bergh 25 mgm bilirubin per 100 cc serum on admission, rising to 30 mgm per 100 cc and subsequently falling to 12 mgm per 100 cc on discharge.

**Treatment.** High carbohydrate diet and intravenous administration of glucose daily for the first ten days in the hospital.

**Progress.** Fluid intake and output measured after the tenth day. Marked diuresis noted on the sixteenth and twenty-fifth days after admission. Steady

improvement in clinical condition throughout the course of the disease. Fluid intake and urine output are shown graphically in chart 1.

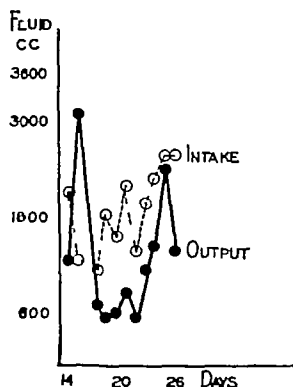


CHART 1. Catarrhal Jaundice.

CASE 2. Male. Aged twenty years. Diagnosis: Catarrhal Jaundice.

Present Illness. Five weeks before admission acute upper respiratory infection with otitis media. Twelve days before admission dark urine and clay

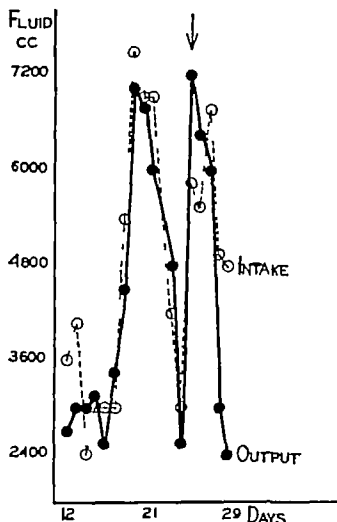


CHART 2. Catarrhal Jaundice.

Arrow indicates appearance of obvious clinical improvement.

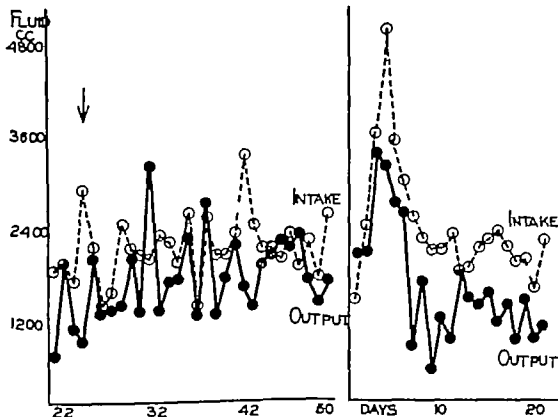


CHART 3. Catarrhal Jaundice, Diabetes Mellitus.

Arrow indicates appearance of obvious clinical improvement.

Left hand graph represents findings made on patient during course of catarrhal jaundice. Right hand graph represents findings made on second admission when patient was completely free of any hepatic disorder.

colored stools associated with anorexia and mild epigastric pain. Jaundice noted eight days before admission.

Past History. Irrelevant.

Physical Examination. Very deeply jaundiced in individual liver edge just felt, tip of spleen palpable two fingers below left costal margin in the anterior axillary line. No evidence of ascites or edema.

Laboratory Tests. Urine showed large amounts

of bile throughout stay in hospital. Stools began to show brown for the first time the day after admission but returned to a clay color the next day and continued so for eleven days returning gradually to normal from that point in the disease. Quantitative van den Bergh on admission 23 mgm per 100 cc. at peak of jaundice 37 mgm per 100 cc. on discharge 5.4 mgm per 100 cc. Progress. Anorexia continued for about two

weeks after admission at which time the patient remarked that he was feeling definitely better. Diuresis was first noted on the sixth, seventh, and eighth days after admission (see chart 2) and continued to recur during the next two weeks. A striking diuresis was noted about twelve days after admission. At no time was there evidence of any abnormal accumulation of fluid. Treatment consisted entirely of rest and dietary measures. Patient discharged practically free of jaundice and with no untoward symptoms.

**CASE 3** Female Aged sixteen years Diagnosis Catarrhal Jaundice, Diabetes Mellitus

**Present Illness** Known diabetes for five years. Three weeks before admission cramp-like pain in lower abdomen with anorexia, nausea, vomiting. Treated in another hospital for acidosis for five days. Three weeks before admission acute respiratory infection with chills, cough and fever. Jaundice noted day before admission to hospital.

**Past History** Irrelevant.

**Physical Examination** Well developed and nourished girl, with moderate jaundice, acidotic breath, liver edge felt three fingers below right costal margin in midclavicular line and slightly tender. Spleen just palpable, tender abscess on left thigh (following insulin administration).

**Laboratory Tests** Urine showed positive tests for bile for fifteen days after admission. Stools clay colored for same period. Quantitative van den Bergh on admission 8 mgm per 100 cc. Sixty per cent retention of bromsulphalein one-half hour after intravenous administration of dye. CO<sub>2</sub> combining power on admission 59 volumes per cent. Fifteen days after admission, van den Bergh 17.5, twenty-five days after admission van den Bergh 15 mgm per 100 cc.

**Treatment** High carbohydrate diet with sufficient insulin to care for the excessive amount of carbohydrate.

**Progress** Patient improved rapidly although clearing of the jaundice was relatively slow. The abscess in the groin healed with moderate rapidity and on discharge the liver had returned to practically normal size and the spleen was not palpable. Sharp diuresis occurred on the twelfth, eighteenth and twenty-sixth days although it will be noted that there was a very high urine output throughout the course of the patient's stay in the hospital. It is of interest to compare the fluid intake and urine output as shown graphically in chart 3 with similar determinations made at a subsequent admission of the patient to the hospital, at which time there was no evidence of a striking diuresis such as was noted when the patient came into the hospital with catarrhal jaundice. It is of interest to note that in this group of fifty cases there were four instances of catarrhal jaundice associated with diabetes mellitus.

**CASE 4** Female Aged thirty-nine years Diagnosis Arsphenamine Jaundice, Tertiary Syphilis, Cystitis

**Present Illness** Four weeks preceding admission, nausea and vomiting, epigastric distress. Jaundice noted one week before admission.

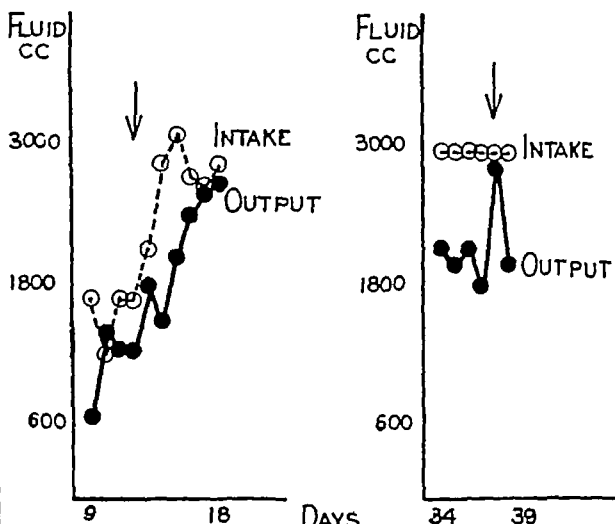
**Past History** Acquired syphilis ten years before admission. No treatment until ten months before admission. Usual antisyphilitic therapy with arsphenamine followed by bismuth and later followed by a second course of arsphenamine.

**Physical Examination** Deep jaundice with right upper quadrant tenderness and a palpable liver two fingers below costal margin.

**Laboratory Data** On admission stools clay colored, urine dark during first week in hospital. Bromsulphalein retention 100 per cent. Quantitative van den Bergh 20 mgm bilirubin per 100 cc.

**Treatment** Rest in bed, cessation of arsenical treatment, and a high carbohydrate diet.

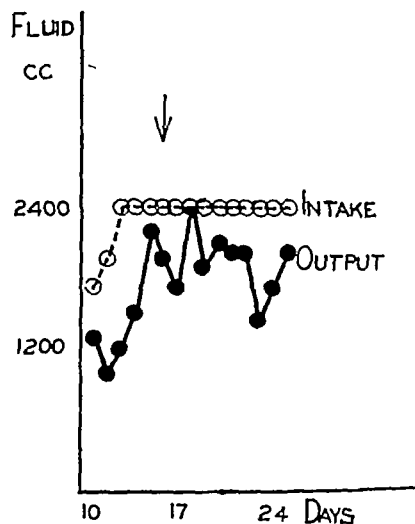
**Progress** Diuresis noted second day after admission and again eight days after admission (chart 4). Complete disappearance of nausea with improvement in symptoms after five days. Patient discharged symptom free after two weeks with slight residual jaundice. During the following two weeks



**CHART 4** Arsphenamine Jaundice. Arrow indicates the appearance of obvious clinical improvement.

Left and right hand graphs represent first and second admissions respectively. Right hand graph represents readings made on the Metabolism Ward.

did not adhere to diet and did not rest. Nausea and vomiting returned in association with fainting attacks and jaundice deepened. Returned to hospital, again placed on high carbohydrate diet and given one intravenous injection of 1000 cc 10 per cent glucose on the second day. Diuresis noted on the fourth day with associated disappearance of



**CHART 5** Arsphenamine Jaundice. Arrow indicates the appearance of obvious clinical improvement.

symptoms. Uninterrupted improvement from this point. No abnormal accumulation of fluid noted at any time.

**CASE 5\*** Male Aged thirty-six years Diagnosis Arsphenamine Jaundice Congenital Syphilis

**Present Illness** Intensive bismuth therapy start

\*Metabolism ward

ed one and one-half years before admission. Weekly injections of arspenamine for one month up to ten weeks before admission. Dark urine, clay colored stools, anorexia, epigastric burning.

Past History Negative except for congenital syphilis.

Physical Examination. Deeply jaundiced. Liver edge felt 8 cm. below costal margin in midclavicular line, very tender, spleen felt easily. Mousy odor to breath. No edema, ascites or hydrothorax.

Laboratory Data. Van den Bergh on admission 28 mgm. bilirubin per 100 cc. Six days later 12 mgm. per 100 cc. On discharge 4.0 mgm per 100 cc.

Treatment. High carbohydrate diet and rest.

Progress. Beginning diuresis noted on sixth day after admission (chart 5) with associated improvement in appetite and freedom from nausea. Diuresis continued with uninterrupted improvement in clinical symptoms.

Case 6 Female Aged forty-seven years. Diagnosis Subacute Yellow Atrophy Due to Cinchophen.

Present Illness Joint pains for some months preceding admission with intermittent cinchophen (Parastan) therapy for about four months. Acute respiratory infection four months before admission. Two months before admission, malaise weakness

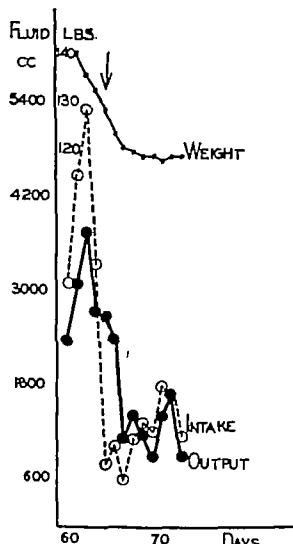


CHART 6 Subacute Yellow Atrophy—Cinchophen. Arrow indicates the appearance of obvious clinical improvement.

and nausea followed one week later by jaundice with clay-colored stools and dark urine. Slight elevation of temperature and in bed for a few days. For six weeks before admission up and around with increasing loss of strength increasing jaundice and intense itching. For at least three weeks before admission, edema of feet and swelling of the abdomen. Cough and pleuritic pain in left chest some weeks before admission.

Past History Unimportant except for mild attack of catarrhal jaundice twenty-eight years before.

Physical Examination. Well-developed, fairly nourished deeply jaundiced woman. Purpuric spots over body and excoorations from scratching. Signs of bilateral hydrothorax, obvious ascites and edema of the legs. Edge of liver felt by careful palpation about three fingers below costal margin and tender. Spleen just palpable.

Laboratory Data. Stools brown. Urine showed a trace of bile. Bromsulphalein test showed 85 per cent retention at the end of one-half hour. Van den Bergh 5.5 mgm. bilirubin per 100 cc.

Treatment. Rest in bed removal of cinchophen high carbohydrate diet, intravenous glucose 1000 cc. 10 per cent daily for first four days.

Progress. Marked diuresis throughout fifth to eighth days inclusive with a relatively high urinary output and again marked diuresis on the twentieth day (chart 6). Loss of twenty-four pounds in body weight in ten days with associated improvement in symptoms and rather rapid disappearance of edema and ascites. At the end of three weeks liver and spleen not palpable. On discharge van den Bergh showed 3.5 mgm. bilirubin per 100 cc., bromsulphalein test showed 35 per cent retention at the end of half an hour. Subsequent course was one of gradual but continuous improvement as determined by symptoms and laboratory data.

Case 7 Female Aged forty six years. Diagnosis Subacute Yellow Atrophy—Cinchophen.

Present Illness Five years before admission painful swollen knees following an acute infection

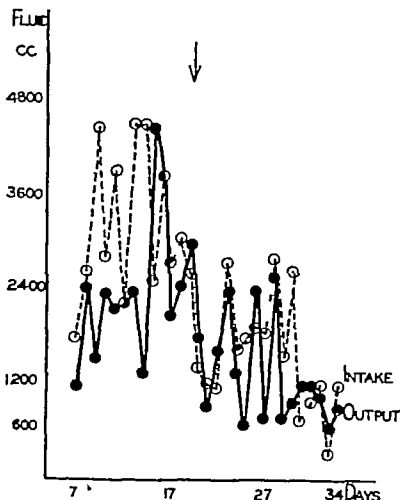


CHART 7 Subacute Yellow Atrophy—Cinchophen. Arrow indicates the appearance of obvious clinical improvement.

Treated by local applications and an "expensive medicine" nature unknown. Six weeks later developed nausea, vomiting and jaundice and lost weight. Entered another hospital and after six weeks of rest and a high carbohydrate diet was discharged relieved. Apparently in good health until one month before admission when patient complained of right shoulder pain. In three days she took Atophan tablets followed in three weeks by

Probably a cinchophen derivative.

dark urine, anorexia, weakness, nausea and vomiting and obvious jaundice

Past History Irrelevant.

Physical Examination Deeply jaundiced, liver edge palpable, slightly tender Tip of spleen just felt No edema, ascites or hydrothorax

Laboratory Data Stools light brown. Urine contained bile on admission examination Van den Bergh 125 mgm bilirubin per 100 cc, gradually increasing over a period of three weeks to 42 mgm. per 100 cc

Progress One week after admission moderate diuresis noted (chart 7) Twelve days after admission marked diuresis associated with gradual improvement in symptoms, return of appetite, diminution of vomiting, and gradual but steady improvement from this point on, although no decrease in the jaundice was noted until one month after admission

CASE 8\* Female Aged fifty six years Diagnosis Granuloma Inguinale Subacute Yellow Atrophy due to Antimony

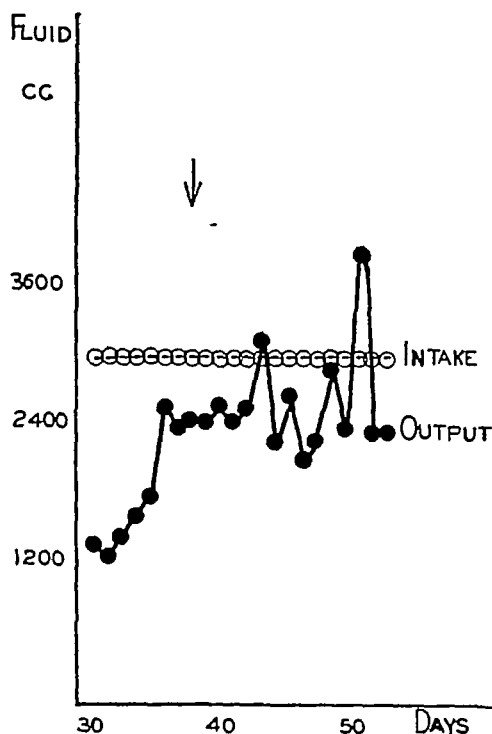


CHART 8 Liver Damage Due to Antimony Poisoning  
Arrow indicates the appearance of obvious clinical improvement

Present Illness Admitted to Skin Service five months previously with a diagnosis of granuloma inguinale, semi-weekly injections since admission. One month prior to admission to the medical ward, anorexia, nausea and dizziness following medication. One week later dark urine with jaundice appeared, nine days before transfer to medical ward

Past History Essentially negative

Physical Examination Well developed and nourished, deeply jaundiced Granuloma inguinale lesions and liver easily palpable

Laboratory Data Urine contained a large amount of bile Stools light brown Van den Bergh on admission 23 mgm per 100 cc At discharge 25 days later 64 mgm per 100 cc

Treatment Rest, omission of tartar emetic treatment, high carbohydrate diet.

Progress Disappearance of nausea and vomiting and return of appetite one week after admission in

\*Metabolism Ward

association with the appearance of moderate diuresis. Marked diuresis noted on the thirteenth day, and this persisted with a still more striking increase up to the nineteenth day (chart 8). Continuous and rapid improvement in symptoms. At no time was there any evidence of abnormal accumulation of fluid in the tissues or serous cavities.

CASE 9 Female Aged thirty nine years Diagnosis Acute Yellow Atrophy, cause unknown.

Present Illness Insidious onset of anorexia for some weeks before admission. Much more marked two and one-half weeks before admission with actual distaste for food. Five days before admission painless jaundice with dark urine and clay-colored stools.

Past History Negative

Physical Examination Well developed and fairly nourished woman with deep jaundice. Liver edge felt two fingers below right costal margin in mid clavicular line and slightly tender. Spleen just palpable.

Laboratory Data Van den Bergh on admission was 16 mgm bilirubin per 100 cc, six weeks after

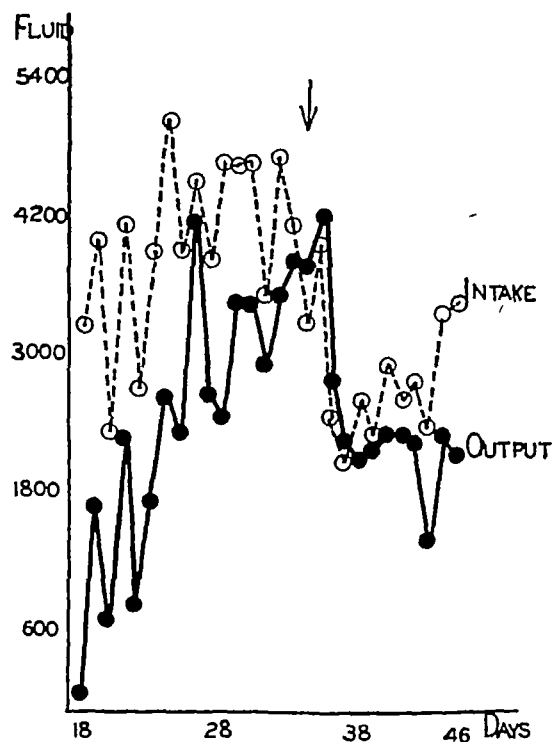


CHART 9 Acute Yellow Atrophy  
Arrow indicates the appearance of obvious clinical improvement

admission (at discharge) 14 mgm per 100 cc. Stools clay colored for first ten days. Urine continued to show very slight quantities of bile at discharge.

Treatment Continuous rest in bed, moderately high carbohydrate diet which patient was practically unable to take until real clinical improvement set in, constant intravenous glucose for sixteen days, after which it was discontinued because of thrombosis of all available veins. High carbohydrate diet from then on.

Progress Patient became rapidly more jaundiced and anorexia, nausea and vomiting increased. Liver diminished in size and her condition was steadily becoming worse during the first two weeks on the ward. Ascites thought to be present toward the end of this period and definite pitting edema of the ankles. At about the time that further intravenous treatment became impossible because of throm-

basis of the veins a definite diuresis occurred (chart 9) and coincidentally the patient's appetite began to return and the nausea commenced to disappear. From this point on it was possible to feed the patient adequate amounts of food by mouth and within five days there was a complete disappearance of edema and all signs of ascites had vanished. At this point the patient began to improve strikingly her appetite was good and there was no difficulty thereafter from any gastrointestinal symptoms. Two months after admission patient was discharged, still jaundiced but apparently progressing favorably. Patient subsequently had a complete return to normal health so far as could be ascertained by the usual clinical measures or by any liver function tests.

**CASE 10** Male Aged forty three years. Diagnosis ? Cirrhosis of the Liver Acute Yellow Atrophy

**Present Illness.** Two months before admission patient was operated on because of sharp right lower quadrant pain and the appendix was removed. At the time it was noted that there was much free

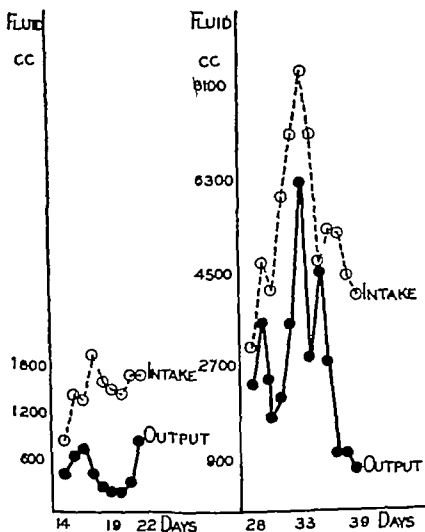


CHART 10 The above graphs illustrate the findings in two fatal cases of acute yellow atrophy

fluid in the abdomen. Rise in temperature, day following operation and constant fever until present admission to the Massachusetts General Hospital, associated with great weakness. Swelling of the abdomen was noted followed by jaundice and clay colored stools. The patient complained of dull aching pain over the entire abdomen.

**Physical Examination.** Deeply jaundiced individual with obvious ascites and a few distended veins on the abdominal wall. Slight pitting edema of the lower extremities. After abdominal paracentesis it was possible to palpate the left lobe of an enlarged liver just above an epigastric hernia and in addition the tip of the spleen was felt two centimeters below the left costal margin.

**Laboratory Data.** Van den Bergh on admission was 16 mgm. per 100 cc. five days later 23 mgm.

eight days after admission 30 mgm. Bromsulphalein retention on admission 100+ per cent. Tyrosin crystals found in urine a few days after admission.

**Treatment.** Rest in bed. High carbohydrate diet during the first days of stay in hospital and daily intravenous injections of ten per cent glucose.

**Progress.** Jaundice and ascites increased rapidly. Patient went downhill steadily became irrational after a few days finally sank into a deep coma and died thirteen days after admission. No diuresis noted.

It is of incidental interest that sharp abdominal pain associated with acute yellow atrophy may simulate an acute surgical emergency and only at operation may the underlying condition be determined.

**CASE 11** Male Aged sixty three years. Diagnosis Acute Yellow Atrophy cause unknown

**Present Illness.** Four weeks before admission joint pains lasting for one week with onset of constipation occasional vomiting after meals, marked anorexia and weakness. For three weeks before admission dark urine clay-colored stools and clinical jaundice.

**Past History.** Unimportant.

**Physical Examination.** Very sick underweight deeply jaundiced individual with mousy breath liver edge not palpable. Ascites and edema.

**Laboratory Data.** On admission the urine contained bile. Stools were light colored. Admission van den Bergh showed 22 mgm. bilirubin per 100 cc. which on the following day increased to 26 mgm. per 100 cc. Bromsulphalein retention 100+ per cent at the end of one-half hour. Further determinations not made.

**Treatment.** Patient was obviously extremely ill from the day of admission and intravenous glucose was administered daily 1000 cc. 10 per cent glucose a day for nine days. In addition an attempt was made to feed him a high carbohydrate diet by means of a nasal catheter.

**Progress.** Patient became comatose after about the third day and went steadily downhill and died thirteen days after admission. It will be noted from the graph shown on the right side of chart 10 that with the exception of a transient rise in the output of urine on the ninth day there was no diuresis during the patient's stay in the hospital.

The following case (chart 11) is presented as an example of chronic liver disease (alcoholic cirrhosis) with a superimposed acute exacerbation of liver injury which probably could be termed acute yellow atrophy. The acute phase of the disease was treated by the use of all the various measures indicated in the treatment of serious liver disease. Diuresis was obtained after the repeated administration of salyrgan and was in contrast to the spontaneous diuresis noted in the preceding cases. With the excretion of larger amounts of urine following each administration of salyrgan there was clinical improvement in the condition of the patient but not until a marked spontaneous diuresis occurred did consistent improvement take place.

**CASE 12** Male Aged thirty-eight years. Diagnosis Alcoholic Cirrhosis of the Liver and Subacute Yellow Atrophy Due to Excessive Alcohol.

**Past History.** Essentially negative except for a mild attack of catarrhal jaundice twenty years before. Patient has been an exceedingly heavy drinker using at least a quart of alcohol daily. Two years before present illness he developed a crippling per



ipheral neuritis which incapacitated him for a year, during which time he stopped drinking. At the end of a year he resumed his accustomed alcoholic intake which he maintained until the beginning of the present illness.

**Present Illness** Without any particular warning, after an unusually large intake of distilled liquor, the patient became sick with marked malaise and the rapid onset of jaundice. This persisted for one week and was followed by the rapid development of coma and sudden increase in the size of the abdomen and legs due to ascites and peripheral edema. For two weeks there was slight elevation of temperature. Patient practically unconscious for the first two months of his illness. During this time tyrosin and leucin were found in the urine on many occasions. There was a marked acidosis with the  $\text{CO}_2$  combining power dropping to 30 vol per cent and remaining at that level for two months.

cites, pitting edema of the hands, sacrum, thighs, legs, and some apparent edema of the face, bilateral pneumothorax, splenic friction rub and purpura. Ballottement revealed an extremely hard, nodular liver, the edge of which was demonstrable one hand breadth below the costal margin from the right axillary line to the left midclavicular line. After tapping, the spleen was easily palpable four fingers below the costal margin.

**Laboratory Data** Red count 2,990,000. Bromsulphalein retention 40 per cent. Van den Bergh 25 mgm bilirubin per 100 cc. Urine bile +. Stools clay color. Because of the difficulty of intravenous medication no further attempts were made to study liver function by laboratory tests.

**Treatment.** Rest in bed, as high a carbohydrate diet as patient could take, limitation of fluid to 1200 cc, repeated injections of salyrgan, transfusion and intravenous glucose therapy and one abdominal

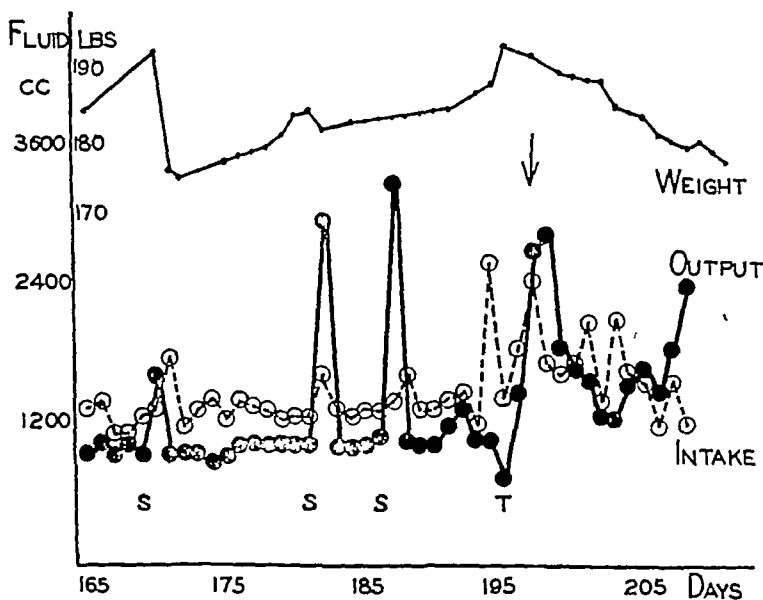


CHART 11. Alcoholic Cirrhosis—Subacute Yellow Atrophy  
At the points marked S on the chart 2 cc. of salyrgan was given intravenously with a striking temporary response. A severe transfusion reaction occurred at the point marked T and was followed by a period of anuria. Two large injections of 25 per cent glucose were given at this point with the production of a marked diuresis which persisted for many days in sharp distinction to that following the use of salyrgan.

Abdominal drainage by paracentesis was necessary at intervals of about ten days. Jaundice increased rapidly for one month and then very gradually dropped to a lower level where it continued for the following three months. An anemia ranging between two and three million red cells per cubic millimeter was encountered after the end of the first month.

Treatment was persistent and heroic and consisted in almost daily intravenous injections of glucose totaling between 100 to 200 grams a day. Bicarbonate of soda was given intravenously in addition to the glucose at the time of the most profound acidosis. Transfusions were employed on several occasions during the first four months of the illness. Salyrgan with and without the use of ammonium chloride was tried on several occasions without any response. At the end of two months the patient showed definite signs of improvement, became oriented and was able to take moderate amounts of food by mouth. At the end of five months he had improved sufficiently so that he was moved to Boston, where he came under our care.

**Physical Examination** (Five and one-half months after onset of present illness). An emaciated, moderately jaundiced individual with tremendous as

paracentesis. It will be noted from the accompanying chart that each administration of salyrgan was followed by an increasingly marked diuresis. The abdominal paracentesis was performed when the patient was first seen and although there was a definite return of ascites over the course of a month no further taps were performed. Because of the existing anemia it was decided to transfuse the patient again, one month after he was first seen. A citrate transfusion was given followed by an immediate unexplained transfusion reaction with resulting increase in jaundice and complete anuria. The patient's condition became very critical although he had been gradually improving up to this point. Two injections of 25 per cent glucose were administered within twenty-four hours and were followed by a sharp diuresis which persisted for a period of three days with rapid disappearance of the ascites and drop in weight. His appetite returned at this point and steady improvement continued without interruption. Another period of spontaneous diuresis was noted about ten days later and from then on the patient made an uninterrupted recovery from the point of view of acute liver insufficiency. His jaundice practically disappeared, the ascites and hydrothorax completely disappeared and there was

no further peripheral edema. The purpura had previously passed. Hepatic and splenic enlargement and a pleural friction rub persisted but the patient was able to be up and around and led a fairly active existence for one year. At the end of this period while he was still showing gradual clinical improvement he contracted an acute respiratory infection and died in a few days.

A graphic description of fluid intake and urine output with corresponding changes in weight is shown in the accompanying chart. It will be noted from the chart that there is a striking difference between the diuresis obtained after the use of salyrgan and that observed as a spontaneous occurrence after the transfusion reaction. Lasting clinical improvement did not occur until a prolonged spontaneous diuresis had occurred.

#### DISCUSSION

It is obvious from the preceding charts that a definite diuresis occurred in a group of patients suffering from severe acute and subacute liver disease due to various causes. As previously noted (table 1) a similar diuresis was observed in three-fourths of a group of fifty patients seen at the Massachusetts General Hospital during recent years. Absence of an increased urinary output was seen only in the relatively mild cases which improved rapidly or in those cases which did not respond to treatment and which came to a fatal termination. The degree of diuresis varied in individual cases and as a rule was less in those patients who presented no clinical evidence of edema, ascites, or hydrothorax. Such a finding was obviously to be expected but it is of extreme interest to note that in many individual cases a pronounced and prolonged increase in urinary output occurred during the period of clinical improvement, even in the absence of any evidence of an abnormal accumulation of fluid in the serous cavities or in the tissues. In a large majority, such spontaneous increases in urinary output were associated with rapid improvement in all symptoms and at times the change was extremely striking once diuresis was established. Occasionally diuresis occurred as long as a week before any favorable change was noted but more frequently it immediately preceded the patient's improvement. There seemed to be no particular difference in the degree of diuresis obtained in those cases treated by rest and diet alone and in those which received additional therapy by intravenous glucose. It is of interest to note that in association with the diuresis following salyrgan, clinical improvement may not be an associated finding.

In only three out of thirty-seven cases showing diuresis during the course of the disease was there a failure to improve. In all the other cases improvement was continuous following the establishment of a real diuresis and the patient either recovered completely or at least entirely recovered from the acute liver injury even

though there remained some permanent damage to the liver. The nature of the acute or subacute liver injury seemed to have no relation to the patient's ability to establish a diuresis and it seems highly probable that the occurrence of this phenomenon was associated directly with an improvement in the function of a previously abnormal liver.

It is not within the scope of this paper to discuss possible physiological changes taking place in association with this diuresis. As previously indicated, many factors undoubtedly play a rôle in the abnormal accumulation of fluid as well as its removal during the different phases of liver disease. There can be no doubt, however, that following the removal of specific toxins, if they existed, plus rest and appropriate glucose therapy, hepatic efficiency was increased and concomitantly there was a shift in fluids from the tissues or serous cavities to the blood stream with the ultimate establishment of diuresis. Because of the fact that diuresis may occur even in the absence of obvious fluid accumulation it is highly probable that in most cases of serious acute liver injury edema of the tissues is nearly always present although it may not be clinically demonstrable. We believe that the finding of such a shift in body fluids offers an excellent means of demonstrating changes in liver function and may be used clinically as a valuable prognostic aid in patients suffering from liver disease. We wish to stress the probable difference between the diuresis frequently noted after the use of salyrgan and that occurring without the administration of diuretic drugs. In the cases showing a spontaneous diuresis, prolonged clinical improvement apparently is a much more consistent result. This is well shown in the case illustrated by chart 11.

Of the various liver function tests that are at present in general use, few if any are of prognostic value unless repeated frequently throughout the course of the disease in order to obtain comparative determinations. The progress of a given case may be adequately followed by observations on the course of the jaundice, variations in the retention of the dye, variations in galactose tolerance, and the like, but frequently these tests fail to give an adequate basis for prognostication. Recent studies by Jones and Fish<sup>10</sup> indicate that single determinations of a plasma fatty acid curve following the administration of adrenalin at times have real value for determining the future progress of a given case. All of the tests that have been devised to date require adequate and sometimes complicated laboratory facilities, such as are usually available only in hospitals and large medical centers. It is particularly for this reason that we have felt the importance of noting the appearance of a spontaneous diuresis in patients suffering from various acute or subacute

disorders of the liver Inasmuch as the only requirements for such a determination are approximately accurate estimations of fluid intake and urine output it is obvious that such observations can be made at the home as well as by the hospital bedside We believe that the observations recorded above warrant the significance that we have attached to such a procedure as being one of real clinical and prognostic interest When it occurs, we believe the appearance of a spontaneous diuresis in cases of serious liver injury nearly always means a fairly rapid and continuous change for the better in the patient's condition provided adequate treatment is maintained As a clinical sign it should be looked for and used as a prognostic guide

## SUMMARY

- (1) We have discussed the common occurrence of abnormal accumulations of fluid in patients suffering from acute and subacute diseases of the liver
- (2) In a relatively unselected group of patients suffering from acute and subacute hepatic disorders we have noted the appearance of what may be called a spontaneous diuresis in a large proportion of cases
- (3) Following the appearance of such a phenomenon we have found almost invariable and continuous clinical improvement
- (4) We suggest the simple determination of fluid intake and urine output by ordinary measurements as a means of noting the appearance of such a diuresis and believe that such a test constitutes a simple and adequate means of determining prognosis in such cases

## REFERENCES

- 1 Jones C M. and Minot, G R Infectious (catarrhal) jaundice attempt to establish clinical entity observations on excretion and retention of bile pigments, and on blood Boston M. & S J 189: 531 (Oct. 18) 1923
- 2 Bauer R Zur Frage des Icterus catarrhalis (The question of catarrhal jaundice) Med. Klin. 22: 1558 (Oct 8) 1926
- 3 Meyer Jacob and Learner A Ascites occurring during jaundice with recovery J A M A. 104: 114 (Jan. 12) 1935
- 4 Root, H F Acute hepatitis in a diabetic with severe acidosis and suppression of urine New Eng J Med 212: 545 (March 28) 1935
- 5 Umber F Parenchymschutztherapie bei Leberkranken. Med. Klin. 25: 1578 (Oct. 11) 1929  
Idem Treatment of cholelithiasis Deutsche med Wchnschr 50: 1785 (Dec. 19) 1924  
Idem Cholangitis Klin Wchnschr 2: 573 1923  
Idem Acute and subacute liver atrophy Klin Wchnschr 1: 1585 (Aug 5) 1922
- 6 Adler A. Liver and diuresis Klin. Wchnschr 2: 1980 1923
- 7 Halita M. Ictère toxi-infectieux avec hydropisie Bull. et mém. Soc. méd. d. hôp de Paris 51: 1266 (Aug 4) 1927
- 8 Voisin, R Anasarque généralisée au décours d'un ictère infectieux. Paris Méd 23: 189 1917  
Idem Asynergy in liver insufficiency Bull. et mém. Soc. méd. d. hôp de Paris 48: 524 1924  
Idem L'exploration fonctionnelle du foie par le rose bengale Rev med chir d. mal du foie 1: 299 1926  
Idem Le dépiétoage de l'insuffisance hépatique au début. Les hépatites chronique latentes J Méd franc 16: 347 1927
- 9 Flessinger, N et Walter H. L'Instantané hépatique. J méd franc. 23: 155 (May) 1934 Le rôle de l'infiltration scléreuse et de la dégénérescence parenchymateuse du foie dans l'exploration chromagoge des cirrhoses Paris méd. 1: 593 (June 27) 1931
- 10 Lederer K. Pneumokokkensepsis mit Leberinsuffizienz und hepatogener Anurie Ein klinischer Beitrag zu der Beziehung zwischen Leber und Wasserhaushalt. Wien. Arch f inn med 20: 143 (April 6) 1930
- 11 Weiss V über das Residualwasser der Leberkranken Klin Wchnschr 7: 936 (May 13) 1928 (Abs J A. M. A. 91: 292 1928)
- 12 Weir J F Association of jaundice and ascites in diseases of liver J A M A 91: 1888 (Dec. 15) 1928
- 13 Butsch W L Cirrhosis of the liver caused by carbon tetrachloride J A M A 99: 728 (Aug 27) 1932
- 14 Poindexter C A. and Greene C H. Toxic cirrhosis of liver report of case due to long continued exposure to carbon tetrachloride J A M A. 102: 2015 (June 16) 1934
- 15 Damany Mentioned by Halita
- 16 Bollman J L., and Mann, F C Experimentally produced lesions of liver Ann. Int. Med 5: 699 (Dec.) 1931
- 17 Van Noorden Metabolism and practical medicine. Pathology 2: 267 1907
- 18 Joslin E P The influence of bile on metabolism. J Exper Med 5: 513 1901
- 19 Jones C M and Fish J W Plasma fatty acids after adrenalin injection in normal subjects and in patients with liver disease prognostic significance J Clin. Invest. 14: 143 (March) 1935

## MYXEDEMA HEART

## Report of a Case

BY JULIAN C GANT, M D \*

## LITERATURE

THE literature on the subject of the so-called "Myxedema Heart" has been accumulating since Zondek's<sup>1</sup> original paper published in 1918 The American literature begins with the report of a striking case by Fahr<sup>2</sup> in 1925 The findings of these original observers have been confirmed by a number of writers No attempt will be made to review the literature in this brief report as several excellent reviews have been given recently.<sup>3 4 5</sup> In the earlier papers there was considerable difference of opinion with reference to the "Myxedema

Heart" At present, however, there seems to be a uniformity of opinion on the existence of a cardiac syndrome characteristic of myxedema The generally enlarged heart, with characteristic electrocardiographic changes which return to normal after thyroid therapy, has been described by a number of writers While the mechanism by which these changes are produced is not clearly understood, the existence of this syndrome is no longer questioned

There is some difference of opinion on the point of the frequency of congestive failure in uncomplicated myxedema The observers at the Thyroid Clinic of the Massachusetts General Hospital<sup>3</sup> feel that failure is relatively rare and

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when present may be due to some complicating factor Fahr<sup>9</sup> and others believe that congestive failure is frequent in the absence of complications. The frequency with which the electrocardiographic changes occur is another controversial point. Ohler and Abramson<sup>1</sup> found the changes in 62 per cent of these cases while Lerman, Clark and Means<sup>8</sup> find these changes to be an essential part of the picture in 100 per cent of the cases. The presence or absence of pericardial effusion in this condition is as yet an unsettled point. Means<sup>7</sup> points out the possible explanations of the cardiac enlargement as being hypertrophy, pericardial effusion, edema and dilatation. He states that pericardial effusion is possible but the x ray appearance is against it. On the other hand Gordon<sup>4</sup> reported a case where a large amount of fluid was withdrawn from the pericardium with a consequent reduction in the size of the heart shadow. This suggests that a pericardial effusion may account for the major part of the apparent enlargement of the heart. This would also account for the extreme sluggishness of heart action as seen under the fluoroscope. This sluggishness seems out of proportion to the size of the pulse and the degree of pulse pressure. It would seem reasonable to suppose that a pericardial effusion as well as an interstitial edema might be present in all cases in varying degrees. The question can only be settled by more pericardial taps and when more autopsy material is available.

So far as I know only two cases of auricular fibrillation occurring in myxedema heart have been previously reported. The first was reported by Walker<sup>6</sup>. In his case thyroid therapy had no effect on the fibrillation but no cause other than the myxedema could be found for the fibrillation. Quinidine was not tried. The other case of auricular fibrillation was given in the series reported by Ohler and Abramson<sup>1</sup>. In this patient sinus rhythm was restored by the giving of thyroid alone.

The case reported here is a striking example of reduction in size of the heart. So far as I am able to determine, there are but three previously recorded cases where the shrinkage in size was equal to or exceeded the one given here. The first was the original case of Fahr's<sup>3</sup> and from the same clinic Davis<sup>10</sup> published another one in 1931. The third is in the series of Lerman, Clark and Means<sup>8</sup> appearing in 1933.

#### CASE REPORT

The patient was a white female aged sixty-six, complaining chiefly of general weakness, sleepiness and sluggishness. She had been a delicate child but had worked very hard as a young woman. Measles and whooping cough were the only childhood diseases. At the age of twelve she had had night-sweats. There were three normal pregnancies at the ages of eighteen, twenty-two and thirty-four. She enjoyed her best health during the five years following the birth of the third child.

Twenty-five years ago (1910) the uterus was removed because of a fibroid tumor and at the same time one ovary and half the other were taken out. The definite decline in health dates from the time the teeth were removed eight years ago. There was considerable hemorrhage following the extractions resulting in a weakness from which she did not recover. The general weakness and lethargy were progressive but became much more noticeable to the patient and her family two years ago. At that time she had a lump in the neck which caused a sore throat and difficulty in swallowing. The lump disappeared after about ten months. There has been no recurrence. The typical complaints of a myxedema patient were present. She did not enjoy anything, was unable to read and had no interest in her friends or her church. Concentration and memory were almost nil. While the skin had always been dry it had been much worse during the past two years. The hair had become brittle and there had been marked thinning. She was always cold, requiring an excessively warm living room and added clothing. The family had noticed the change in facial expression and marked slowness of speech and motion. As she put it, she just "wanted to be completely lazy." There was much indigestion and the appetite was rather poor. Her bowels were sluggish and the use of cathartics necessary. She was not overweight and there had been no significant change in weight. Dyspnea while not distressing was very definite. There was no orthopnea, no cough or precordial pain. There was a moderate amount of swelling of the ankles.

Physical examination revealed many of the typical signs of myxedema. Motion and speech were slow in the extreme. The face was pale, waxy and masklike. There was the usual puffiness around the eyes with the narrowing of the palpebral angles. The hair was dry and brittle and there was a near baldness on the top of the head. The skin was dry and scaly; this was very conspicuous on the arms where scales several mm. in diameter could be peeled off. No abnormality of the thyroid was found. Persistent crepitant rales were heard at both lung bases. The heart was markedly enlarged to percussion both to the left and right. Heart sounds were very distant and no murmurs were heard. The systolic blood pressure was 150 mm and the diastolic 80 mm. The abdomen was rather prominent but no definite evidence of fluid could be made out. There was a moderate amount of pitting edema of the ankles. The cardiac enlargement was confirmed by fluoroscopic examination and the heart action was noted to be very sluggish.

There was a moderate degree of secondary anemia, the hemoglobin being 60 per cent, red blood cell count 3,480,000 and the white cell count 3,850. A teleroentgenogram of the heart showed general enlargement, the transverse diameter being 18.2 cm. and that of the chest 24 cm. The electrocardiogram showed auricular fibrillation with a ventricular rate of 60. The T waves were iso-electric and the QRS complexes were low. There was no abnormal axis deviation. The basal metabolism was minus 46 per cent.

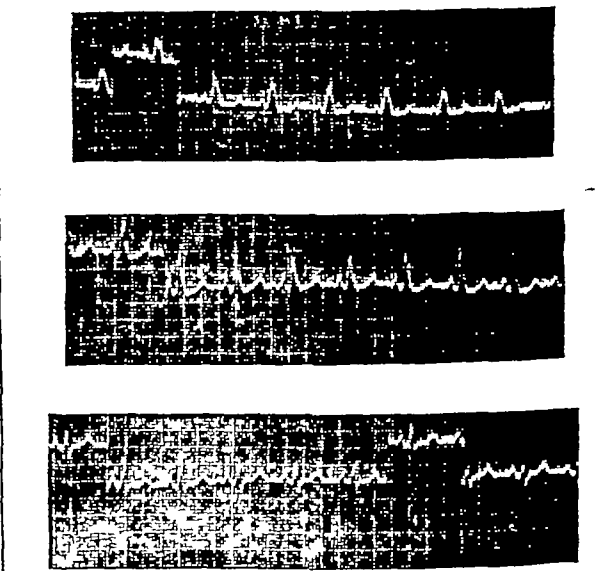
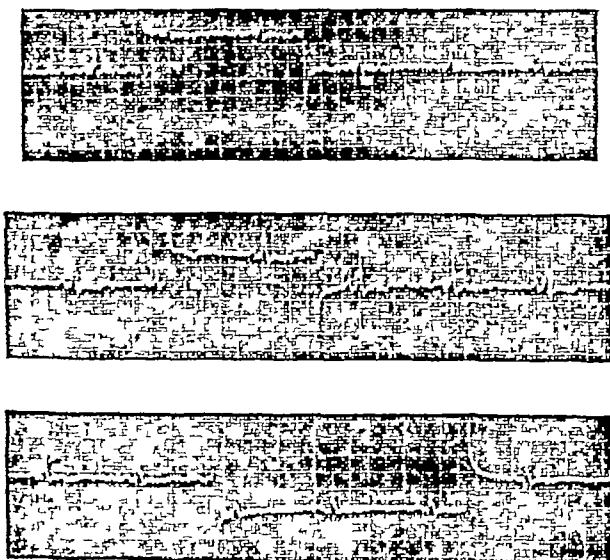
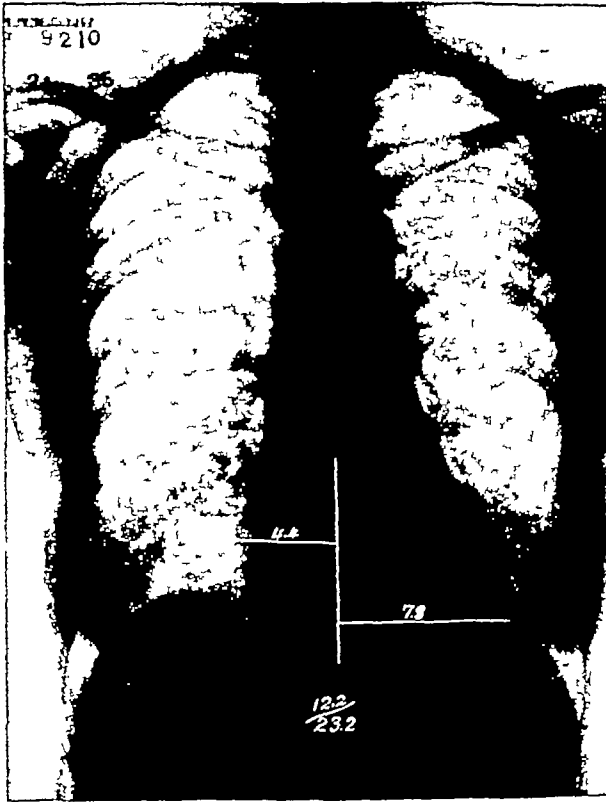
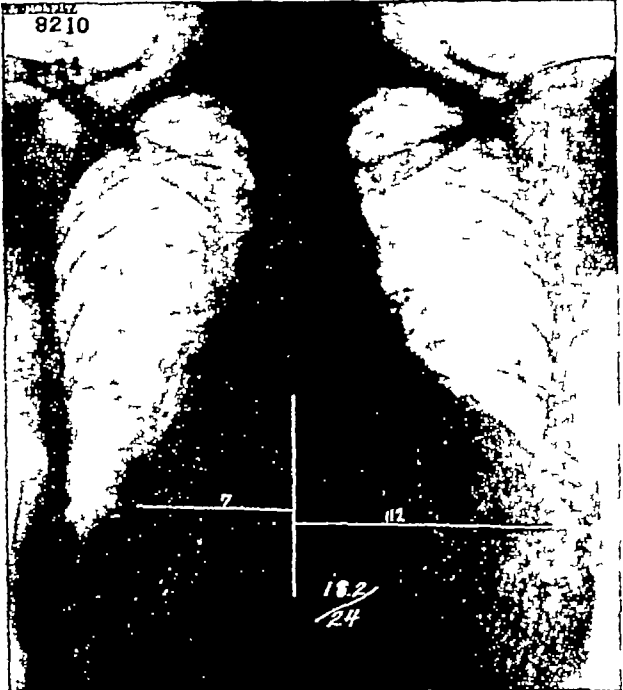
The patient was put on bed rest and started on  $\frac{3}{4}$  gr thyroid substance (Armour's) daily. The dose of thyroid was increased by  $\frac{1}{4}$  gr every three days. When the thyroid dosage reached 3 grs daily the patient became increasingly nervous, making necessary a reduction in the daily dose. Eight weeks after starting treatment the patient took cold and also developed marked anorexia and some nausea. At this time the dose of thyroid was still further reduced to  $1\frac{1}{2}$  grs. daily. After this epi-

sode her appetite improved and she gained strength more rapidly During this period the systolic blood pressure varied from 120 to 150, the diastolic ranging from 50 to 80

Five and one-half months after the first observations were made she entered the hospital for the second series of observations The accompanying photographs show the marked change that had taken place The thin brittle hair had been replaced by thick, brown hair with normal texture The eyes were bright and the mask-like, waxy ap

plaints had disappeared The appetite was good and the bowels functioned normally She was active and quick motioned. Her family and friends recognized her as an entirely changed individual.

The second teleroentgenogram showed that the transverse diameter of the heart had decreased by 6 cm and there was no evidence of congestive failure,



Date December 5 1934 Serial No 232

Date May 21 1935 Serial No 273

pearance had entirely disappeared The skin was smooth and of fine texture as contrasted with the coarse scaly skin previously seen She was alert, responding readily to questions and conversing interestedly A moderate amount of general weakness still persisted but other than this the old com

the lungs being entirely clear The cardio thoracic ratio was normal. The electrocardiogram showed that normal rhythm had been restored The rate was 90 The voltage was normal and the T waves were upright in all leads There was a slight degree of intraventricular block and the QRS complex was widened to 12 sec The basal metabolism was

minus 13¼ per cent. Her weight was 103 lbs., this was 15 lbs less than her weight 5½ months previously. During the entire time the patient had been taking liver and iron (Lextron, Lilly) for the anemia. The hemoglobin was 65 per cent and the red cell count was 3 780 000

# DISCUSSION

This report adds to the literature one more case of congestive heart failure associated with myxedema. That congestive failure was present is shown by the dyspnea and peripheral edema with the pulmonary congestion shown both by auscultation and x ray. Part of the gross enlargement here shown is no doubt due to the dilatation usually accompanying congestive failure. In this case the picture may not be due to uncomplicated myxedema, in view of the persistent intraventricular block and rather rapid heart on only 1½ grs of thyroid substance. However, the fact that the patient is now active without any signs of failure suggests that myxedema is the added factor responsible for the heart failure.

Myxedema as one of the causes for auricular fibrillation is suggested by this case. This seems strange in view of the frequency of this arrhythmia in hyperthyroidism. That normal rhythm was established coincidentally with the giving of thyroid in this case is a fact worth noting. The possibility of it being a coincidental finding is recognized.

This report again emphasizes two other points brought out several times in the literature. First, myxedema must be thought of in the normal and even underweight individual, as well as the obese. Secondly, thyroid must be given cautiously in these individuals. While it may be necessary gradually to increase the dose up to 8 or even 4 grs daily to rid the patient of all the signs of myxedema, the maintenance dose will usually be small. If an error is made it should be made on the side of caution. In cases with cardiac complications it is safer to maintain a basal metabolic rate of 15 to 20 per cent rather than bring them up to the theoretical normal.

# REFERENCES

1. Zondek, H. Das Myxödem. München, med Wchnschr 1159 1912
2. Fabr G Myxedema heart. J. A. M. A. 84: 346 1925
3. Lerman, J.; Clark, R. J. and Means, J. H. Heart in myxedema: electrocardiograms and roentgen ray measurements before and after therapy. Ann. Int. Med. 6: 1281 (April) 1932.
4. Ohler, W. R. and Abramson, J. Heart in myxedema. Arch. Int. Med. 53: 166 1934.
5. Hallock, P. The heart in myxedema, with a report of two cases. Am. Heart J. 8: 166 1933-34.
6. Lerman, J.; Clark, R. J. and Means, J. H. Further observations on heart in myxedema. Ann. Int. Med. 8: 93 (July) 1934.
7. Means, J. H. Hypothyroid heart disease. New Eng. J. Med. 208: 541 1932.
8. Gordon, A. H. Pericardial effusion in myxedema. Reported at the meeting of the Assn. of American Physicians, May 7, 1935. (To be published.)
9. Walker, J. E. Hypothyroidism associated with cardiac enlargement ("myxedema heart") and auricular fibrillation. J. A. M. A. 100: 1016 (April 1) 1933.
10. Davis, J. C. Myxedema heart with report of one case. Ann. Int. Med. 4: 723 1931.

# MASSACHUSETTS STATE HEALTH COMMISSION

BY FRANK KIERNAN, A.B.\*

**A**CTING under authority of Chapter XI of the Resolves of 1935, Governor James M. Curley on August twenty first appointed the Massachusetts State Health Commission to make a study and proposed revision of the public health laws and practices of the Commonwealth. The last study of this kind was made by Mr. Lemuel Shattuck in 1850. Mr Shattuck's report, which is now a rare and historic document, described the public health practices and regulations of his day and made recommendations for improving them. Among the major recommendations of his report were the following: the appointment of a state health officer, the appointment of a State Board of Health, a revision of the laws relating to health, a record of vital statistics in the Health Department, and the establishment of a school of nurses at the Massachusetts General Hospital. He also advocated reforms in industrial hygiene and pointed out the growing menace of pools of stagnant water adjacent to mill ponds.

In the eighty five years which have passed  
Kiernan, Frank—Executive Secretary Massachusetts Tuberculosis League, Inc. For record and address of author see "This Week's Issue," page 816

since the Shattuck report much legislation affecting health, especially in recent years, has been enacted into law. Practices and procedure of public health useful ten, twenty, or fifty years ago have in the course of time become inadequate to meet the complexities of modern life. New laws have often been added to the statute books without sufficient thought as to their integration as part of the rational legal system for public health. Practices have grown up to meet current needs without sufficient planning as to the rôle they will ultimately play in the whole scheme of public health. For these reasons a revision of the laws and practices has been in the minds of public health officials for several years. As far back as the administration of Dr. Eugene Kelley as State Commissioner of Public Health and later in the administration of Dr. George H. Bigelow, the subject was discussed.

In October, 1934, the Massachusetts Central Health Council, an organization composed of fifteen public and private, state-wide health agencies, crystallized opinion on this subject and appointed a committee to initiate the movement to

secure affirmative action Professor Curtis M Hilliard, President of the Council, appointed for this purpose the following committee

Dr Wilson G Smilie, Chairman  
 Dr Henry D Chadwick  
 Dr Francis P Denny  
 Mrs Leslie B Cutler  
 Prof Curtis M Hilliard  
 Dr William H Robey  
 Dr Charles F Wilinsky  
 Dr Gaylord W Anderson  
 Mr Frank Kiernan

Dr Charles F Wilinsky, Deputy Commissioner of Health of the City of Boston, and Director of the Beth Israel Hospital, was Chairman of a Sub-Committee which guided the proposal through the various stages of its development, including the enactment of the necessary legislation for the appointment of the Commission. Part of the work of the committee named above was to secure a grant of funds for defraying the cost of the study. A grant of \$10,000 was secured from the Commonwealth Fund, which has also underwritten the cost of a number of public health projects in the Commonwealth.

The members of the Commission appointed by Gov Curley are as follows

Dr Henry D Chadwick,  
 State Commissioner of Public Health  
 Dr Winfred Overholser,  
 State Commissioner of Mental Diseases  
 Dr Charles E Mongan,  
 President, Massachusetts Medical Society  
 Professor Curtis M Hilliard,  
 President, Massachusetts Health Council and Professor of Biology and Public Health, Simmons College  
 Dr Wilson G Smilie,  
 Professor of Public Health Administration, Harvard School of Public Health  
 Dr Alexander S Begg,  
 Dean, Boston University School of Medicine and Secretary, Massachusetts Medical Society  
 Prof Samuel C Prescott,  
 Dean of Science and Professor of Industrial Biology, Massachusetts Institute of Technology  
 Dr Dwight O'Hara,  
 Chairman, Public Health Committee, Massachusetts Medical Society and Professor of Preventive Medicine, Tufts College Medical School

Dr David D Seannell,  
 Chief of Surgical Staff and President of Senior Staff, Boston City Hospital  
 Dr Francis X Mahoney,  
 Health Commissioner, City of Boston  
 Dr Charles F Wilinsky,  
 Deputy Health Commissioner, City of Boston and Executive Director, Beth Israel Hospital  
 Dr Gerardo Balboni, Physician, Home for Italian Children and Member of the Staff of the Massachusetts General Hospital

The Commission, organized on September ninth, chose as its officers the following

Dr Henry D Chadwick, Chairman  
 Dr Wilson G Smilie, Vice-Chairman  
 Dr Charles F Wilinsky, Secretary-Treasurer

An executive committee was also appointed, which is composed of the officers and the following additional members of the Commission.

Dr Alexander S Begg  
 Prof Curtis M Hilliard  
 Dr Charles E Mongan

The Commission, at its organization meeting voted to adopt the policy followed by the New York State Commission which carried on a similar study of public health in 1932, viz, to appoint a number of special committees selected from leaders in the field of medicine and public health, the membership of the committees not to be confined to the Commission. The Commission decided upon thirteen such committees. The Commission leaders in the several fields which are to be studied by the special committees were asked to serve as chairmen. The list of the Committees, their chairmen and membership, is as follows

(1) *Codification of Public Health Laws*

Dr Henry D Chadwick, Chairman  
 Dr Gaylord W Anderson  
 Dr Alexander S Begg  
 Dr Francis P Denny  
 Prof Curtis M Hilliard  
 Dr Francis X Mahoney  
 Dr Charles E Mongan  
 Dr Winfred Overholser

(2) *Public Health Practices and Procedure*

Dr Wilson G Smilie, Chairman  
 Dr Gaylord W Anderson  
 Prof Curtis M Hilliard  
 Prof Murray P Horwood  
 Dr Francis X Mahoney  
 Dr Charles E Mongan  
 Dr Ernest M Morris  
 Dr Dwight O'Hara

Dr Stephen Rushmore  
Dr L. Jackson Smith  
Dr Charles F. Wilnisky

(3) *Communicable Disease Control*

Dr Paul R. Withington, Chairman  
Dr Gaylord W. Anderson  
Dr Frederick J. Bailey  
Dr Henry D. Chadwick  
Mrs Leslie B. Cutler  
Miss A. Hamblin  
Dr William O. Hewitt  
Dr Edwin R. Leib  
Dr Joseph W. Monahan  
Dr Harrie W. Peirce  
Dr Edwin H. Place  
Dr John Poutas  
Dr Elliott Robinson  
Dr Conrad Wesselhoeft

(4) *Public Sanitation*

Prof Samuel C. Prescott, Chairman  
Dr David L. Belding  
Mr Joseph C. Cort  
Mr Philip Drinker  
Dr R. E. Dyer  
Prof Gordon M. Fair  
Prof. Murray P. Horwood  
Dr James A. Keenan  
Mr Hermann C. Lythgoe  
Mr Frank E. Mott  
Dr M. Victor Safford  
Mr Arthur D. Weston  
Mr Robert Spurr Weston

(5) *Maternal and Infant Hygiene*

Dr Frederick C. Irving, Chairman  
Dr Stewart H. Clifford  
Dr Robert L. DeNormandie  
Dr M. Louise Diez  
Dr Martin J. English  
Dr Charles E. Mongan  
Dr Charles W. O'Connor  
Dr Lendon Snedeker  
Miss Frances Stern  
Dr Harold O. Stuart  
Dr Charles F. Wilnisky

(6) *Child Hygiene*

Dr Richard M. Smith, Chairman  
Dr Kirke Alexander  
Rev Robert P. Barry  
Dr Alice Blood  
Dr Susan M. Coffin  
Mrs Myron F. Converse  
Dr Joseph Garland  
Dr Percy R. Howe  
Dr James A. Keenan  
Miss Winifred Kenneren  
Dr Fredrika Moore  
Rev Richard J. Quinlan

Dr David D. Scannell  
Mr Carl L. Schrader  
Dr Warren R. Sisson  
Dr Whitman G. Stickney  
Dr Harold C. Stuart  
Dr Douglas A. Thom  
Mr Alfred Whitman  
Dr Charles F. Wilnisky

(7) *Social Hygiene and Venereal Disease Control*

Dr E. Granville Crabtree, Chairman  
Dr William P. Boardman  
Miss Ida M. Cannon  
Dr Oscar F. Cox, Jr  
Dr Hilbert F. Day  
Dr Harold L. Higgins  
Dr Harold L. Leland  
Dr Nels A. Nelson  
Dr A. K. Paine  
Miss Florence M. Patterson  
Dr Dwight L. Suscoe  
Dr Wilson G. Smilie  
Mrs. Maida H. Solomon

(8) *Hospitals, Dispensaries, Clinics, and Health Centers*

Dr Frederic A. Washburn, Chairman  
Rev Thomas J. Brennan  
Richard K. Conant, Commissioner, Dept.  
of Public Welfare  
Dr Hilbert F. Day  
Dr Nathaniel W. Faxon  
Dr Channing Frothingham  
Dr Joseph B. Howland  
Dr George A. MacIver  
Dr Henry M. Pollock  
Mr Arthur G. Rotch  
Dr David D. Scannell  
Dr George C. Shattuck  
Dr Eugene Walker  
Dr Charles F. Wilnisky  
Mr Frank E. Wing

(9) *Mental Hygiene*

Dr Winfred Overholser, Chairman  
Dr Clarence A. Bonner  
Dr L. Vernon Briggs  
Dr Henry B. Elland  
Dr Donald Gregg  
Dr William Healy  
Dr James V. May  
Dr Douglas A. Thom  
Dr Kenneth J. Tillotson

(10) *Tuberculosis Control*

Dr Frederick T. Lord, Chairman  
Dr Gerardo M. Balboni  
Miss Ethel Cohen  
Dr Cleaveland Floyd  
Dr John B. Hawes 2nd  
Miss Eleanor Kelley  
Mr Horace Morrison



Dr George O'Donnell  
Dr Alton S Pope  
Dr Sumner H Remick

(11) *Occupational Hygiene*

Mr Manfred Bowditch, Chairman  
Dr W Irving Clark  
Mr Philip Drinker  
Dr Francis D Donoghue  
Dr Dwight O'Hara  
Dr Robert S Qunby  
Mr Samuel Squibb  
Mr Stephen E Whiting

(12) *Adult Hygiene and Special Medical Problems*

Dr Robert B Osgood, Chairman  
Dr Walter Bauer  
Dr Robert B Greenough  
Dr Elliott P Joslin  
Dr Herbert L Lombard  
Dr George R Minot  
Dr Charles E Mongan  
Dr Frank R Ober  
Dr William H Robey

(13) *Public Health Nursing*

Miss Florence M Patterson, Chairman  
Miss Mabel M Brown  
Prof Curtis M Hilliard  
Miss Helen F McCaffrey  
Mrs Harold A Marvin  
Miss Sophie C Nelson  
Miss Helen C Peck  
Miss Marjorie Stimson

Miss Hazel Wedgwood  
Miss Marion C Woodbury

On October twenty-first a general meeting of the chairmen of the committees was held at the office of Dr Henry D Chadwick in the State House. The general work of the Commission was discussed. The report of the New York State Commission, which will serve as a guide to the present group, was reviewed. Plans were made for calling the several committees into action within the near future.

The Commission has been fortunate in securing to carry on the field work, Dr Carl E Buck, Director of Field Service of the American Public Health Association. It has also been successful in securing Judge A K Cohen, the only living member of the State Commission which codified all the laws of the Commonwealth in 1921. Judge Cohen will assist the Commission in collating the present laws and preparing whatever new legislation the Commission may in its final report recommend.

The special committees as they meet will begin their work with a conference with Dr Henry D Chadwick, Chairman of the Commission.

An office for the Commission has been opened in Room 1150 in the Little Building adjacent to the offices of the Massachusetts Tuberculosis League. Mr Frank Kiernan, has been appointed Executive Secretary of the Commission. He is also Executive Secretary of the League. Miss Dorothy D Adams has been retained as Assistant Secretary.

PRACTICE OF ANESTHETIZATION\*

The practice of anesthetization, at least so far as it relates to general anesthesia and spinal anesthesia, presents a problem different from that presented by the practice of roentgenology and of pathology. It comes more nearly, it seems to me, to making the anesthetist always a practitioner of medicine, who cannot lawfully perform his duties without having been licensed so to practice. In the course of anesthetization, reliance must be placed on the anesthetist's judgment to a very large extent, for the operating surgeon ordinarily finds his time and attention fully taken up with the operation itself. The relative independence of the anesthetist and the operating surgeon has been recognized in the decisions of courts that have held the operating surgeon not liable for the malpractice of the anesthetist although he is liable for the failure of those who may be properly termed his assistants to discharge the duties imposed on them. The custom of using anesthetists who are not licensed to practice medicine has, however, reached such proportions that it would be difficult to effect a change. Moreover, in effecting a change, it will be found necessary to take into consideration the difficulty of

finding in sparsely settled parts of the country physicians who can and will devote themselves to the practice of anesthetization to an extent sufficient to qualify them for such work in sufficient numbers to make them always available when needed.

Several states have enacted laws specifically authorizing the administration of anesthetics by unlicensed persons.

DRUG FIRMS FINED

Among the items which led to the successful conviction of several drug firms by the Federal Government are the following: internal medicine, cosmetics, liniments, pain killers, tonics for women's disorders, stomach, blood, liver, and functional ailments, gland treatments, laxatives, antiseptic soap, antirheumatic and tuberculosis medicines and a large number of preparations, alleged cures of other diseases.

The action of the government is based on fraudulent representation of efficacy of the various drugs, and tests in a government laboratory.

The concerns prosecuted in September were located in Tennessee, New York, Pennsylvania, Kansas and Massachusetts.

While much good is being accomplished, one may wonder why some of the best sellers among proprietary medicines are permitted to continue to do business.

\*Extract from the address of Dr William C Woodward before the Joint Session of the Council on Medical Education and Hospitals and the Federation of State Medical Boards of the United States at the Annual Congress on Medical Education, Hospitals and Licensure, Chicago February 19 1935

CASE RECORDS  
of the  
MASSACHUSETTS GENERAL  
HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C CABOT M.D.

TRACY B MALLORY, M.D., *Editor*

CASE 21451

PRESENTATION OF CASE

A sixteen year old colored girl entered complaining of headache, stiff neck and generalized aches and pains.

She had been rather weak and readily fatigued during the four years prior to her admission but had been able to carry on ordinary light housework. She complained frequently during this time of headaches, dizziness and anorexia. Six weeks before entry she developed a bad cold which was associated with very severe epistaxis. She became quite weak and prostrated and lost five pounds within a week. Her neck became somewhat stiff and she complained of aching ears and dizziness. After two weeks in bed she arose for two days but became dyspneic, very weak, vomited several times and was compelled to return to bed. One week later she was admitted to a hospital. There was no cough, hemoptysis or night sweats. She complained of fleeting pain in the precordium and stabbing pain in the cervical spine and left knee. She ran a septic febrile course for seventeen days after her admission. Headache appeared, increased in severity, and since there was no improvement she was transferred to this hospital.

She had had a tonsillectomy, adenoidectomy and appendectomy seven years previously. She had had pneumonia at the age of eleven. For several years she had had repeated examinations at a tuberculosis clinic but no positive diagnosis had ever been made. She had had rheumatic fever at some time during her childhood.

Her mother died of heart disease. One sister was living and well.

Physical examination showed a well developed but thin young colored female who looked quite ill. The skin was warm and moist and the mucous membranes were slightly pallid. The pupils were artificially dilated. Fundus examination revealed bilateral papilledema of three to four diopters with some exudate. There was vague tenderness on pressure over the mastoids and frontal sinuses. Examination of the eardrums was not recorded. The neck and

vertebral column were remarkably rigid. The lungs were normal. The heart appeared to be markedly enlarged with the apex impulse in the sixth interspace near the midaxillary line. There was a questionable apical thrill. Loud systolic and diastolic murmurs were audible at the mitral area and transmitted to the base.  $P_2$  was accentuated and greater than  $A_2$ . The blood pressure was 180/50. The abdomen was soft but tenderness was elicited in both upper quadrants. There were no palpable masses. Neither the spleen nor the liver was felt. The knee jerks and ankle jerks were hyperactive. There were bilateral Kernig signs. The remainder of the examination was negative.

The temperature was  $103^\circ$ , the pulse 120. The respirations were 30.

Examination of the urine was negative except for a green reaction to Benedict's solution. The blood showed a red cell count of 3,300,000, with a hemoglobin of 56 per cent. The white cell count was 15,900, 90 per cent polymorphonuclears, 5 per cent lymphocytes, 2 per cent monocytes, 2 per cent eosinophils and one per cent basophils. A blood Wassermann was negative. A blood culture taken on the day following admission was positive for streptococcus hemolyticus.

A portable x ray film demonstrated dullness in the left lower lung field which was obscured for the most part by an enlarged heart shadow.

The patient continued to complain of severe headache and pain in the right wrist and neck. A lumbar puncture was done and exhibited clear colorless fluid which was expelled with slightly increased pressure. There were 2 polymorphonuclears, 6 lymphocytes and 2 red blood cells per cubic millimeter. An alcohol test was very slightly positive and the ammonium sulphate test was negative. Sugar was 60 milligrams per cent. The Wassermann was negative and a culture of the fluid produced no growth. Four days after admission another lumbar tap revealed 640 cells per cubic millimeter, which were for the most part lymphocytes. Pressure was not increased and the fluid was clear. Ross-Jones and Pandey tests were negative. The protein was 71 milligrams per cent, the sugar 68 milligrams per cent. The chlorides were equivalent to 670 milligrams sodium chloride per 100 cubic centimeters of blood. Two days later petechiae were observed in the conjunctiva and subsequently several crops appeared elsewhere. Throughout her entire hospital stay the patient's temperature curve remained between  $103^\circ$  and  $104^\circ$ . She did not respond to palliative therapy and died on the eleventh day.

DIFFERENTIAL DIAGNOSIS

DR. RICHARD C CABOT. Anyone would make a snap diagnosis of tuberculous meningitis after reading the first two lines of this history but

not her heart disease, would make her feel poorly

DR. CABOT They do not tell much about the joints at that time, that might have helped us to decide on that point.

As to the second point of Dr White's, cerebral abscess It is well taken and one that I should have said more about I have been fooled a number of times in saying meningitis when I should have said abscess Here it is not an important distinction In an ear case it would be an important distinction I do not know any way in which a differential diagnosis can be made with no localizing symptoms Abscess more often has none In the absence of any localizing brain symptoms I cannot say any more than Dr White has said, and I agree to it

DR ROBERT S PALMER What do you think of the bilateral papilledema without increased pressure by lumbar puncture?

DR CABOT I do not know what to think of it What do you think?

DR PALMER I have no idea

DR CHARLES S KUBIK Here is a record of the lumbar punctures, seven in all The spinal pressure at admission was 285, on two occasions it was 350, but following that it dropped and at the last lumbar puncture it was only 70

DR. CABOT That gives a higher impression than I had had before

DR ALFRED KRANES I saw this patient on the neurologic service and reached about the same conclusion as Dr Cabot has I might say that in the physical examination the murmur described as mitral was mainly aortic and she did have signs of consolidation or compression at her left base

She arrived with a letter from the hospital where she had been previously stating that they had done several blood cultures and obtained pneumococcus type I That was the only disturbing feature of the case We thought she had subacute bacterial endocarditis with meningeal lesions and probably a diffuse embolic encephalitis similar to several other patients we have seen The question of tuberculous meningitis came up but we thought that the high sugar on several taps practically ruled that out, although it was theoretically possible We felt if we could confirm the presence of type I pneumococcus it might be reasonable to try anti-pneumococcus serum The blood cultures showed hemolytic streptococcus and that was abandoned.

DR WHITE May I add a word about transmission of murmurs? The record says that "loud systolic and diastolic murmurs were audible at the mitral area and transmitted to the base" The truth is the other way round Aortic valve murmurs are often transmitted to the apex but mitral murmurs are almost never transmitted to the aortic area

DR MEANS Dr Mallory, Dr Crooke asked me if the radiologist could find any evidence of

congenital heart and explain the rest of the picture on that basis The clinical description does not sound like it

DR AUBREY O HAMPTON No, I do not think we can make anything out of that except a diffusely dilated heart with dilatation downwards to the left As Dr Cabot said, this is a portable film I would like to help you on the lower lobe but I do not think I can It could just as well be pressure atelectasis from enlargement of the heart, and there may be a small quantity of fluid on that side

DR. TRACY B MALLORY Dr Kubik, you saw this patient clinically

DR KUBIK I might say a little more about the cerebrospinal fluid The cell count fluctuated a good deal At the first lumbar puncture only two or three cells were found, at another 649 They dropped after that to 46 and then went up to 300 and later dropped again to 150 We have seen other cases of bacterial endocarditis with meningeal symptoms in which the same thing has occurred In this case, as in most of the other cases that I have seen, the spinal fluid was xanthochromic and contained red blood cells, on one occasion 2,900 We often have difficulty in recovering organisms from the fluid and in some cases fail to find them This patient had seven lumbar punctures There is a record here of four cultures, all of them presumably negative Sugar content was normal and one wonders whether this was a real meningitis, or simply a cellular reaction due to embolism of small meningeal vessels without actual infection of the meninges by organisms Of course in addition to lesions in the meninges one would expect in a case of this kind to find numerous lesions in the brain, possibly many small lesions I do not believe that I have ever seen an abscess complicating bacterial endocarditis, but should suppose that it may occur

#### CLINICAL DIAGNOSES

Old rheumatic heart disease  
Acute bacterial endocarditis (hemolytic streptococcus)  
Multiple brain abscesses (embolic)

#### DR RICHARD C CABOT'S DIAGNOSES

Old rheumatic heart disease, aortic and possibly mitral  
Bacterial endocarditis  
Meningitis  
Infarcts of the lung and spleen ?

#### ANATOMIC DIAGNOSES

Bacterial endocarditis, acute (hemolytic streptococcus), aortic, mitral and tricuspid  
(Septicemia, hemolytic streptococcus)  
Rheumatic heart disease, mitral, aortic

Cardiac hypertrophy  
Multiple infarcts of the brain  
Infarction of the spleen.  
Nephritis, acute embolic, minimal  
Pulmonary edema.  
Pericardial effusion.  
Operative scar Appendectomy  
Petechial hemorrhages in conjunctivae, pericardium, and ureter  
Pulmonary embolus.

## PATHOLOGIC DISCUSSION

Dr. MALLORY The autopsy showed most of the findings that were expected. The heart was very much enlarged. It showed signs of old rheumatic heart disease on the mitral and aortic valves in the form of thickening and scarring of the leaflets and of the chordae tendineae not severe enough, however, to suggest that either mitral stenosis or aortic insufficiency was present in significant degree until the terminal bacterial endocarditis developed. Bacterial vegetations were present on the aortic valve, where there was a very large mass, also on the mitral and they had spread onto the ventricular endocardium beneath the aortic valve and up on the auricular endocardium above the mitral valve. The tricuspid showed one small mass of vegetations and did not show any evidence of previous rheumatic involvement that we could make out. However, arising from the vegetation on the tricuspid there was a pulmonary embolus which had nearly completely plugged the artery leading to the right lower lobe. There was, however, no infarction. The left lower lobe was entirely negative. There was no evidence of old tuberculosis. As is almost invariably the case in bacterial endocarditis, we did find infarcts in other organs: a couple of gross ones in the spleen, although the spleen as a whole was only very slightly enlarged. The kidneys showed no gross infarcts but on microscopic examination they showed the typical focal glomerular lesions that one regularly finds in cases of bacterial endocarditis.

The brain showed no grossly visible meningitis but on section small infarcts were found. There were no definite abscesses. I would agree with what Dr. Kubik said, that with bacterial endocarditis of the viridans type one probably never sees abscesses. I have frequently seen abscess, however, when the endocarditis was due to the hemolytic streptococcus and I am a little surprised that the infarcts did not break down in this case.

Dr. WHITE Was this hemolytic?

Dr. MALLORY Yes.

Dr. CABOT Where did all these cells in the spinal fluid come from?

Dr. KUBIK That is rather hard to tell. We

have no microscopic sections of the brain as yet. I should expect to find some exudate in the subarachnoid space even though it is not visible to the naked eye. Here apparently there were showers of cells due possibly to successive emboli or crops of emboli with subsidence of the meningeal reaction in between.

## CASE 21452

## PRESENTATION OF CASE

A forty-eight year old married brass finisher was admitted complaining of loss of appetite, weakness and loss of weight.

About eight months prior to his admission the patient suffered a minor injury to his ankle. At this time he began to lose his appetite and soon developed weakness of the lower extremities and shortness of breath upon exertion. Shortly thereafter he had vague pain in one or the other shoulder and on the inner surface of the arms. This recurred several times a week. Occasionally he would be awakened at night with a sensation of suffocation and was compelled to sit up in bed. He continued to work although this became increasingly difficult for him. His appetite was so poor that he eliminated his breakfast and noon meal. Two months before admission he became very markedly dyspneic, even with minor exertion. At the same time weakness of the upper extremities became quite pronounced. He felt distended after meals, was frequently nauseated, and occasionally vomited. He now discontinued all regular meals and lived on a diet of raw eggs, beer, and milk. Six weeks before admission he found that three pillows beneath his head enabled him to sleep more comfortably. He suffered from a dull aching localized pain in the right costal margin which recurred every afternoon. Up to this time he had lost fifty-seven pounds. Three weeks prior to admission he was compelled to stop work. He began to vomit everything, except for the diet noted above, directly after ingestion. The vomitus was never blood stained. Ordinary walking became difficult because of asthenia and dyspnea. Two days before admission he developed an annoying cough associated with nasal discharge and hoarseness.

At the age of eighteen years he had been refused admission to the Army because of "rheumatic heart disease" although this had never caused him any symptoms. The patient had had influenza with pneumonia at the age of twenty-two years.

His father had died of "tuberculous abscess of the bronchus." He had one son then in the hospital with an appendiceal abscess. The remainder of the family history was negative.

His occupation had exposed him to aspiration of some brass dust

Physical examination revealed a well-developed, emaciated, slightly cyanotic and orthopedic man weighing 142 pounds. His teeth were in very poor condition and his breath was quite foul. The skin and mucous membranes were of normal color. His chest was normal in shape but there was absent tactile fremitus anteriorly from the third rib to the bottom on both sides. Posteriorly it was absent from the midportion of the scapula to the bases. These areas were percussed flat and breath sounds and vocal resonance were absent. The heart was normal in size and there were no murmurs audible. The blood pressure was 105/80. The abdomen was distended. There was shifting dullness in the flanks and a fluid wave was elicited. A tender liver edge was felt four centimeters below the costal margin. The spleen was not felt. The remainder of the physical examination was negative.

The temperature was 102.5°, the pulse 120. The respirations were 25.

Examination of the urine was negative except for a trace of bile. The blood showed a red cell count varying from 3,200,000 to 4,800,000 within two weeks, with a hemoglobin of 65 to 75 per cent (Tallqvist). The white cell count was 6,600 on admission and rose slowly to 11,950 during the period of hospitalization. There were 85 per cent polymorphonuclears, 10 lymphocytes and 5 monocytes. Platelets were reported as being normal. The sputum contained some blood but was otherwise negative. The vomitus was guaiac negative. The stools were negative. The serum protein was 6.9 per cent, the nonprotein nitrogen 28 milligrams per 100 cubic centimeters and the chlorides were equivalent to 94 cubic centimeters 0.1 normal chloride per 100 cubic centimeters. The icteric index was 4. A liver function test revealed 0 to 5 per cent retention. The van den Bergh gave a normal indirect reaction. A blood culture contained only contaminating diphtheroids.

X-ray examination revealed marked dullness in both lung fields obliterating the diaphragms. There was thickening in both lateral borders. There was stripe formation in the upper portion of dullness on the left side. The heart was displaced to the left and was not evidently enlarged. The lung markings were slightly increased with some mottling of the fields. The stomach and esophagus appeared to be negative. The liver was enlarged and the appearance of the abdomen suggested the presence of fluid.

On the second day a bilateral thoracentesis was performed, the left chest yielding 1,270 cubic centimeters of fluid and the right 550. This fluid had a specific gravity of 1.014 and

a total protein of 3.8 per cent. No organisms were present and there was no growth on culture. The cells were predominantly red blood cells. Takata-Ara reaction of serum and chest fluid was strongly positive. On the ninth day the patient felt well save for a continued poor appetite. Two days later his abdomen was observed to be rapidly enlarging. A week later the abdominal circumference began to diminish. There was occasional emesis. A chest tap obtained 700 cubic centimeters of amber-colored fluid from the left chest. There was no essential change in its content. A gastrointestinal series at this time showed a small hernia of the stomach through the esophageal hiatus. The stomach was high in position and there was constant prepyloric spasm without any evidence of disease in the stomach. The cap was not deformed nor was there any evidence of defect in the second portion of the duodenum. The upper loops of the small intestine were constantly dilated. No obstruction was visible. At the end of the third week an abdominal paracentesis yielded 3,000 cubic centimeters of hazy, pseudochylous fluid. This fluid had a specific gravity of 1.014. There were 630 cells, all of which were young polymorphonuclears and lymphocytes. The total protein was 3.5 per cent. A smear and culture were negative. An examination for tumor cells was negative. The patient was very weak and apprehensive at this time and had lost eleven pounds since admission. An x-ray exhibited marked increase in the process in both lung fields. The areas of consolidation were large and becoming confluent. There was also an increase in the amount of fluid. The spleen appeared to be enlarged. One month after admission he began to vomit more frequently and developed diarrhea, four to six movements daily, which did not respond to therapy. Shortly thereafter he began to cough, became rapidly weaker and expired on the thirty-eighth day.

#### DIFFERENTIAL DIAGNOSIS

DR EDWARD D. CHURCHILL. I admit beforehand that I do not know what the diagnosis is. It seems to be a problem of diagnoses. In fact in going over the case I do not see quite why it was given to a surgeon. Perhaps that will give us a lead as to diagnosis.

All through the present illness the loss of appetite is emphasized and reemphasized.

There is nothing in the present illness that points toward disease of any particular organ, just a loss of weight with gastrointestinal symptoms and disturbances that might go with advancing cachexia.

The patient was refused admission to the Army because of "rheumatic heart disease." Later on in the physical examination we find he has a normal heart.

With regard to the possibility of brass poisoning we used to consider the ague and chills common to brass foundries attributable to that cause. Now, however, the syndrome is thought not to be due to brass but to the fumes of zinc coming from molten brass. As far as I know there is no industrial poisoning due to brass itself. He was a brass finisher and I think that we may dismiss industrial disease.

We can also dismiss rheumatic fever and cardiac decompensation. There was no edema of the ankles and no other signs of cardiac decompensation.

The respiration rate was 25 despite the description that he was dyspneic, orthopneic and cyanotic. The blood showed a slightly reduced red cell count. The hemoglobin was somewhat low. The icteric index was a little elevated, going with the trace of bile but certainly not more than a subicteric degree of jaundice.

They were bold in taking off 1270 cubic centimeters of fluid from the left chest and 500 from the right. The cells were predominantly red blood cells, but the fluid was not described as bloody in the gross.

I had not heard of the Takata Ara reaction until yesterday and I busied myself trying to find out what it is.

DR. TRACY B. MALLORY. Dr. Crone was responsible for that. Perhaps he will put in a word.

DR. NEIL L. CRONE. The Takata Ara reaction in brief is a precipitin or a flocculation reaction and is read as a flocculent precipitate formed when varying dilutions of serum are added to sodium carbonate and mercuric chloride. There have been a number of papers written about it the gist of which is as follows. In normal people the test is positive in two out of every hundred. In patients with cirrhosis of the liver the test is positive in from 65 to 80 per cent, depending on whose observations are accepted. There are two other conditions in which the test has been reported positive by a number of observers. One is in generalized metastatic carcinoma, carcinomatosis. In such cases the liver is usually involved with milary metastases, but not always. The other condition is milary tuberculosis in which case also the liver is usually involved widely with milary tuberculosis but again not always so.

This patient's Takata Ara reaction was not a questionable reaction at all. It was strongly positive and, as I remember, I repeated it on both the serum and chest fluid the second time.

DR. CHURCHILL. What is the significance of a strongly positive Takata Ara reaction in the presence of a normal functional test of the liver?

DR. CRONE. The reason I am doing them is

to try to find out whether the Takata Ara reaction offers anything that the usual liver function tests do not offer. I cannot answer that. We have had positive tests in patients who clinically have cirrhosis of the liver but whose liver function by other tests was normal. Until we have done more, I do not think one can say.

DR. CHURCHILL. The diagnosis is boiling down, at least in my mind, to milary tuberculosis or generalized carcinomatosis. We also have to consider cirrhosis of the liver.

He has a small hernia of the stomach through the esophageal hiatus, a finding that is not uncommon and might be expected in a case with that much fluid.

We must consider the causes for a total illness of eight or nine months terminating in death. This is quite rapid for any type of liver cirrhosis that is accompanied by normal liver function and no jaundice. Chest fluid may appear in certain types of liver cirrhosis. I have never known it to be quite so pronounced as this. I am going to dismiss primary liver cirrhosis as the cause of this man's death. That brings us to milary tuberculosis. The blood is quite consistent with milary tuberculosis. The duration of the disease is long but particularly in adults of this age milary tuberculosis may run a chronic and an atypical course. The chest symptoms are quite suggestive. I do not think we can dismiss milary tuberculosis from the differential diagnosis. Then we turn to the very common disease that kills a man of forty-eight in eight months—carcinomatosis. The general picture as far as I can see is consistent with such a diagnosis except that we have absolutely no inkling as to a primary focus of the disease. In carcinomatosis we look for metastases and for a primary growth. In milary tuberculosis we look for changes in the lung fields. I wish Dr. Hampton would review these first two chest films.

DR. AUBREY O. HAMPTON. In the first film we have of the chest there is a very indefinite milary process present which can be seen only on close inspection. In this second film the milary process is quite distinct. The fluid which is present at both bases in the first film has not increased, probably because of chest taps. In the third film, taken one month and twenty-two days after the first, there has been a marked change in the milary process. The pulmonary lesion is now characterized by a diffuse bronchopneumonia. The fluid has not increased. I remember interpreting these films and we searched for a primary tuberculous lesion hoping to obtain a lead toward the diagnosis of milary tuberculosis but not one was found. There was thus slight displacement of the trachea toward the left by what appears to be a mass in the region of the thyroid. We were quite impressed by the symmetrical pleural effusion. I do not remember seeing this picture before but it must be

cur in late stages of milary tuberculosis. The only significant finding was the rapid change in the character of the lesion. I think that this change was the reason we hazarded the diagnosis of milary tuberculosis. We were content to explain the displacement of the trachea on the basis of exaggeration due to scoliosis.

DR. CHURCHILL: Then your diagnosis was milary tuberculosis of the lung with the atypical finding of bilateral pleural effusion. The x-rays of the skeleton were negative. You saw nothing in the bones?

DR. HAMPTON: No.

DR. CHURCHILL: So the disease is striking chiefly in the chest and in the abdomen.

DR. HAMPTON: I think perhaps a film of the barium-filled bowel should be shown. I do not know that it offers much in the way of differential diagnosis, however.

This small bowel is apparently in a state of contraction and the margins of the gut show a fine irregularity. There are other evidences of irritability of the bowel. For example, the terminal ileum is empty, the cecum is filled and the right half of the colon is empty while the descending colon is well filled. The loops of the small bowel are rather widely separated and the cecum appears small. There is very little gas in the small bowel such as one would expect were ileus present as is usually seen in carcinomatosis. The Sterling sign which indicates ileocecal tuberculosis was not present, as you see the cecum is filled. From the gastrointestinal examination therefore we were unable to say that a primary tuberculous focus was present and we were unable to differentiate definitely tuberculous peritonitis and carcinomatosis.

DR. CHURCHILL: We are left with the differential diagnosis of milary tuberculosis and carcinoma apparently labored over on the wards. The only possible clue to a primary lesion Dr. Hampton pointed out in the low thyroid, nothing very striking. I am not familiar enough clinically with the course of milary tuberculosis in a man of this age to get a positive lead toward that diagnosis. Milary tuberculosis, particularly in older people is apt to be atypical and the diagnosis frequently not made until autopsy. It certainly cannot be excluded. However, the gastrointestinal symptoms and the amount of fluid in both chests lead me to put carcinomatosis as my first choice. The origin is most probably in the gastrointestinal tract. Carcinoma of the appendix is known to give a diffuse involvement of the lymphatic channels throughout the diaphragm, pleural cavity and the lungs. The stomach we must assume to be normal by the x-ray, but the other parts of the bowel are not ruled out. It would be unusual for the prostate to produce this picture. It would be unusual for thyroid

carcinoma. To come back to the puzzling Takata-Ara reaction. It does not help us because Dr. Crone says it may be positive in either of these conditions. I would be glad for anyone else to offer opinions in this case. I should say (1) carcinomatosis, primary focus unknown, possibly appendix, (2) milary tuberculosis, pulmonary and abdominal type, without meningeal manifestations.

DR. CHESTER M. JONES: Are you at all impressed by the fact that the spleen was felt the second time? Apparently it was missed at first on account of ascites. The abdomen was tapped and then the spleen was felt. Does that make you lean more toward milary tuberculosis?

A PHYSICIAN: What was the temperature chart?

DR. CHURCHILL: We have only one notation, 102°.

DR. MALLORY: It was pretty constantly elevated, the rectal temperature running from 102° to 103°.

DR. CHURCHILL: The pulse was not elevated?

DR. MALLORY: No.

DR. CHURCHILL: The temperature is more suggestive of milary tuberculosis than carcinoma. We have been working without the aid of the temperature chart.

I wish some of the internists would give their opinions on this case.

DR. FREDERICK T. LORD: It seems to me this pleural fluid has rather a lower specific gravity than one would probably find in an inflammatory fluid, which would make me also lean more toward a carcinomatosis.

DR. JONES: It seems to me there is nothing much on which to make a diagnosis of intra-hepatic disease unless there is secondary involvement. I am interested in Dr. Lord's remark about the fluid. It seems to me the protein in that fluid is high for a transudate and I think it is not consistent with cirrhosis any more than the rest of the picture is. As to its being non-inflammatory I do not know. I should think it was a higher protein content than you usually see in a transudate and I think it would be more in favor of an inflammatory type of reaction.

I am wondering about the story at the end of the first paragraph. Just before he came in he had a cold and was hoarse. That might have been an upper respiratory infection and nothing else, but the combination of hoarseness and the x-ray picture with displacement of the trachea makes one wonder if there was not a localized process as a result of the hoarseness.

I think the way Dr. Churchill summed the case up was the logical way to diagnosis.

DR. WYMAN RICHARDSON: The patient was on my service. I thought he had malignant dis-

case and I refused to accept Dr Hampton's diagnosis on the basis of the length of the story, which I thought was unusual for miliary tuberculosis

One other thing, the examination of the smear showed degenerate reaction of polymorphonuclear cells which should have suggested infection

#### CLINICAL DIAGNOSIS

Metastatic malignancy, generalized in the chest and abdomen, primary source

DR. EDWARD D CHURCHILL'S DIAGNOSES

- (1) Carcinomatosis Primary focus unknown. /
- (2) Miliary tuberculosis

#### ANATOMIC DIAGNOSES

Tuberculosis, miliary, of the lungs, liver and spleen.

Tuberculous pleuritis, bilateral, with effusion

Tuberculous peritonitis

#### PATHOLOGIC DISCUSSION

DR MALLORY The autopsy showed that the x ray department had won out Immediately

on opening the abdominal cavity we found innumerable minute tubercles studded over the peritoneal surfaces Both pleural cavities showed an identical reaction The lungs likewise were rather uniformly peppered on both sides with miliary tubercles We did not find any old tuberculous focus as a source for the picture I do not know whether it is fair to assume from the autopsy findings what the content of the pleura and peritoneum may have been like during life. At any rate certainly at autopsy a large proportion of the exudate was clotted so that it would be possible that the serum which was drawn off was simply supernatant fluid and for that reason had a lower gravity than it otherwise would have.

DR. JONES What did the spleen show?

DR MALLORY It was normal in size

The liver was slightly, not markedly enlarged. Both diaphragms were very low, probably explaining why the liver was readily palpable There were miliary tubercles in the liver and there was also a definite bile stasis in the liver for which no obvious reason in the form of obstruction in the bile ducts or degeneration of liver cells was found.

We found no thyroid tumor



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## A BILL TO RAISE THE QUALIFICATIONS FOR PRACTICE

RECENTLY there was filed with the Secretary of State the draft of a bill in which the Board of Registration in Medicine recommends to the General Court that certain changes in the medical practice act of Massachusetts be made. The proposals cover three points.

The first proposal adds two years of collegiate work to the high school education already required as a preliminary premedical education.

The second proposal explicitly authorizes the board to accept an equivalent of the medical course now formally stated to consist of four years of instruction of not less than thirty-two school weeks in each year. Many foreign universities have a different arrangement of the medical course and require five or six years of twenty-eight or twenty-six weeks in each year. Such courses if given in recognized schools of medicine may fairly be considered equivalent to the regular course adopted in the United States and should be recognized as such.

The third proposal introduces the characterization of a medical school of which the gradu-

ates are eligible for examination by the board, that it be approved by the board. This rather simple phrase "approved by the board" has great significance, and its introduction into the law or its continued omission therefrom carries with it the possibility of great good or of great harm to the health of the people of this Commonwealth.

Thus there is opened another stage in the campaign which has as its goal the giving to the people of Massachusetts of adequate protection against unqualified practitioners of medicine.

The long process of preparing the candidate for the practice of medicine is complicated in the extreme. The determining of just what qualifications a physician should possess is perhaps simple, if one does not make too long a list, if one is not too specific, and if one insists that they should be possessed by every physician. But how to determine which individuals have the capacity for developing into good physicians, how to determine into just what specific environment or educational procedure they should be introduced, how to determine at intervals in this time-consuming education if the reactions of the student are such as to justify his going on along this line of endeavor, how to determine finally whether he has developed to such a stage of knowledge and skill and character that he may reasonably be entrusted with the responsibilities of the physician, are problems which the most intelligent and honest of medical educators regard as having reached now only tentative solutions.

The issues are so critical, the danger of taking medical education lightly are so great, the harm that may result from any perversion of the power of conferring medical degrees, authorized by the state as a solemn responsibility, are so great, that the state should place upon some one of its administrative bodies, the duty of scrutinizing and evaluating and approving, or condemning if need be, all medical schools whose graduates may ask to be admitted to its examination.

The Board of Registration in Medicine of Massachusetts is to be commended for its continued interest in this aspect of protection and for its persistence in again recommending to the General Court a course of action which is in itself so reasonable and in practice has been found to work so well wherever it has been tried. The medical profession should make clear to the Legislature that it believes that the public should have the more adequate protection which the bill will provide.

## THE HANDBOOK FOR PHYSICIANS

VOLUME 22, No. 3 for July, August and September, 1935 of *The Commonwealth*, issued by the Massachusetts Department of Public Health, appears as a *Handbook for Physicians*.

This publication will reach physicians of Massachusetts as soon as possible after release by the printers

In the foreword by Dr Chadwick, Commissioner of Public Health, the purpose of the issue is clearly stated to be for the "more effective utilization of certain of the community resources" at the disposal of the physicians of the Commonwealth

Although the classification of these aids is defined as restricted to those which "have a particular bearing upon the public health" the reader will find that guidance and information which will enable the practitioner to cooperate with the authorities in the public health activities of the State

The language of the document is clear and concise, so that there can be no excuse for failure to comply with all of the rules and regulations required of physicians in dealing with communicable diseases. In addition the resources of preventive and therapeutic medicine as applied to diseases under the supervision of public health bodies, are set forth

This should be the doctors' *vade mecum* for all physicians who may come in contact with diseases which are included in the reportable list

Dr Chadwick invites constructive criticism and comments for use in revisions of this publication

### NEW YORK'S INFANT MORTALITY

A RECENT study of infant mortality in New York City since 1810, made by Dr Charles F Bolduan, director of the Bureau of Public Health Education, and Louis Weiner, vital statistician of the department, shows that, contrary to general belief, child deaths have not declined steadily during the past century according to an article in the *New York Times*

The rate at the beginning of the nineteenth century—180 deaths per 1 000 births—was actually about the same as at the beginning of the twentieth century—just under 140 deaths per 1,000 births. Much of the drop in the infant mortality rate since 1870 has been shown merely to offset a marked increase in the preceding sixty years, the rate having risen rapidly from somewhere between 120 and 145 in 1810 to 180 in 1850, 220 in 1860 and almost 240 in 1870

There are reasons for this rise during the first three quarters of the last century. In the second quarter of the century far reaching social and economic changes took place. Population growth accelerated, factories multiplied and immigration increased with consequent crowding and lowering of standards of living. Wages especially after the panic of 1837, were repeated

ly reduced. The character of the city's milk supply deteriorated with a diminution in pasturage for the cows in the city dairies

During the Fifties and Sixties legislative action was finally obtained which resulted in the organization of the present Department of Health, with wide powers and after 1870 a decline in infant mortality was noted. By 1880 the rate had dropped to 200 and by 1900, as previously noted, it was again below 140. By 1910 it was 113, by 1920 85 and by 1930 it had dropped to 57. The rate in 1934 was 52, and so far this year it has been 51.7

The marked drop in the past fifty years has been due to many factors—improvements in the milk supply, including compulsory pasteurization, the establishment of baby health stations, organized educational efforts, and, undoubtedly, the great decrease in flies resulting from the introduction of motor cars

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

MUNRO DONALD A.B. M.D. Harvard University Medical School 1916 F.A.C.S. Visiting Surgeon, Neurological Surgery, Boston City Hospital. Assistant Professor of Neurological Surgery, Harvard University Medical School. His subject is "The Modern Treatment of Cranio-cerebral Injuries with Especial Reference to the Maximum Permissible Mortality and Morbidity." Page 893. Address 818 Harrison Avenue, Boston, Mass.

JONES, CHESTER M. A.B., M.D. Harvard University Medical School 1919. Physician, Massachusetts General Hospital. Assistant Professor of Medicine, Harvard University Medical School. Address Massachusetts General Hospital, Boston Mass. Associated with him is

EATON FRANCIS B. B.S. Address Massachusetts General Hospital, Boston, Mass. Their subject is "The Prognostic Significance of a Spontaneous Diuresis in Acute or Subacute Disease of the Liver." Page 907

GANT, JULIAN C. B.A., D.N.B. M.D. College of Medical Evangelists, Loma Linda, Los Angeles. Assistant in Medicine, Massachusetts General Hospital. His subject is "Myxedema Heart. Report of a Case." Page 918. Address 313 Commonwealth Avenue, Boston, Mass.

KIERNAN, FRANK A.B. Executive Secretary, Massachusetts Tuberculosis League Inc. His subject is "Massachusetts State Health Commission." Page 921. Address 1148 Little Building, Boston, Mass.

sent themselves have had such inadequate preparation in these fundamental sciences that they have not been able to profit as they should by their attempts to secure medical education. If the foundation is weak, the superstructure, no matter how carefully built, cannot be sound.

That collegiate instruction in physics, chemistry and biology is generally regarded as necessary is shown by the statutory requirements of all but eight States. In six of the eight, the requirement is by Board ruling, authorized by statute. Massachusetts is one of the two remaining States.

## II *Authorizing the Accepting of a Medical Course Equivalent to Four Years of Thirty Two Weeks in Each Year*

The Board has found that rarely do graduates of foreign medical schools, even the best, fulfill exactly the present requirement of four years of thirty-two weeks in each year. The reason for this is the different system of education and arrangement of the medical curriculum. Foreign universities require no shorter period of instruction, but the instruction is extended over five, six, or seven years, with less than thirty-two weeks in each year. The total number of weeks of instruction in the course is greater than that required by the present statute. Accepting the equivalent of the present requirement would not lower the standards, but make them more flexible.

## III *Requiring That Medical Schools from Which There Graduate Certain Candidates for Examination for Registration Be Approved by the Board*

Since there still exist in the United States so-called medical schools which continue to admit students and give them the medical degree without providing for them a reasonably good medical education as judged by generally accepted standards, the Board recommends that the General Court of Massachusetts adopt protective measures against these unqualified graduates similar to the measures by which the legislatures of other States protect their citizens. This additional protection will be made possible if only graduates of schools approved by the Board are admitted to examination.

The Commonwealth of Massachusetts

In the Year One Thousand Nine Hundred and Thirty-Five

AN ACT relative to the Qualifications of Applicants for Registration as Qualified Physicians

*Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:*

SECTION 1 Section two of chapter one hundred and twelve of the General Laws, as appearing in the Tercentenary edition thereof, as amended by chapter one hundred and seventy one of the acts of nineteen hundred and thirty-three, is hereby further amended by striking out the second sentence of said

section and inserting in place thereof the following —

Each applicant who shall furnish the Board with satisfactory proof that he is twenty one or over and of good moral character, that he possesses the educational qualifications required for graduation from a public high school, that he has completed two years of pre medical collegiate work, including Physics, Chemistry and Biology, in a college or university approved by the board, that he has attended courses of instruction for four years of not less than thirty two school weeks in each year, or courses which in the opinion of the board are equivalent thereto, in one or more legally chartered medical schools, and that he has received the degree of doctor of medicine, or its equivalent, from a legally chartered medical school having the power to confer degrees in medicine and approved by the board, shall upon payment of twenty five dollars be examined, and if found qualified by the board, be registered as a qualified physician and entitled to a certificate in testimony thereof, signed by the chairman and secretary.

SECTION 2 The provisions of said section two as existing immediately prior to the effective date of this act shall continue to govern as to the eligibility of any applicant for registration as a physician who had matriculated prior to the effective date of this act in any legally chartered medical school having power to confer degrees in medicine.

## THE APPOINTMENT OF DR ALICE HAMILTON

Dr Alice Hamilton of Boston has been appointed as technical adviser to Secretary Perkins in connection with a vigorous campaign against the menace of industrial accidents and diseases.

## THE AWARD OF THE NOBEL PRIZE

On October 24, 1935, the Nobel Prize for Medicine was awarded to Dr Hans Spemann, Professor of Zoölogy at the University of Freiburg im Breisgau, Baden.

This prize includes an award of 160,000 kroner, or about \$42,000.

Dr Spemann's work for which he is especially recognized has been in connection with experimental biology.

He was born in Stuttgart, Germany, June 27, 1869, the son of Wilhelm Spemann, a publisher. He was educated at Eberhard Ludwigs Gymnasium from 1878 to 1888. He had military training and studied medicine from 1891 to 1894 at the University of Heidelberg, Munich and Würzburg and was given work as an assistant in the University of Würzburg in 1895.

In 1914 he became director in the Kaiser Wilhelm Institute for Biology in Berlin and later was appointed professor of zoölogy at the University of Freiburg in Breisgau — *Abstracted from the report in the New York Times, October 25, 1935*

## ANTERIOR POLIOMYELITIS CASES

WEEKLY LIST OCTOBER 26 NOVEMBER 2 1935

City or Town	No of Cases
Fall River _____	2
Brockton _____	2
Norfolk _____	1
Norwood _____	1
Belmont _____	1
Boston _____	6
Cambridge _____	1
Lexington _____	1
Somerville _____	4
Lawrence _____	2
Lynn _____	1
Methuen _____	1
North Reading _____	1
Worcester _____	3
Springfield _____	1
Total _____	28

## TOTAL CASES FOR YEAR

January-June _____	14
July _____	46
August _____	481
September _____	537
October _____	237
November _____	8
Total _____	1323

## RED CROSS DISASTER, HEALTH AND SAFETY SERVICES

Death and destruction rode in the wake of the rising waters when cloudbursts in southern New York State early in July caused the greatest floods that area has known in fifty years. Forty-three lives were lost, 255 persons were injured, 9000 homes were damaged or washed away and even greater suffering would have resulted had not Red Cross Chapter workers arrived on the scene before the crest of the flood was reached to assist panic-stricken victims to reach places of safety and provide emergency care for those made homeless.

Chairman Grayson of the American Red Cross mobilized his workers with amazing swiftness and before the rain had ceased to fall the Director of Disaster Relief and his aids were en route from Washington, by plane to this beautiful finger-like country visited by hundreds of vacationists each year but then ambroiled by the raging waters of streams and rivers filled to overflowing by the forty-eight hour deluge.

More than 9000 families were affected by this single disaster and at the height of the emergency the Red Cross was feeding more than 7000 persons and providing shelter for half that number. But

this was only a beginning of the work of the Red Cross for among those made homeless more than 4000 families were without the financial means to rehabilitate themselves and must have the assistance of the Red Cross in rebuilding and repairing their homes and providing a thousand and one essentials before they could resume normal living.

The Red Cross sets no arbitrary limit on kinds of relief. If a family with no resources of its own has lost its home if the home is in need of repairs if the furnace is damaged or if the furniture is swept away or ruined if fencing is down on a farm if vital farm machinery is ruined the Red Cross meets the needs. The Red Cross makes no loans whatever assistance it gives it gives outright, with no strings attached.

You yourself may never need the services of Red Cross disaster workers you may never need the ministrations of a Red Cross public health nurse but someone else surely does. You may never be saved from drowning by the timely arrival of a Red Cross life saver and the application of the prone pressure method of artificial respiration—but many are the men and women, the boys and girls who walk the land today because someone trained by the Red Cross was at hand in an emergency.

Year after year through more than half a century citizens before us have maintained by membership the American Red Cross as the great humanitarian agency—and there is nothing in all its many valuable services which is more helpful more neighborly than these services which pertain to the conservation of human life. Nothing could be more unselfish or appeal more strongly to the generous instincts of a people.

Some months ago an epidemic of malignant malaria broke out in a southern State. Now malaria is something usually thought of as slow working a drain upon physical energy but hardly in a group with some of the other contagious diseases like typhoid fever or smallpox. Actually here in this progressive public-spirited community this form of malaria struck swiftly and terribly. First diagnosed as undulant fever later dengue, there were developed seventy-four cases five deaths before a hurry call was sent to the Red Cross. A representative of the Red Cross nursing service after a rapid survey telegraphed the needs to headquarters. The director of the service scanned her lists for the most conveniently located available nurses quickly dispatched eight to the scene. They at once made their presence felt in a nursing campaign lasting several weeks helping physicians to check the progress of the disease effectively and nursing their patients back to health.

A number of times each year there are emergency demands for nurses similar to the example just cited. Disaster so often strikes rural communities, leaving behind a trail of injured to be cared for in improvised hospitals. Sometimes unsanitary conditions are potential breeders of disease. Typhoid lifts its head here and there in rural districts and

small towns—just as it did last year in one of the Northwestern States. The need for help is great—and the Red Cross responds, for there are more than 36,000 nurses on the active list of the Nurses' Reserve ready for instant service in the Army, the Navy or for the Red Cross emergency service. These nurses meet the highest professional standards and are available in every part of the Nation. They constitute a powerful line of health defence.

Half the child population of a county high up toward the Canadian line was found to be suffering from goitre when an itinerant Public Health nurse of the Red Cross made her first school inspection after arriving for her tour of duty. Symptoms ranged from slight to toxic. Cases were at once referred to physicians for treatment and upon their advice iodine tablets were distributed, which checked the progress of the malady and had the effect of awakening the community to the importance of preventive measures.

Continuing her school inspections, she brought about the immunization of 428 children from diphtheria and obtained dental inspection and services for children whose teeth had been noticeably neglected.

This sort of thing is all in the day's work of the Red Cross nurse. The press occasionally carries stories of more spectacular nursing achievements, reflecting the heroism of Red Cross nurses in time of epidemic and disaster, of their bravery of the elements and disregard of self, but perhaps the largest contribution of all is their daily bedside nursing, their detection of unsanitary conditions, their coöperation with local health authorities in the improvement of health situations, their health inspections of children and adults, their zeal in promoting immunization against contagious diseases, their teaching of simple home nursing.

This last year Red Cross Chapters employed more than 800 public health nurses that means year round programs of bedside nursing. They made more than a full million nursing visits and went into the schools and inspected 600,000 children—detected defects before they developed serious complications sent many a child to doctor or dentist or oculist for corrections that made school work easier and safeguarded future development.

Of course, it is humanly impossible for even a large group of professional nurses to respond to all the demands for service. To meet this pressing need, the Red Cross trains many of its nurses to teach mothers, fathers and even younger members of the family to take care of chronic invalids, the aged, sick brothers and sisters and others in the home who need special care but do not require the services of a trained nurse. Last year more than 2000 nurses were authorized to conduct courses in Red Cross Home Hygiene and Care of the Sick. More than 50,000 students were awarded certificates for satisfactory completion of the course. Since the Red Cross first undertook the teaching of home hy-

giene classes, approximately three-quarters of a million certificates have been issued.

In safety, as in health, the Red Cross is the great evangelist. In Washington, D. C., a slow gas leak fills a house with deadly fumes, a whole family is slowly succumbing. A young woman in the household is a holder of several Red Cross first aid certificates, has even been authorized to instruct in the subject. She rushes to fling open the windows, turn off the gas, summons a physician and places the victims where they will be in uncontaminated air, at once busies herself applying the prone pressure respiration to the one most desperately affected. She saves those lives.

In the old days of the muddy, treacherous swimming hole and unsupervised bathing beaches water tragedies took terrific toll. They still do. But they are at last being definitely checked and the trend of drownings is downward. There are 8000 drownings a year, but there are thousands, perhaps millions, more swimmers. The Red Cross is making progress—it is looked to for safety leadership, furnishes hundreds of camp counselors, teaches swimming, trains for safety, equips teachers to carry on the work. It holds a series of National aquatic schools each spring for men and women who make swimming and outdoor activities their vocation or summer avocation.

Summarizing briefly a twelve months' record of accomplishments by the companion Red Cross Services, First Aid and Life Saving: 183,000 first aid certificates awarded, 74,000 life-saving certificates.

In twenty-one years 633,000 life saving certificates have been issued, and in the last quarter of a century first aid certificates have been granted to more than 946,000.

Think of all the bruises and wounds that have been dressed by these hundreds of thousands, the infections that have been prevented, the fractures that have been cared for until the arrival of medical help, the blood flows that have been stopped, the shocks that have been mitigated, the innumerable and varied emergencies that have been successfully met because of Red Cross training!

Red Cross health and safety services are supported—just as are other Red Cross services—by the annual Roll Call. Everyone ought to have a part in the Red Cross, by joining through the local Chapter. This year, as always, the period between Armistice Day and Thanksgiving Day—November 11-28—has been set aside for Nation-wide enrollment of members. Won't you join the Red Cross?

#### NEWS ITEMS

The annual conference of the National Society for the Prevention of Blindness will be held at the headquarters of the Society in Rockefeller Center, New York, December 5 to 7, it has been announced by Lewis H. Carris, managing director. Among the topics to be discussed will be Medical Social Eye Work, The Prevention of Eye Accidents Caused by Fireworks, and The Division of Responsibility be-

## Between Official and Unofficial Agencies in the Movement for Prevention of Blindness

The election of the following as honorary vice-presidents of the Society is announced Dr George E. DeSchweinitz of Philadelphia emeritus professor of ophthalmology in the Medical School University of Pennsylvania Dr John H. Finley associate editor of the *New York Times* and Miss Lillian D. Wald president of the Henry Street Settlement of New York City Other honorary vice-presidents of the Society are the following United States Senator Thomas P. Gore of Oklahoma Helen Keller and Mrs. Winifred Holt Mather

Dr. Walter B. Lancaster of Boston associate in ophthalmology Harvard University Medical School and Dr. Bernard Samuels of New York City professor of clinical surgery Cornell University Medical School, have been elected to the Society's board of directors

## NEWS ITEMS FROM MAINE

The Franklin County Memorial Hospital Medical Institute of Farmington Maine held a Cancer Clinic on October 11, 1935

2-5 P.M. Ward Rounds and Case Clinic.

6 P.M. Dinner

7 P.M. Paper "The Successful Diagnosis and Treatment of Cancer," by Dr. Barbara Hunt, of Bangor Maine

Paper "Some Recent Advances in Cancer Research," by Dr. C. C. Little Director of the American Society for Control of Cancer

## THE MAINE MEDICAL ASSOCIATION CLINIC

The Annual Maine Medical Association Clinic was held this year at Lewiston, Maine, October 24-25, 1935. Sessions on the twenty-fourth were at St. Mary's Hospital in the morning and afternoon and on the twenty-fifth at The Maine General Hospital.

## PROGRAM

From 9 A.M. to 12 noon each day surgical clinics with operations and demonstration of cases

12 M. Buffet luncheon.

2 to 5 P.M. Fifteen-minute papers by members of the hospital staffs

5 P.M. Thursday Neurological conference by Dr. Elliott C. Cutler

5 P.M. Friday Round Table conference on Cancer in Maine conducted by Dr. Clarence C. Little

7 P.M. Each night. Banquet at DeWitt Hotel.

8 P.M. Thursday "The Surgeon and His Art," Dr. E. C. Cutler

8 P.M. Friday "Problems Pertaining to Cancer" Dr. C. C. Little

## CORRESPONDENCE

### TROUBLE AHEAD

The Commonwealth of Massachusetts  
Department of Public Health  
State House, Boston

October 21 1935

Editor *Acta Eng and Journal of Medicine*

The diagnosis and management of syphilis and especially of early syphilis, have been written and talked about so much in recent years that there is bound to be trouble ahead for the physician who makes mistakes in diagnosis or who fails to treat the patient properly. Appearance before the Board of Registration in Medicine is the least that can happen. Suits for malpractice will follow as rapidly as the public becomes acquainted with what it has a right to expect from the physician. The following cases are presented

Early in February an indigent male called upon a city physician presenting a penile lesion of a few days duration. The patient testified before the Board of Registration in Medicine that the lesion was painted with mercurochrome boric acid ointment or wash was prescribed and the patient advised that the lesion was of no consequence and would disappear

The following April the patient's wife who was then two months pregnant called upon the same physician. She presented a rash sore throat and genital lesions. The clinical picture was so characteristic that the physician (who had no recollection of having taken a blood test on any patient for several years) suspected syphilis. He had no serological outfits handy and requested that the patient return the next day. He failed to impress her with the possible seriousness of her condition and she did not return. The physician made no attempt to determine that she ever received any further medical attention nor did he report her to this Department for investigation.

A month or so later the same physician was called to this family's home because the younger (two years old) of two small daughters had a rash. The physician is reported to have stated that her condition "might be German measles" but that "he didn't think so." No further study of her condition was made.

Eventually these three members of this family were found, by another physician to have syphilis. The mother was then more than six months pregnant.

The outrageous mismanagement of these infections was so obvious that investigation by the Board of Registration in Medicine was requested.

There are a number of points about this case which deserve the attention of the medical profession

1. Syphilis and especially a recent infection or syphilis in a pregnant woman is a dangerous communicable disease

- 2 The husband's infection could have been diagnosed immediately by darkfield examination of serum from the lesion. Any syphilologist and most of the syphilis clinics in the State are equipped to make darkfield examinations. The very least that could have been done would have been the making of repeated blood tests, although once the blood has become positive the chance of clinical and serological cure has dropped at least 10 to 15 per cent.
- 3 Diagnosis of the husband's infection and its immediate and proper treatment might have prevented the infection of the wife. If she were already infected, she could have been kept under constant observation and treatment could have been begun immediately upon the appearance of evidence of infection. Or, if the sexual history indicated exposure, and the patient acquainted with the advantages of immediate treatment, infection could have been assumed and treatment begun at once.
- 4 The contact infection of the two year old daughter would have been prevented.
- 5 Treatment of the wife's infection could have been begun early in pregnancy. Treatment begun before the fifth month and continued to term is almost certain to prevent a congenital infection.
- 6 The adequate treatment of primary syphilis results in clinical and serological cure in 85 to 90 per cent of cases. In the secondary stage the chance of clinical and serological cure is from 15 to 20 per cent less. Thereafter "cure" in the double sense is problematical.

The records of the Board of Registration in Medicine show the following case as an example of the serious damage which may be done by erroneous diagnosis, particularly when the accepted diagnostic procedures are neglected.

A woman went to a physician because of some symptoms referred to her back. A diagnosis of syphilis was made by the Abrams' electrotonic method. Later the husband was examined by the same method and a diagnosis of syphilis was again made. These diagnoses led to recriminations and almost broke up the family, but as both histories were negative for syphilis another physician was consulted.

After the generally accepted laboratory tests had been applied and the patients had been properly examined, both were declared to be free of any evidence of infection with syphilis. The complaint of deceit was laid before the Board of Registration in Medicine.

The Department of Public Health has sent each of the 6,000 physicians in Massachusetts at least twenty-one reprints on the modern management of syphilis and gonorrhea during the last six years. It has enjoyed the advice of a large group of consultant specialists in the preparation and selection of this material. The Department offers free serological diagnostic laboratory service to every phy-

sician in the State. It offers arsenicals without charge to every physician who wishes to treat syphilis. It offers speakers on these diseases to any medical society or club that wishes a speaker. There is not a clinic chief in the state who would not welcome the opportunity to teach the management of syphilis or gonorrhea to any physician who will take the time to attend clinic sessions. Every possible effort is being made to enable the physician to add to and retain in his private practice those patients who come to him with either of these diseases.

Syphilis and gonorrhea are among the most prevalent of the reportable communicable diseases. Numerically, economically, socially and pathologically, they constitute the major, modern public health problem. Congenital and accidentally acquired syphilis account for from 15 to 20 per cent of the problem. Innocent infections in wives account for well over half the infections with either syphilis or gonorrhea in women. At least 10 per cent of all gonorrhea in the female is in girls under fourteen years of age, most of which is innocently acquired.

Gonorrhea and syphilis are no respecters of persons or morals. They are to be found in every physician's practice if they are looked for. The control of both diseases depends largely upon prompt and correct diagnosis, adequate treatment, constant control of the patient and a thorough search for related cases. When the medical profession adequately appreciates these facts, such situations as those described in this lengthy communication will be considerably less prevalent than they are, most unfortunately, today.

Yours truly,

N. A. NELSON, M.D., Assistant Director,  
Division of Communicable Diseases

#### IODINE AS AN ANTISEPTIC

Harvard University Medical School  
Department of Surgery

October 17, 1935

Editor, *New England Journal of Medicine*,

A recent editorial in your *Journal* boldly described iodine as the antiseptic "par excellence." Since there is abundant evidence to the contrary I have felt that perhaps you would accept this small note with its references and opposing attitude for publication so that those of your readers who doubt the editorial writer's opinion may feel a little relieved.

The true appraisal of an antiseptic is a difficult measure. Unfortunately, all too often the measuring rod used is the efficiency of a drug to kill bacteria in vitro. This test is really of no value if we mean by a useful antiseptic one that is useful in wounds or for the preparation of the skin. It has been repeatedly shown that though iodine may have a high bactericidal action on organisms in vitro, if blood is added the killing power of the

drug is greatly diminished or even lost. It has also been shown that a drug which has a high killing power in vitro is of little value in destroying organisms on the skin. It would appear that your editorial writer was interested in the use of iodine by surgeons, which would mean in wounds and on skin. Yet your writer quotes as evidence of the value of iodine tests which involve only the exposure of bacteria in vitro to iodine a matter of little concern to the surgeon.

The following table of references and results em

phasizes without need of further discussion the fallacy of the in vitro method as a means for testing the value of antiseptics for surgical use, and that iodine though it has a high killing power in vitro is useless as an antiseptic in the presence of blood or as a skin preparation. Of course I may have misused the meaning of the word antiseptic by your writer for iodine in a bacteriological sense is a good bactericide

Very truly yours,

ELLIOTT C. CUTLER, M.D.

Author	Journal	Volume	Page	Year	Iodine	Scrapings	Biopsies
Neate	Mil Surgeon	29	200	1911	removed	66% sterile	50% sterile
Decker C	Deutsche med. Wchnschr	37	1078	1911	removed	55%	100% Growth
Turner and Catto	Lancet	1	733	1911	left on		90% sterile
Robb	Surg., Gynec. & Obst	17	324	1913	removed left on	57% 86%	
Bovée J W	Am J Obst. & Gynec.	70	12,	1914		84%	41% "
Browning C H.	Brit. M J	1	562	1918	removed		40% "
Scott and Hill	J Urol	14	135	1925	left on	75%	75% "
Tinker and Sutton	J A. M. A.	87	1847	1926		100% Growth	
Simmons J S.	J A M A.	91	704	1928	3.5% tinc. 70% "	52% sterile 88%	
Reddesh, G F., and Drake W E	J A. M. A.	91	712	1928	70%	63% "	
Scott, W W., Hill J H., and Ellis M G	J A. M. A.	92	111	1929	70%	48% "	86.5%
Ozereliev A. A	Zentralbl f. Chir	57	136	1930	70% "		60%
Raisiss, G W., Severac, M., and Moetsch, J C	J A M A.	94	1199	1930	70% " 50% " 10% "	70% 100% Growth 100% Growth	
Smith, J W	J Urol	28	485	1933	in alc. acetone and H <sub>2</sub> O	50%	
Simmons J S	Surg., Gynec. & Obst.	58	55	1933	70% tinc in wounds	inoculated with staph abrasions 83% sterile sup incision 83% " deep incision 81%	



## RECENT DEATHS

**BROWN**—EDWARD WELLS BROWN, M D, of 337 Elm Street, Northampton, died at his residence suddenly, October 25, 1935

His office was at 16 Center Street. Dr Brown was born in 1871 in Milwaukee and previous to the study of medicine was educated at Yale and the University of Wisconsin. He received his M D degree from Columbia University College of Physicians and Surgeons in 1894

Dr Brown joined the Massachusetts Medical Society in 1898 and was also a Fellow of the American Medical Association. He was a member of the staff of the Cooley Dickinson Hospital and for several years held the position of chief. He had served Hampshire County as Medical Examiner for the last twenty years

Surviving him are his widow, a daughter, Miss Janet Brown, two sons, Dr Stephen Brown and Mr Richard B Brown and a brother, Mr Howard Brown of Springfield

**RICH**—FRANK A RICH, M D, of 8 Union Street, Burlington, Vermont, died recently in that city. He was born in 1861 and graduated from the University of Vermont Medical School in 1893. He also practiced Veterinary Medicine

Dr Rich served as a member of the faculty of the University of Vermont for forty years

**MORAN**—HORACE S MORAN, M D, of 12 Richardson Avenue, Wakefield, Massachusetts, died suddenly October 18, 1935

He was born in Wakefield, graduated from the Harvard Medical School in 1893 and was formerly a member of the Massachusetts Medical Society

Dr Moran is survived by a brother, George W Moran, and a sister, Miss Caroline H Moran

## OBITUARIES

**JOHN W KEEFE, M D, F A C S, L L D**

1863-1935

Dr John W Keefe of Providence died at his summer home, Narragansett Pier, August 3. The cause of death was cerebral hemorrhage. John William Keefe was born at Worcester, Massachusetts, April 25, 1863, the son of Denis and Alice (McGrath) Keefe. His early life was spent in Worcester and after graduating from the public schools, he entered upon the study of medicine at the University of Michigan, 1882 and 1883. He then went to New York and received his medical degree at the University Medical College, New York University, in 1884. He interned at Bellevue Hospital, receiving an appointment on the first surgical division. Following his graduation from Bellevue Hospital he came to Providence and established himself in general practice. He early became connected with the Rhode Island Hospital and served that institution thirty-three years, first in the capacity of Surgical Externe in 1886, Out Patient Surgeon from 1887 to 1895, Assistant Visiting Surgeon from 1895 to 1897

when he was appointed Visiting Surgeon which position he filled for twenty-two years. He resigned in 1919 as Active Visiting Surgeon and was appointed Consulting Surgeon

Dr Keefe took a very prominent part in the founding of St Joseph's Hospital serving as Visiting Surgeon four years and later as Visiting Gynecologist for ten years retiring in 1905, and was appointed Consulting Surgeon. He built the John W Keefe Surgery in Providence in 1913 and conducted that institution until a few years ago doing most of his private surgical work there

He was one of the founders of the American College of Surgeons and of the New England Surgical Society. He was Past President of the Rhode Island Medical Society, of the New England Surgical Society, of the New England Branch of the American Urological Association, and President (1916) and Vice-President of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons. During the administration of President Taft he received a commission in the Medical Reserve Corps and during the World War served as Major in the Medical Department of the United States Army

Dr Keefe, realizing that a surgeon should be an anatomist, was a constant student of anatomy and devoted much time to the study of this subject. He did frequent dissections on the cadaver as well as operative surgery on animals and animal experimentation. Early in his career he saw the advantages of study in Foreign Clinics and made several trips to Europe to observe and familiarize himself with the surgery of the masters of his day. He was a frequent visitor to the large and famous clinics of this country and a faithful attendant at meetings of many surgical societies to which he belonged

He was the first practitioner in Rhode Island to give up the general practice of medicine and confine himself to the practice of surgery as a specialty. Endowed with natural talents and those qualities which make for the successful surgeon, with an engaging personality and a constant aim to advance and achieve, Dr Keefe's record and attainments stand preëminently in the history of surgery in Rhode Island and New England as well as achieving a national reputation in his chosen specialty. I think it can be safely said that the surgeons of every state in the Union knew of "Keefe of Rhode Island", of his reputation and ability and of his contributions to surgical literature. If the oft heard saying be true that "surgeons are born and not made," it most certainly applies to Dr Keefe for he had in addition to an excellent training, those qualities of a deft hand with a technique of manipulation and a finesse in operating that marks the true artist in surgery, a sound judgment and the quality of decision, with the courage, ability and faith to act upon that decision

He was the author of many essays on surgical subjects. In 1931 he presented to the Rhode Island Medical Library a collection of his essays, forty-three in number. These papers were read before the Providence Medical Association, the Rhode Island Medical Society, the American Urological As

sociation and the New England Branch of the American Urological Association the New England Surgical Society and the American Association of Obstetricians Gynecologists and Abdominal Surgeons. A perusal of these papers is valuable and very interesting for they begin with the early history of operation for appendicitis. One paper on this subject in 1891 was the first paper on appendicitis read before the Rhode Island Medical Society and was followed by a second paper in 1894 the title of which was "Twelve Consecutive and Successful Operations for Appendicitis." This seems a small number of appendix cases to report when we compare it with the immense number of appendix cases which Dr. Keefe did in the years that followed. At the time of writing this paper however many of the doctors in Rhode Island were advocating the cure of appendicitis with large doses of castor oil and there was considerable controversy between the medical men and the surgeons as to the proper treatment of appendicitis. There are several of Dr. Keefe's essays which stand out as reports of pioneer work such as a paper in 1913 on "Stenosis of the Pylorus in Infancy" with report of two cases followed by a second paper in the same year with report of six additional cases. The technique of the operation done by Dr. Keefe preceded the published technique of the Ramstedt operation for this particular condition. In the literature of more recent years Dr. Keefe has been given credit for his priority in this operation. In 1916 he wrote a paper entitled "Sheet Rubber Superior to Gauze in Abdominal Operations." This was an original contribution to surgical technique and many surgeons throughout the country adopted this method of walling off viscera and were enthusiastic over its advantages. In 1925 he presented a paper before the Rhode Island Medical Society entitled "Traditions of Medicine in Rhode Island" which is a particularly valuable and interesting writing. In fact this compilation includes so many valuable and interesting papers that one could well afford to devote many hours pleasantly and profitably in reviewing these writings.

Dr. Keefe received an LL.D. from Manhattan College, New York in 1909 and one from Providence College in 1932. The latter college said of him in its citation:

In Dr. Keefe Providence College beholds a success attained through persistence in striving for professional perfection. The College would therefore honor such achievement for its own sake for the sake of its inestimable benefit to the common good, and for the sake of these pre-professional students within the college who look forward to a successful career. By honoring Dr. Keefe it would hold up an example how alone genuine professional success is secured and sustained namely by the ceaseless and untiring expenditure of personal effort evoked not merely during the years of preparation but ever afterwards, even when reputation has been made and recognition granted.

In addition to Dr. Keefe's love for his profession and his deep interest in surgery he was a

student of history and a lover of biographies. He was devoted to hunting and fishing having done considerable large game hunting in Maine and Canada, as well as fishing in those regions. Sword fishing was one of his favorite sports and in which he indulged as late as only last year.

At the time of his death he was Consulting Surgeon to St. Joseph's Hospital, the Rhode Island Hospital, the Charles V. Chapin Hospital, the Providence Lying In Hospital, the South County the Westerly the Woonsocket and the Pawtucket Memorial Hospitals.

In 1895 Dr. Keefe married Statia Sherman Maher of Brookline Mass. who died three years ago. He leaves four daughters, Mrs. John A. Bolster and the Misses Alice Sherman, Mary Ruth and Gertrude Sherman Keefe.

His reputation will endure his memory will be cherished by his many intimate and loyal friends and by numberless patients who have received the benefits of his expert skill and his kindly ministrations.

ARTHUR T. JONES  
WALTER L. MUNRO

#### DR. NATHAN FRIEDMAN

##### RESOLUTIONS

WHEREAS our friend and fellow worker Dr. Nathan Friedman has been called to his everlasting rest

We, the staff of the Jewish Hospital for Chronic Patients in meeting assembled hereby resolve that in his demise the institution has lost a devoted friend a loyal physician and a kindly minister to the sick.

It is further resolved that we extend our sincere sympathy to his beloved family in their hour of trial and to express the hope that the fragrance of his memory will ever be their everlasting solace.

In accordance with our sense of loss we deem it fitting that its expression be spread upon our records in order that his services as secretary associate and counselor be forever recorded in affection and appreciation.

MAURICE GERSTEIN M.D., *Chairman of Staff*  
Greater Boston Bikur Cholim Hospital.

#### NOTICES

##### MEDICAL CLINIC AND STAFF ROUNDS AT THE PETER BENT BRIGHAM HOSPITAL

At 3:30 P.M. on Thursday November 14 in the amphitheater of the Peter Bent Brigham Hospital, Dr. Henry A. Christian, Physician-in-Chief, Hersey Professor of the Theory and Practice of Physic in the Harvard Medical School, will give a medical clinic. To it are cordially invited practitioners and medical students.

On Saturdays in the wards of the Peter Bent Brigham Hospital from 10 to 12 staff rounds will be conducted by Dr. Christian.

## LAWRENCE CANCER CLINIC

Established 1928

Lawrence, Mass, October 22, 1935

*To the Physicians of the North Half of Essex County*

Dear Doctor

The regular Lawrence Cancer Clinic, to be held at Lawrence General Hospital, One Garden Street, Lawrence, upon Tuesday, November 19, at 10 00 A M, will be a Demonstration Clinic with Channing C Simmons, M D, of Boston, Surgeon-in Chief to Collis P Huntington Memorial Hospital, and member of the Cancer Commission of Harvard University, Boston, present as consultant. You are invited to accompany any of your patients whom you desire shall have this service, or to send them with a note, and a report will be returned to you. This service is gratis. Your attendance at the Clinic is always welcome.

This Clinic is endorsed by the Committee on Post-graduate Instruction of the Massachusetts Medical Society.

Committee ROY V BAKETEL, M D,  
CHAS J BURGESS, M D,  
FRED'K D MCALLISTER, M D,  
JOHN J MCARDLE, M D,  
HARRY H NEVERS, M D,  
THOS V UNIAO, M D,  
J FORREST BURNHAM, M D,  
*Chairman*

## A DEBATE RELATING TO MEDICAL SERVICE

The University of Kansas  
University Extension Division  
Lawrence

*To the Secretaries, State and National Medical Associations*

I think you are aware of the fact that some thirty or more high school debating leagues are debating this year the following question

"Resolved That the several states should enact legislation providing for a system of complete medical service available to all citizens at public expense"

The medical profession throughout the entire country has been most helpful in assisting these schools and debaters in securing authoritative information

The National Broadcasting Company is providing the facilities of its Red Network for a chain broadcast on this question on Tuesday afternoon, November 12. The following statement gives the essential facts concerning this broadcast.

## Speakers

Affirmative William Trufont Foster, Director, Polak Foundation. Professor Bower Aly, University of Missouri, Editor of the Debate Handbook. Negative Dr Morris Fishbein, Editor, *Journal of the American Medical Association*. Dr R G Leland, Director, Bureau of Medical Economics, American Medical Association.

Time—November 12, 2 00 to 3 00 P M, Eastern Standard Time (1 00 to 2 00 P M, C S T, 12 00 to 1 00, M S T, 11 00 to 12 00, P S T)  
Stations Broadcasting — NBC Red Network and affiliated stations

HAROLD G INGHAM,

*Chairman, N U E A Committee on Debate Materials and Interstate Cooperation*

## ANNOUNCEMENT

W H WATERS, M D, of 270 Commonwealth Avenue, Boston, announces that he will open the Boston Miami Clinic, Coconut Grove, Fla, for its eleventh winter season on November 11.

## REMOVAL

M M ANSHIN, M D, announces the removal of his offices to 99 Franklin Street, Lynn, Mass.

REPORTS AND NOTICES  
OF MEETINGS

## HAMPDEN DISTRICT MEDICAL SOCIETY

The regular seasonal meeting of the Hampden District Medical Society began with a luncheon at the Monson State Hospital on September 25 at 1 30 P M. This was followed by a medical program arranged by the Hospital Staff. Dr Theodore S Bacon of Springfield, President of the Society, presided. There was an attendance of sixty members. The first paper was read by Dr Stein on "The Role of Mental Hygiene in General Practice." He dwelt on the sociological and psychological qualifications desirable in a great physician, the lack of which may cause a thousand quacks to rush in. He instanced the different problems presented at different periods of life and set forth a classification of mental disorders in which etiological factors were considered. The problem of the neuroses was touched on and a case report of a fifteen year old girl with enuresis was discussed.

Dr Roderick Heffron of the State Department of Public Health outlined the State Pneumonia Program, based on studies carried out in a large number of hospitals during 1931, to which the State Department supplied type sera and facilities for typing and who reported back their results. He stated that the laboratories of some fifty hospitals were qualified to carry on the work of typing, etc. The serum used is a concentrated one, Felton's Antibody Solution, effective for Types 1 and 2. The State is planning to take over the work of its production and distribution in the near future and the leading hospitals will also keep it on hand. Indications, contraindications, precautions and technique, and the possible types of reactions, were discussed. Charts were shown illustrating the marked reduction of the mortality where serum was properly used.

Dr Yakovlev of the Monson State Hospital Staff presented cases of Wilson's Disease, progressive lenticular degeneration of the corpus striatum.

brain, and cirrhosis of the liver a rare disease yet one which is increasingly met with

The meeting adjourned with a vote of thanks to the Hospital Staff

#### CARNEY HOSPITAL CLINICAL MEETING

On October 21 1935 at 8 30 P.M. the third clinical meeting of the Carney Hospital was held.

Dr A. McKay Fraser spoke on "The Early Diagnosis and Treatment of Appendicitis". He prefaced the main part of his address with a brief historical sketch of the disease and the probable influence of familial tendencies and body types. He brought out the various symptoms and physical signs which should be watched for and stressed the importance of the education of the lay person against the use of cathartics in abdominal pain. He gave careful consideration to the differential diagnosis. As to the treatment he was not didactic but gave the pros and cons of early operation late operation and the Ochsner expectant treatment. His talk was followed by a general discussion in which several of the visitors consulted him on cases of theirs which were somewhat obscure.

Dr R. H. Aldrich followed Dr Fraser with a discourse on "The Treatment of Burns". Dr Aldrich stressed his theory on the rôle of infection in burns and stated that he did not believe that the etiology of the toxemia in a burned patient was due either to an absorption of a split protein from the burned area or to a shifting of the water balance of the body with the resulting blood concentration. He stated that in practically one hundred per cent of larger burns the beta-hemolytic and the gamma streptococcus existed in pure culture on the burned areas. From this he deduced that a burned patient should be considered to have an infected open surgical lesion. He considered asepsis and antiseptics to be the logical treatment. He has recently abandoned gentian violet for a combination of three of the anilin dyes namely crystal violet, brilliant green and neutral acriflavine. He described the technique of the treatment and concluded with an emphasis on two points: first that the treatment of burns requires a great deal of work and is not to be lightly considered, and the second, that if and when some other substance is found that is superior to the combination of the three dyes that substance also will be an antiseptic possessing the properties of analgesia and escharosis.

The address was followed by lantern slides, charts showing the history of the treatment of burns, and a demonstration of a severely burned patient.

#### THE MASSACHUSETTS MEDICAL BENEVOLENT SOCIETY

The Annual Meeting of the Massachusetts Medical Benevolent Society was held at the Boston Medical Library on October 24 1935

The Treasurer Dr Roger I. Lee reported that

during the last year the Society has been of financial assistance to twenty-two doctors' families. In the cases of more than half of this number the help has gone to the widows and children of deceased physicians. The necessity for increased funds so as to be even more helpful was evident as was the need for a larger sustaining membership among the practicing physicians of Massachusetts

Dr George Gray Sears resigned his Presidency of the organization and the following officers were elected:

*President* Dr Robert M. Green.

*Vice President* Dr Lincoln Davis.

*Secretary* Dr Hilbert F. Day

*Treasurer* Dr Roger I. Lee.

*Trustees* Dr Lloyd T. Brown Dr Charles G. Mixer Dr Charles C. Lund.

HILBERT F. DAY M.D. *Secretary*

#### THE SOUTHEASTERN MASSACHUSETTS ASSOCIATED BOARDS OF HEALTH

More than seventy health workers representing seventeen towns and cities in Barnstable and Bristol Counties met on Wednesday October 23 at Handy's Inn in Falmouth for the regular fall meeting of the Southeastern Massachusetts Associated Boards of Health. The President, Dr T. L. Swift of Falmouth called the meeting to order two of the selectmen of the town welcomed the visitors and the speaker for the afternoon Mr F. W. Goodhue of the Massachusetts Department of Welfare, was introduced.

The subject for consideration was "Reportable and Supportable Diseases" and the treatment was from the administrative rather than the medical point of view. Boards of health are interested in reportable diseases while welfare officials are involved in financial matters related to them and there is almost absolute confusion as to the relative positions of the two departments in such matters. If the disease is reportable it must come to the attention of the board of health and have proper supervision but when, as in a majority of the cases, there are questions of finance apparently the welfare officials should be responsible. In cases in this category there seems to be no well advised mode of procedure. Even in health matters there are widely varied customs. Quarantine for example, should be a very definite procedure but some boards isolate the worker the support of the family while other boards permit him to go regularly to work. Thus there seems to be no real definition of quarantine but, as a fundamental matter this is one feature that ought to be standardized.

In cases of pregnancy coupled with venereal disease, it has been asserted that the board of health should care for the disease while the welfare pays the pregnancy costs. For another example how about the multitude of indirect charges, such as the care of the family when the wage-earner is stricken with a notifiable disease? It seems pretty well established as a principle that medicine is under obligation to cooperate with the board of health but

where is the limit? When does special care cease, and what items should be within the province of the welfare board? These matters are very complicated today

The presentation of many instances of a nature akin to those noted above constituted the major portion of Mr Goodhue's address, leading to the emphatic expression of the necessity of some real agreement between health officials and welfare boards as to the practical limits of their respective spheres. He called attention to the fact that the recently created State Health Committee, the purpose of which is to review the health laws, looking toward revision, desires the fullest information on matters like those now under consideration here

Dr M E Champion of North Harwich, formerly with the State Health Department in Boston, and now a member of the Public Health Council of Barnstable County, dwelt quite at length on the unfortunate condition, based as it is on customs that are really archaic, and urged steps toward the betterment of the situation. In the general discussion which followed, Mr W G Kirschbaum of New Bedford, Mr Charles R. Bassett of Yarmouth, Dr A P Goff of Hyannis, Dr R P MacKnight, local District Health Officer, and Dr W O Hewitt, of Attleboro, offered affirmative arguments

There was the usual exchange of experiences before the meeting, the social features of which included a dinner enlivened by music by a high school string ensemble

#### CARNEY HOSPITAL

##### OUT-PATIENT STAFF

The monthly meeting of the Out-Patient Staff will be held Tuesday, November 12, at 11 30 A M

Speaker Dr Curran

Subject Pneumonia.

W J MACDONALD, M D., *Secretary*

#### MASSACHUSETTS SOCIETY FOR MENTAL HYGIENE

The Annual Meeting of the Society will be held on Wednesday, November 20, at the Twentieth Century Club, Boston, beginning with a luncheon at one o'clock.

Speakers are Rev Phillips E Osgood, Rector of Emmanuel Church, who will speak on "Personal Religion as a Force for or against Normal Life," and Dr Winfred Overholser, Commissioner of the Massachusetts Department of Mental Diseases, who will talk on "The Mental Health Program of the State Department of Mental Diseases"

#### THE SOUTH END MEDICAL CLUB

The next regular meeting of the South End Medical Club will be held at the office of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, on Tuesday, November 19, 1935, at 12 noon. The speaker will be Francis Lowell Burnett, M D, Di-

rector of Health Class for Psoriasis, Massachusetts General Hospital, Director of Health Class for Arthritis, Peter Bent Brigham Hospital. The title of his talk will be "New Principles for Normal Nutrition and Health to Cure Disease." Lantern slides will be used. All physicians are cordially invited to attend this meeting. Luncheon will be served at 1 o'clock

#### NORFOLK DISTRICT MEDICAL SOCIETY

##### PROGRAM FOR 1935 1936

November 26, 1935

Norwood Hospital at 8 P M

Papers by the staff

January 28, 1936

Hotel Kenmore at 8 P M

Dr Benedict F Boland—"Cauterization of the Cervix Uteri Using Various Electrical Methods" Illustrated with lantern slides

February 25, 1936

Massachusetts Memorial Hospitals at 8 P M

Papers by the staff

March 31, 1936

Hotel Kenmore, at 8 P M.

(Subject to be announced)

May, 1936

Annual Meeting

(Place, date and subject to be announced)

The censors meet for the examination of candidates November 7, 1935, May 7, 1936, November 5 1936

FRANK S CRUICKSHANK, M D

1236 Beacon Street,

Brookline, Massachusetts

#### NEW ENGLAND ROENTGEN RAY SOCIETY

The November meeting of the New England Roentgen Ray Society will be held at the Massachusetts Eye and Ear Infirmary, 243 Charles Street, Boston, Mass., on Friday, November 15, at 8 15 P M

DR A S MACMILLAN, *President*,

483 Beacon Street,

Boston, Massachusetts

DR RICHARD DRESSER, *Secretary*,

695 Huntington Avenue,

Boston, Massachusetts

#### BOSTON FLOATING HOSPITAL

There will be a Staff meeting of the Boston Floating Hospital from 12 noon to 1 P M, on Friday, November 15. Discussion of Poliomyelitis with special reference to the use of vaccines, by Dr James M Baty

#### MASSACHUSETTS MEMORIAL HOSPITALS

There will be a meeting of the Surgical Section in the Ladies' Aid Room, Talbot Memorial, 82 East Con-

cord Street, Boston on Friday November 8 1935 at 1<sup>st</sup> noon.

Dr Milo C Green will present 'A Case of Peritoneal Tumor' and there will be a case presentation by Dr Phillips L. Boyd

Milo C Green *Secretary*

#### NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

The next meeting of the New England Ophthalmological Society will be held on Tuesday November 12, 1935 at 8 P.M. at the Massachusetts Eye and Ear Infirmary, 243 Charles Street, Boston.

##### PROGRAM

Tuberous Sclerosis with Tumor of Optic Nerve.  
Dr Harry C Messinger

Paper Etiology of Trachoma. Analysis of Recent Studies Dr Phillips Thygeson Iowa City Iowa.  
Discussion

BENJAMIN SACHS M.D. *Secretary-Treasurer*

#### MASSACHUSETTS EYE AND EAR INFIRMARY

The annual meeting of the Alumni of the Infirmary will be held on Wednesday November 13 It will begin at 9 A.M. and continue all day

#### HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held in the Peter Bent Brigham Hospital Amphitheatre (Shattuck Street Entrance) Tuesday evening November 12, at 8 15 P.M.

##### PROGRAM

##### Presentation of Cases

Recent Studies in Yellow Fever—A Virus Disease  
By Dr Frederick F Russell, Lecturer in Preventive Medicine and Hygiene, Harvard Medical School.

MARSHALL N FULTON M.D. *Secretary*

#### WORCESTER DISTRICT MEDICAL SOCIETY

GRAFTON STATE HOSPITAL,  
WEDNESDAY NOVEMBER 13 1935

6 30 P.M. Buffet Supper (Main Auditorium)

7 30 P.M. Scientific Program

a. Repression and Communicability in Catatonic Stupor Dr Benjamin Cohen Research Member of Grafton State Hospital Staff.

b. Parenteral Paraldehyde Dr Bardwell Flower Assistant Superintendent, Grafton State Hospital

Dr Charles Mongan our present State President, will also address this meeting concerning many problems confronting the Massachusetts Medical Society

##### SPECIAL MEETING

Town House—34 Elm Street, Worcester Mass  
8 15 P.M., Wednesday November 10 1935

The Holy Cross College Debating Team will debate on the following subject

Resolved, that a system of Compulsory Sickness

Insurance should be enacted by the Massachusetts Legislature

This meeting and debate is on a subject of intense interest to the Medical Society at the present time. The meeting is open to members of the Society and their wives and other members of their families.

Dr. ERWIN C MILLER, *Secretary*

Dr. WILLIAM LYNN, *President*

#### SOCIETY MEETINGS CONGRESSES AND CONFERENCES

##### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY NOVEMBER 11 1935

##### Tuesday November 12—

9 10 A.M. Boston Dispensary \*5 Bennet Street, Boston Report on the Results of Short Wave Therapy in the Past Year Dr P Hoefer

2 3 P.M. Radio Broadcast. NBC A Debate Relating to Medical Service.

2 30 P.M. Pediatric Ward Visit. Massachusetts Eye and Ear Infirmary

7 45 P.M. Gardner Auditorium, State House, Boston The Management of Disease in Childhood in Relation to Mental Health Bronson Crothers M.D.

8 P.M. New England Ophthalmological Society Massachusetts Eye and Ear Infirmary 43 Charles Street, Boston.

8 15 P.M. Harvard Medical Society Peter Bent Brigham Hospital Amphitheatre (Shattuck Street entrance)

##### Wednesday November 13—

9 A.M. Massachusetts Eye and Ear Infirmary Annual Meeting of the Alumni.

\*9 10 A.M. Boston Dispensary \*5 Bennet Street, Boston. Ward Cases Dr S J Thannhauser

11 A.M. Clinico-Pathological Conference. Children's Hospital.

##### Thursday November 14—

8 30 9 30 A.M. Clinic Surgical and Orthopedic Staffs of Children's Hospital at the Children's Hospital.

\*9 10 A.M. Boston Dispensary \*5 Bennet Street, Boston. Recent Observations on the Functional Properties of the Vascular System and on the Hemodynamics in Arterial Hypertension Dr Soma Weiss

2 30 P.M. Medical Clinic at the Peter Bent Brigham Hospital.

5 P.M. Lecture on 'The Care of the Patient,' Dr Arthur R. Crandell. Harvard Medical School, Amphitheatre C.

##### Friday November 15—

\*9 10 A.M. Boston Dispensary \*5 Bennet Street, Boston. Ward Cases. Dr S. J. Thannhauser

13 1 P.M. Boston Floating Hospital Staff Meeting

8 15 P.M. New England Roentgen Ray Society Massachusetts Eye and Ear Infirmary \*43 Charles Street, Boston.

##### Saturday November 16—

\*9 10 A.M. Boston Dispensary, \*5 Bennet Street Boston. Liver Disease. Dr S. J. Thannhauser

10-12. Staff rounds at the Peter Bent Brigham Hospital.

Open to the medical profession.

Open to Fellows of the Massachusetts Medical Society

November 7—Harvard Medical School. The George W. Gay Lecture on 'Medical Ethics' Amphitheatre C at 5 P.M.

November 7—Faulkner Hospital Clinical Meeting at 5 P.M.

November 8—Massachusetts Memorial Hospitals, Surgical Section. See page 948

November 8—William Harvey Society in the Auditorium of the Beth Israel Hospital, Boston at 8 P.M.

November 8—Boston University School of Medicine Surgical Clinic at the Boston City Hospital, Cheever Amphitheatre, 12 1

November 9—The Atlantic Dermatological Conference. See page 391 Issue of October 31

- November 12—Harvard Medical Society See page 949  
 November 12—Carney Hospital, Out-Patient Staff See page 948  
 November 12—A Debate Relating to Medical Service See page 946  
 November 12—New England Ophthalmological Society See page 949  
 November 13—Massachusetts Eye and Ear Infirmary, Annual Meeting of Alumni See page 949  
 November 14—Harvard Medical School Lecture on 'The Care of the Patient, Dr Arthur R Crandell. Amphitheatre C at 5 P.M.  
 November 14—Medical Clinic at the Peter Bent Brigham Hospital See page 945  
 November 15—New England Roentgen Ray Society See page 948  
 November 15—Boston Floating Hospital Staff Meeting See page 948  
 November 19—Lawrence Cancer Clinic. See page 946  
 November 19—The South End Medical Club See page 948  
 November 20—Massachusetts Society for Mental Hygiene See page 948  
 November 21—Harvard Medical School Lecture on 'The Care of the Patient. Dr David D Scannell Amphitheatre C at 5 P.M.  
 December 5-7—National Society for the Prevention of Blindness See page 940

### DISTRICT MEDICAL SOCIETIES

#### FRANKLIN DISTRICT MEDICAL SOCIETY

Meetings are held on the second Tuesday of November, January, March and May at the Weldon Hotel, Greenfield, at 11 A.M.

CHARLES MOLINE, M.D. Secretary

#### NORFOLK DISTRICT MEDICAL SOCIETY

November 26 - May, 1936—See page 948

#### PLYMOUTH DISTRICT MEDICAL SOCIETY

November 21—State Farm Subject and speakers to be announced later

January 16—Goddard Hospital Subject and speakers to be announced later

March 19—Plymouth County Sanatorium, South Hanson

April 16—Brockton Hospital.

May 21—Lakeville State Sanatorium

G A MOORE M.D., Secretary

#### SUFFOLK DISTRICT MEDICAL SOCIETY

December 11—Joint Meeting with the New England Heart Association at the Boston Medical Library 'Constrictive Disease of the Pericardium,' Dr Charles Sidney Burwell. Discussion Dr Edward D Churchill and Dr Paul D White

January 29, 1936—Joint Meeting with the Boston Medical Library at 8 Fenway Observations Around the World, Dr Walter B Cannon.

March 18, 1936—Meeting at the Boston Medical Library 'The Laboratory and Clinical Story of Fatigue' Dr Arlie V Bock and Dr David B Dill Discussion Dr Donald J McPherson and Dr Augustus Thorndike Jr

April 29, 1936—Annual Meeting at the Boston Medical Library 'The Treatment of Septicaemia' Dr Champ Lyons 'The Pleurality of Scariatal Streptococcus Toxin' Dr Sanford B Hooker Discussion Dr Hans Zinsner

The medical profession is cordially invited to attend all of these meetings

ROBERT L. DeNORMANDIE M.D., President,

CHARLES C LUND M.D. Secretary,

FRANCIS T HUNTER, M.D.  
Boston Medical Library

#### WORCESTER DISTRICT MEDICAL SOCIETY

November 13—See page 949

November 20—Special meeting See page 949

December 11—Wednesday evening St. Vincent Hospital, Worcester, Mass. Dinner and scientific program Subjects of program to be announced later

January 8, 1936—Wednesday evening Worcester City Hospital, Worcester, Mass. Dinner and scientific program Subjects of program to be announced later

February 12, 1936—Wednesday evening Worcester State Hospital, Worcester, Mass. Dinner and scientific program, Subjects of program to be announced later

March 11, 1936—Wednesday evening Memorial Hospital, Worcester, Mass. Dinner and scientific program. Subjects of program to be announced later

April 8, 1936—Wednesday evening Hahnemann Hospital, Worcester, Mass. Dinner and scientific program. Subjects of program to be announced later

May 13, 1936—Wednesday afternoon and evening Annual Meeting of Society Time, place and details of program to be announced in an April issue of the Journal.

ERWIN C MILLER, M.D., Secretary

## BOOK REVIEWS

Food and Beverage Analyses Milton A Bridges 246 pp Philadelphia Lea & Febiger \$3 50

This small and handy volume of analytical data is a real contribution to the practice of nutrition. Most of the book consists of a table of the nutritive and caloric values of all kinds of food, for here the raw product, as well as its combination in commonly used commercial preparations, is listed. The figures given represent the caloric value and the protein, fat, and carbohydrate content of average portions in grams, and also household portions, of each food. In other chapters, tables of the acid and alkali ash, mineral, inorganic salt, vitamin, and iodine values of foods, are given. And at the end of the book, the composition, alcoholic content, and fuel values of malt liquors, wines, and distilled spirits are listed. There is also a complete bibliography, a good index, and the print is clear. The book should be found very useful to practitioners, dietitians, and medical students.

A Bibliography of Two Oxford Physiologists, Richard Lower 1631-1691, John Mayow 1643-1679 John F Fulton 62 pp New Haven Yale University Press

A complete bibliography of these two important seventeenth century physiologists has long been anticipated. The importance of the work of Richard Lower and John Mayow was emphasized in a paper published in 1908 by Professor Francis Gotch. Before his paper very little was known of John Mayow and hardly more about the more important of the two men, Richard Lower. Professor Fulton has now given us a carefully edited bibliography, similar in appearance to his well known bibliography of Robert Boyle, published in 1932-3. This new bibliography sets a high standard and is of inestimable value to the historian of medicine and science. There is a brief introduction by Dr K J Franklin, who has done so much to add to our knowledge of the Oxford physiological group. The separate editions of the works of both Lower and Mayow are carefully collated, their contributions to other works noted, biographies and commentaries are listed, many of the important title pages are reproduced, and there is an excellent index.

# The New England Journal of Medicine

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## MALIGNANT HYPERTENSION\*

BY HARRY A. DEROW, M.D.† AND MARK D. ALTSCHULE, M.D.†

### INTRODUCTION

MUCH has been written in the recent years concerning a rapidly fatal form of hypertension termed by various authors "malignant hypertension", "malignant nephrosclerosis", "arterioneerosis", "arterioloneerosis", and "malignant phase of essential hypertension". A survey of this literature reveals important differences in the descriptions of the clinical picture and more particularly of the underlying pathology in this type of hypertension. It was therefore considered desirable to study the postmortem material obtained from patients in whom the diagnosis of malignant hypertension had been made during life. This paper represents the result of such a study.

Clinically, malignant hypertension manifests itself by a history of severe headache, weight loss, weakness, and visual disturbances. Examination of patients with these symptoms reveals severe persistent hypertension and a typical retinal picture. The retina in malignant hypertension has been described by Wagener<sup>1</sup> and others.<sup>10, 11, 12</sup> It has been termed "renal retinitis", "retinitis of malignant hypertension", "albuminuric retinitis",<sup>10</sup> "malignant hypertensive neuroretinitis",<sup>11</sup> and "hypertensive neuroretinopathy".<sup>12</sup> Edema and hyperemia of the optic discs are the outstanding features. In addition, sclerosis of the arterioles, retinal hemorrhages, and "cotton wool" spots are present.

The earlier<sup>2, 3, 4, 5</sup> authors stressed the invariable terminal occurrence of acute uremia in patients with malignant hypertension. On the other hand, Keith, Wagener, and Kernohan<sup>6</sup> and Murphy and Grill<sup>7</sup> emphasized the failure of other organs particularly the heart and brain, in such patients, and described cases in which there was absolutely no evidence of renal insufficiency. Volhard and Fahr<sup>8</sup>, Stern<sup>9</sup>, Herrheimer<sup>4</sup>, and Fishberg<sup>3</sup> regard the fundamental pathology of malignant hypertension to consist in renal necrotizing arteriolitis, while Keith, Wagener, and Kernohan<sup>6</sup>, described only a very widely distributed arteriolar medial hypertrophy. Murphy and Grill<sup>7</sup> observed little medial hyper-

trophy, but they did find renal arteriolitis in some instances but could demonstrate no correlation between its presence and the occurrence of renal insufficiency.

There has however, always been universal agreement that the elevation of blood pressure in malignant hypertension is of the *primary essential type*.

Analysis of the cases seen at the Beth Israel Hospital, Boston, with the clinical picture of malignant hypertension as described by Keith, Wagener, and Kernohan<sup>6</sup> revealed the fact that the hypertension in some of them was unquestionably of secondary origin. This was discovered only at postmortem examination and was entirely unsuspected during life. Moreover, even in those instances in which the hypertension was undoubtedly primary, autopsy revealed a variety of underlying pathological processes. Five cases typical of the series under the direct observation of the authors, are reported.

### REPORT OF CASES

**CASE 1** History I B (B I H No 4740) a forty-three year old Russian Jewish iron worker with a family history of heart trouble in one sister and with a past history of measles in childhood occasional slight epistaxis from the left nostril since childhood several sore throats each winter and nocturia of four or five times a night for about four years entered the hospital on December 13, 1929 complaining of weakness of two weeks duration. About four weeks before admission the patient noted loss of appetite dyspnea while at work, spells of dizziness, and a slight cough, the last most marked at night. These symptoms progressed and the patient took to bed two weeks before admission. At that time he also became orthopneic and his cough began to be associated with pain in his right chest. Twelve days before admission the patient was told that he had high blood pressure. He lost twelve pounds in weight in the four months preceding admission.

**Physical Examination** The patient was a dyspneic orthopneic man with slight cyanosis of the ears and lips and Cheyne-Stokes respiration. The anterior-posterior diameter of the chest was increased. The percussion note was somewhat hyperresonant. A few moist rales were heard at the lung bases. The heart was moderately enlarged and presented an accentuated aortic second sound. The liver was palpable three centimeters below the costal border. The peripheral arteries showed marked thickening and tortuosity. The blood pressure was 27.5 systolic and 140 diastolic. Ophthalmoscopic examination revealed hyperemia of both discs with slight papilledema. The vessels were narrowed and tortuous and showed marked arteriovenous nicking. Both fundi contained numerous

From the Nephritic Clin. of the Beth Israel Hospital, Boston, Massachusetts, and the Department of Med. in Harvard Medical School.

†Derow Harry A.—A student Physician Beth Israel Hospital. Altschule Mark D.—Resident in Medical Research Beth Israel Hospital. For records and addresses of authors see "This Week Issue" page 991.



irregular areas of degeneration temporally and scattered punctate, linear and irregular fresh and old hemorrhages as well as areas of exudate, the last especially prominent about the maculae.

**Laboratory Data** Seven urine examinations showed a specific gravity ranging from 1.002 to 1.012, with a trace to a large trace of albumin in all specimens the sediment was negative except for the finding of a few leucocytes on one occasion and several granular casts on another. The white blood cell count ranged between 10,900 to 14,200 per cu mm with an increase in the polymorphonuclear cells to 82 per cent. The red blood cell count was 4,200,000 per cu mm with a hemoglobin of 70 per cent (Tailqvist). Blood Wassermann reaction was negative. Phenolsulphonphthalein excretion after intramuscular injection of the dye was 5 per cent after two hours and ten minutes on two occasions. The blood sugar was 95 mg per cent. The blood nonprotein nitrogen on admission was 54 mg and the blood creatinine was 3.6 mg. These values rose to 141 mg and 71 mg per cent respectively during the following two weeks. The icteric index was 11.3. The serum phosphate was 7.1 and 8.9 mg per cent on two occasions toward the end of his course, and the serum calcium was 10.2 and 9.3 mg per cent. The blood CO<sub>2</sub> combining power ranged between 30 and 38 volumes per cent. The blood cholesterol on two occasions was 208 and 195 mg per cent respectively.

Electrocardiogram showed normal rhythm rate 90, with inverted T" and T'" and slurred QRS'.

**Clinical Course** The patient was given a salt poor 30 gram protein diet, fluids to 1500 cc and was digitalized. His blood pressure fluctuated about 210 systolic and 120 diastolic during the first two weeks of his stay and then slowly fell to 170 systolic and 95 diastolic as the patient lapsed into coma. During the three weeks of his hospital stay he had several attacks of angina pectoris and severe epistaxes. His weakness and cyanosis increased and the patient failed rapidly, expiring on the twenty-first day of his stay.

**Autopsy** (No A301) Autopsy was performed by Drs. Stern and Schlesinger two hours postmortem. Both legs showed considerable edema. The eyelids were puffy. The peritoneal cavity contained 250 cc of serous fluid. The left pleural cavity contained 750 cc and the right 700 cc of fluid. The surfaces of both lungs bore a few small fibrous adhesions. The pericardial cavity contained 100 cc of clear, straw-colored fluid.

The right kidney weighed 190 and the left 200 grams. The capsules stripped with difficulty, leaving a slightly granular, pitted, pale brownish-yellow surface. The kidneys were firm in consistency. The cortex was well demarcated from the medulla and measured 5 mm in thickness. The kidneys appeared congested. Microscopic examination revealed a moderate increase in the interstitial connective tissue. The connective tissue was edematous and contained a small number of chronic inflammatory cells, the latter occurring in foci in some areas. The glomeruli presented varying degrees of fibrosis. A moderate number showed marked fibrosis of the tufts and some were represented only by a mass of fibrous tissue. Most of them were normal except for occasional tiny foci of polymorphonuclear cell infiltration. The glomerular capsules showed slight thickening in a few areas but no definite crescent formation. In a few instances adhesions had formed between capsule and tuft. The larger arteries showed slight to moderate intimal thickening. Many of the arterioles were entirely normal. A very few showed medial hyalinization and thickening. In rare instances, there were small foci of arteriolar necro-

sis at the point at which the afferent arterioles entered their respective glomeruli. The tubules showed marked atrophy of the lining epithelium. Many of the lumina contained granular debris, masses of fibrin, and casts of various sorts. In short, the kidneys showed chronic glomerular nephritis, and rare foci of arteriolonecrosis.

The heart weighed 650 grams. The valves were all normal. The left ventricle was markedly hypertrophied measuring 3.7 cm in thickness except at the apex where it was thinned, measuring 0.3 cm. The right ventricle measured 0.8 cm in thickness. The circumflex branch of the left coronary artery was completely occluded and the descending branch markedly narrowed. The other arteries showed moderate atheromatous change.

The lungs were somewhat congested and presented small scattered, pneumonic areas.

The aorta was normal in size but showed diminished elasticity. There were a few scattered atheromatous plaques, one of which in the thoracic region had ulcerated leaving a denuded area measuring 10 x 6 mm.

All of the other organs showed varying degrees of congestion. The liver showed, in addition, moderate central necrosis. The arteries presented moderate sclerosis. The arterioles of the pancreas and adrenals showed slight to moderate medial thickening and hyalinization. Those of the spleen showed similar, though more marked changes, with foci of medial necrosis and thrombosis.

**Comment** This middle-aged patient with a negative past history entered the hospital with a present illness characterized by loss of weight of four months' duration, dyspnea, dizziness and cough of four weeks' duration and orthopnea and pleuritic pain of twelve days' duration. Examination revealed dyspnea, orthopnea, cyanosis, slight emphysema, a few râles at the bases of the lungs, moderate cardiac enlargement, a palpable liver, marked arteriosclerosis and a blood pressure of 225 systolic and 140 diastolic. Ophthalmoscopic examination showed typical malignant neuroretinitis. There was a slight anemia. The other laboratory findings indicated marked renal impairment. His course was steadily downhill and he died in uremia three weeks after admission. Postmortem examination revealed chronic glomerular nephritis with a small amount of superimposed vascular nephritis. Rare foci of arteriolonecrosis were also observed in the kidneys. This patient with autopsy findings of chronic glomerular nephritis presented a typical picture of malignant hypertension terminating in uremia.

**CASE 2 History** E. R. (B. I. H. No 14671), a twenty-two year old American Jewish housewife with a negative family history and with a past history of measles and uncomplicated scarlet fever in childhood, entered the hospital on May 26, 1932, complaining of blindness of two days' duration. The patient was accepted for life insurance one year before admission. She was entirely well until four months before admission at which time she began to experience slight fatigue, occasional frequency and enuresis, and slight blurring of vision, the last relieved by glasses. She visited a physician who told her that her blood pressure was slightly elevated. Two days before admission she suddenly began to experience marked blurring of vision,

severe frontal headache and severe vomiting. She soon became quite blind. She also became confused and at times comatose. She lost nineteen pounds in weight in the two months preceding admission.

**Physical Examination.** The patient was a well developed poorly nourished young woman lying in bed in no distress. The heart was normal in size, with a reduplicated first sound and an accentuated second aortic sound. There was slight thickening of the walls of the peripheral arteries. The lungs, abdomen and extremities were entirely negative. The blood pressure was 200 systolic and 140 diastolic. Ophthalmoscopic examination revealed moderate elevation of the right disc with absent cupping. The left disc outline was blurred. The retinal vessels were entirely negative. There was a single hemorrhage above the right disc.

**Laboratory Data.** Eight urine examinations revealed a specific gravity ranging as high as 1.034. All the specimens showed slight or very slight traces of albumin, several contained occasional leucocytes and rare erythrocytes and granular casts. The red blood cell count on admission was 4,650,000 per cu. mm. and the hemoglobin was 75 per cent. (Tallqvist). These values slowly fell to 4,120,000 per cu. mm. and 70 per cent, respectively. The white blood cell count ranged between 11,000 and 20,300 per cu. mm. with a polymorphonuclear cell count of 81 to 85 per cent. The blood sugar was 105 mg. blood nonprotein nitrogen  $^{29}$  to 38 mg., blood creatinine 1.6 mg. per cent. and the blood CO<sub>2</sub> combining power 57 to 61 volumes per cent. The blood Wassermann, Kahn and Hinton reactions were negative. Phenolsulphathalein excretion after two hours and ten minutes following intramuscular injection of the dye was 50 to 55 per cent. Basal metabolism was plus 11 per cent. Lumbar puncture revealed an initial pressure of 210 mm. of water with normal dynamics. Examination of the spinal fluid revealed one cell, no globulin, a negative Wassermann reaction and a total protein of 50 mg. per cent.

X-rays of the skull and kidneys were negative.

**Clinical Course.** The patient was given a salt poor 40 grams protein diet with fluids to 3000 cc. During her first day she received magnesium sulphate by mouth and intramuscularly every four hours, and was also subjected to a venesection of 275 cc. After several hours her vision became normal. The next day her optic discs both showed cupping and definite margins. At this time a tiny hemorrhage and several patches of exudate were also noted. Arteriovenous nicking developed during the following week. In the course of her ten-day stay her blood pressure fell to 170 systolic and 120 diastolic. She continued to receive 50 per cent. solution of magnesium sulphate by mouth in smaller doses. She was discharged on her tenth day with orders to continue the above régime at home. She was quite well for one week, and then weakness, anorexia, frequent vomiting and attacks of pain with paresthesias in the arms supervened. At this time her blood pressure was 180 systolic and 140 diastolic. During the second week following discharge she suddenly lost the sight of her right eye. The blindness slowly improved. Thereafter for the next two months she was fairly comfortable except for irregular fever, occasional headaches and pains in various parts of her body. Two and one-half months after discharge she suddenly became completely blind and had seven bouts of left-sided convulsions over a period of several hours. Examination at this time revealed the absence of all deep reflexes. After two days she reverted to her previously fairly comfortable state. Her weakness and anorexia became worse and in the four and one-half months after

discharge she lost twenty-four pounds in weight. She therefore reentered the hospital on October 23, 1932.

**Second Admission Physical Examination.** At this time the examination revealed the same findings as on the first admission except that there was marked wasting. The blood pressure was 215 systolic and 160 diastolic. Ophthalmoscopic examination revealed blurring of the disc margins and absence of cupping. The arterioles were narrowed and slight arteriovenous nicking was present. There were many patches of exudate and one hemorrhage.

**Laboratory Data.** Fourteen urine examinations showed a maximum specific gravity of 1.016. More albumin and a greater number of leukocytes were present in all specimens than during the first admission. The blood nonprotein nitrogen was 31 mg. and the blood creatinine was 1.3 mg. per cent. The red blood cell count on four occasions varied between 4,000,000 and 4,350,000, the hemoglobin was 70 per cent. (Tallqvist). The white blood cell count ranged between 6,100 and 9,100 with a normal differential count and smear. Phenolsulphathalein excretion following intramuscular injection of the dye after two hours and ten minutes varied from fifty per cent. on admission to twenty-five per cent. shortly before death. Lumbar puncture showed an initial pressure of 250 mm. of water with a positive globulin test and a total protein of 75 mg. per cent.

X-rays of the skull and kidneys were negative.

**Clinical Course.** Her course during the remaining forty-nine days of her life was characterized by apathy and listlessness with frequent headaches and occasional sensations of numbness and tingling in various parts of the body. The blood pressure fluctuated about 200 systolic and 160 diastolic. The eye ground changes were progressively increased in severity. On the forty-ninth day of her stay she suddenly became comatose and shortly thereafter expired.

**Autopsy (No A32-36).** Autopsy was performed by Drs. Krakower and Schlesinger through a limited abdominal incision. There was a large subconjunctival hemorrhage over the left eye. The glands of the axillae and inguinal regions appeared somewhat enlarged as were those of the peritoneal cavity. There was a moderate amount of yellowish fluid in both pleural cavities, particularly the right.

The right kidney weighed 40 grams and the left 140 grams. The right kidney was small. The ureters and vessels were normal in position and origin. The right renal artery was small. The capsule of the right kidney stripped easily revealing moderate fetal lobulations. The surface was otherwise not remarkable. On section through the long axis of the right kidney a sharp line of demarcation between the upper and lower portions was noted 5.5 cm. from the upper pole. The entire kidney measured 10.5 cm. in length. In the upper portion the cortex was well defined and measured 0.2 cm. as compared with 1.3 cm. below that point. The pelvis of the upper portion was somewhat dilated and the medulla thinner than normal indicating the presence of a slight partial hydronephrosis. The cortex in the lower portion of the right kidney appeared swollen and poorly outlined. The pelvis in this portion of the kidney was quite normal. The capsule of the left kidney stripped easily revealing scattered pit-like depressions. The cortex appeared swollen and measured about 1.0 cm. in thickness. The pelvis was not remarkable. Microscopic examination of the atrophic upper portion of the right kidney showed slight cellular proliferation of the glomerular tufts with congestion in some areas but no infiltration. None of the glomeruli appeared hyalinized. The glomerular cap-

sules were thickened, but presented no cellular proliferation. The afferent arterioles showed moderate hyalinization of the media and narrowing of the lumen. The tubules all appeared very small and presented thickening of the basement membrane. The lumina of the tubules were almost entirely obliterated. A slight increase in interstitial fibrous tissue with a few scattered foci of lymphocytic infiltration was noted in the medulla. The larger arteries revealed fibrous thickening of the adventitia and the intima. The microscopic picture in the lower portion of the right kidney and in the entire left kidney was quite different. Here the glomeruli were entirely normal and the afferent arterioles showed no evidence of hyalinization. The convoluted tubules were markedly dilated and in some areas vacuolization of the cells was present. The basement membrane was nowhere thickened. There were a few scarred areas near the cortex, containing a small number of chronic inflammatory cells. There was slight intimal proliferation in the larger arteries.

The heart weighed 240 grams. There was some atheromatous deposit in the aortic valve and in the aortic leaflet of the mitral valve. The coronary vessels were normal except for occasional small atheromatous plaques especially at their origin. The aorta presented a few scattered atheromatous plaques particularly about the orifices of the intercostal and iliac vessels. The elasticity of the aorta was good. The circumference of the aorta in the thoracic region was 4.0 cm and in the lumbar region 3.0 cm. The gastrointestinal tract was not remarkable except for scattered patches of congestion and pinpoint areas of hemorrhage. The adventitia of the colon was thickened. Several of the arteries in it were thrombosed.

The muscularis of the gall bladder was edematous. The adventitia was markedly thickened and fibrosed. The arterioles showed slight hyalinization and marked thickening and fibrosis of the media. Marked thickening of the intima of the arterioles was also noted. Necrosis and thrombosis of the arterioles with hemorrhage and inflammatory cell reaction were present in several areas. A large artery in one section showed marked intimal thickening with thrombosis.

The other organs showed varying degrees of congestion. The arterioles of the intestines, pancreas and adrenals showed slight medial thickening and hyalinization, and those of the spleen presented similar though more marked changes.

**Comment.** This young woman with a negative past history entered the hospital with a present illness characterized by slight fatigue, occasional frequency and enuresis, slight blurring of vision and hypertension of four months' duration, palpitation of two weeks' duration and severe headache, vomiting and blindness of two days' duration. Physical examination was entirely negative except for hypertension of 200 systolic and 140 diastolic. Ophthalmoscopic examination revealed malignant neuroretinitis. Her course was steadily downhill for the next seven months and was terminated by the sudden onset of coma due apparently to a cerebral accident. Postmortem examination revealed necrosis of the arterioles of the gall bladder. The kidneys were entirely normal except for an early partial hydronephrosis, with resulting atrophy of the upper portion of the right kid-

ney. This patient whose only renal lesion was a partial hydronephrosis of one kidney presented the typical picture of malignant hypertension terminating abruptly with coma.

**CASE 3.** History P S (B I H No 20013), a fifty six year old Russian Jewish cattle dealer, with a family history of the death of his father of heart disease and with a past history of typhoid fever in 1919 and a fracture of the right leg in 1913, entered the hospital on October 7, 1933, complaining of vomiting of one day's duration. He was accepted for life insurance in 1928. He was quite well until about a year before admission, when he began to experience severe morning headache and frequent attacks of dizziness and tinnitus. He also became aware of dyspnea and palpitation on exertion, loss of appetite and nocturia of once a night. From time to time, he also had attacks of substernal pain which radiated to the neck and back and occasionally down the left arm. He lost twenty five pounds in weight in the year preceding admission. Six months before admission all his symptoms became worse and he also developed marked blurring of vision. Several weeks before admission he began to have crampy pains in the hands and feet and the day before admission commenced to vomit.

**Physical Examination.** The patient was a fairly well nourished, middle-aged man lying in bed in no distress. The heart was not enlarged. The heart sounds were of good quality. The second aortic sound was accentuated and ringing. The lungs and abdomen were normal. The peripheral vessels were thickened and tortuous. The deep reflexes were somewhat hyperactive and there was a positive Hoffmann's sign on the right. The fingers were slightly clubbed. Blood pressure was 230 systolic and 155 diastolic. Ophthalmoscopic examination revealed pallor of the discs with obliteration of the outlines and peridisc edema. The arterioles were markedly narrowed. There were many areas of hemorrhage and a few patches of exudate.

**Laboratory Data.** Four urine examinations revealed a specific gravity ranging from 1.004 to 1.015. All the specimens contained very small amounts of albumin and rare erythrocytes and leukocytes as well as hyaline casts on rare occasions. The red blood cell count on admission was 5,390,000 per cu. mm with a hemoglobin of 90 per cent (Tallqvist). This gradually fell to 3,890,000 per cu. mm with a hemoglobin of 70 per cent. The white blood cell count fluctuated between 10,200 and 18,800 per cu. mm with a polymorphonuclear cell count of 85 per cent. The blood smear was normal. The blood Wassermann, Kahn and Hinton reactions were negative. The blood sugar fluctuated between 85 and 101 mg per cent and the blood nonprotein nitrogen between 27 and 36 mg per cent. The icteric index was 7.5. Lumbar puncture revealed normal pressure and dynamics, a positive globulin test and a total protein of 110 mg per cent, sugar of 74 mg per cent, and chlorides of 618 mg per cent. The spinal fluid Wassermann was negative. Phenolsulphonphthalein excretion after two hours and ten minutes following intramuscular injection of the dye on two occasions was 15 and 25 per cent respectively.

X rays of the kidneys showed no abnormalities. A seven foot film of the heart revealed no cardiac enlargement.

**Clinical Course.** The patient was given a house diet with fluids to 5000 cc. His blood pressure fluctuated about 230 systolic and 160 diastolic, tending to fall slightly below this level shortly before

death. He became confused soon after admission. Slight improvement followed a venesection of 500 cc. on his fifth day and lumbar puncture on his third and eleventh days. Nevertheless his mental state became worse and several days before death he became comatose. At this time signs of pneumonia at the right base were noted. He died on his twenty first day.

**Autopsy (No A33-58).** Autopsy was performed by Drs Greenblatt and Schlesinger through a limited abdominal incision two hours postmortem. The right kidney weighed 90 and the left 130 grams. The perirenal fat was adherent to the thickened capsules, but the capsules stripped with ease presenting only a few points of adhesion. The kidneys, especially the right, were contracted. They presented a finely granular mottled yellowish and brownish surface. The cortex of the right kidney was irregular and atrophied, measuring 2 to 5 mm in thickness. It appeared pale and yellowish-gray in color. The cortex of the left kidney was similar in appearance but was wider and better defined. The left renal pelvis showed numerous hemorrhagic points. The ureters were normal. Microscopic examination revealed a small amount of patchy scarring. Such areas contained fibrosed glomeruli and small foci of chronic inflammatory cell infiltration. The rest of the glomeruli were swollen and congested. Scattered about were a small number of foci of necrosis. These occurred mainly in the glomeruli but also in afferent arterioles and small arteries. These areas contained masses of fibrin. A few of the afferent arterioles showed hyalinization and thickening of the media. Most of the arterioles were normal. The larger arteries presented marked intimal proliferation throughout. In some areas the intubules showed colloid degeneration. In one section there was a large, old infarct consisting of a mass of edematous scar tissue containing dilated capillaries, a few chronic inflammatory cells, scattered atrophic tubules, and several completely fibrosed glomeruli and tubules. In short these kidneys showed arteriosclerosis and a small amount of acute necrotizing glomerulitis and arteriolitis.

The heart weighed 435 grams. The left ventricle appeared hypertrophied. The valves and endocardium were normal. The aorta was 65 cm. in circumference in the thoracic region, and 70 cm. in circumference in the lumbar region. There was atheromatous deposit with ulceration from the arch to the bifurcation most marked in the lumbar region. The elasticity of the aorta was absent.

The liver presented as incidental findings two small hemangiomas; there was also congestion and slight central necrosis.

The other organs showed varying degrees of congestion. The arterioles of the intestine and the pancreas presented slight medial thickening and hyalinization while those of the spleen showed more marked changes of the same nature.

**Comment.** This elderly man with a negative past history entered the hospital with a present illness characterized by morning headaches, dizziness, dyspnea and palpitation on exertion, loss of appetite, nocturia and loss of weight of one year's duration. Physical examination was entirely negative except for a blood pressure of 230 systolic and 155 diastolic, generalized arteriosclerosis and hyperactive tendon reflexes on the right. Ophthalmoscopic examination revealed typical malignant neuroretinitis. An anemia

gradually developed while the patient was in the hospital. His renal function showed slight impairment. His course was rapidly downhill and on his twenty first day he died of bronchopneumonia. Postmortem examination revealed arteriosclerosis and a small amount of necrotizing glomerulitis and arteriolitis of the kidneys. This patient with postmortem findings of a small amount of renal arteriosclerosis and occasional foci of necrosis in the glomeruli and afferent arterioles presented the typical clinical picture of malignant hypertension terminating with bronchopneumonia.

**CASE 4 History.** S. L. (B. I. H. No. 20001) a forty-one year old Russian Jewish clothing worker with a negative family history and with a past history of influenza in 1918 entered the hospital on October 6, 1933 complaining of severe headaches of two years duration. The patient was quite well until two years before admission, when he began to experience severe headaches chiefly frontal, lasting eight to twelve hours daily. He also commenced to suffer with nocturia of twice a night and slight palpitation on exertion. He entered a hospital where he was told that his blood pressure was elevated; he was ordered to restrict his meat intake. He was free from headaches until thirteen months before admission when they recurred lasting each time from one-half to twenty-four hours. They were accompanied by nausea, and rarely by vomiting. He was admitted to another hospital where he was found to have hypertensive changes in the eyegrounds, a diffusely enlarged thyroid gland, sclerosis of the peripheral vessels, an enlarged heart and a blood pressure of 228 systolic and 150 diastolic. All specimens of his urine showed small amounts of albumin and casts. His basal metabolism was plus 25 to 30 per cent. A subtotal thyroidectomy was performed and his blood pressure fell to 170 systolic and 100 diastolic. His basal metabolism at this time was plus four per cent. Microscopic examination of his thyroid gland revealed no evidence of hyperplasia. He was discharged with a diagnosis of essential hypertension and arteriosclerosis. Following discharge he was well until eight months before admission to the hospital. From this time on he experienced constant recurrences of his headaches, dimness of vision and increased irritability. Six months before admission to this hospital the patient became depressed and suspicious, and developed delusions. At this time the blood pressure was 208 systolic and 142 diastolic. The patient's headaches and vomiting became worse and were sometimes accompanied by loss of memory and changes in personality. He also had transitory diplopia. His dyspnea, palpitation and weakness increased. In addition the patient had two attacks of hematuria each lasting several days, four months and three days respectively before admission to this hospital. He lost 50 pounds in weight in the two years preceding admission.

**Physical Examination.** The patient was a well developed, poorly nourished middle-aged man lying in bed in no distress. The heart was not enlarged. The second aortic sound was accentuated. The lungs, abdomen and extremities were normal. The peripheral arteries showed advanced sclerosis. The blood pressure was 230 systolic and 150 diastolic. Ophthalmoscopic examination revealed swelling and hyperemia of both discs and obliteration of the disc margins. The arterioles were narrowed and beaded. There were scattered hemorrhages and patches of exudate.

**Laboratory Data** Ten urine examinations showed a specific gravity ranging from 1.008 to 1.020. All the specimens contained albumin in varying quantities. Rare granular casts and leukocytes were seen in the sediments and on one occasion there was a shower of erythrocytes. Four red blood cell counts ranged between 4,660,000 and 5,250,000 per cu mm with a hemoglobin of 75 per cent (Tallqvist). The white blood cell count fluctuated between 8,900 and 14,400 per cu mm with a normal differential cell count and smear. The blood Wassermann, Kahn and Hinton reactions were negative. The blood sugar was 82 mg per cent, the icteric index 10, the serum calcium 9.4 mg per cent and the serum phosphate 4.3 mg per cent. The blood CO<sub>2</sub> combining power varied between 49 and 54 volumes per cent and the blood nonprotein nitrogen fluctuated between 38 and 51 mg per cent. Phenolsulphonphthalein excretion two hours and ten minutes following intramuscular injection of the dye varied between five and fifteen per cent on three occasions. Lumbar puncture revealed an initial pressure of 200 mm of water with normal dynamics, no cells, and negative globulin and Wassermann reactions.

A seven foot heart x-ray revealed no cardiac enlargement.

Electrocardiogram showed normal rhythm, rate 100 to 110, left axis deviation, deep S" and diphasic T' and T"

**Clinical Course** The patient was given a house diet and fluids to 3000 cc. His blood pressure fluctuated about 240 systolic and 160 diastolic. His chief symptom was mental dullness which responded temporarily to venesections and lumbar puncture. There was no great change in his condition and he was discharged on his twenty-seventh day to another hospital where his course continued slowly downhill. He died of bronchopneumonia in December, 1933.

**Autopsy** (No A33 102) Autopsy was performed by Drs. Greenblatt and Schlesinger. Several cc of clear fluid were found in the peritoneal cavity.

Each kidney weighed 100 grams. The capsules stripped easily, revealing finely granular, mottled, red and gray surfaces. The cortex measured 5 to 7 mm. The right renal pelvis was the site of a large petechial hemorrhage. The left was normal. Microscopic examination revealed moderate congestion and edema and slight patchy fibrosis with chronic inflammatory cell infiltration. Most of the glomeruli were normal except for slight thickening of the tufts. In rare instances there was thickening of the capsule due to proliferation of the lining cells. The tubules were atrophic, and showed thinning of the lining cells. Many contained precipitated protein and casts of various sorts. The arteries showed moderate intimal thickening. The arterioles in many areas showed intimal proliferation and in rare instances, slight to moderate hyalinization of the media. However, most of the arterioles were free of hyalinization. In short, the kidneys showed a small amount of arteriosclerotic and arteriolosclerotic change.

The heart weighed 400 grams. The coronary arteries were palpable and studded with small atheromatous plaques. The valves and endocardium were normal. The lungs were negative except for generalized congestion and some pneumonia in the left lower lobe.

The aorta showed good elasticity. A moderate amount of patchy atheromatous change was present. The brain weighed 1390 grams. There was marked arteriosclerosis of the superficial arteries. The rest of the organs showed varying degrees of congestion. The arteries of the prostate were slightly sclerosed. The arterioles in the pancreas

presented slight medial hyalinization and similar more marked changes were visible in the spleen.

**Comment** This middle-aged man with a negative past history entered the hospital with a present illness characterized by severe headaches, loss of weight, nocturia and palpitation of two years' duration, nausea of one year's duration, blurring of vision and mental changes of eight months' duration and two attacks of hematuria shortly before admission. Physical examination was entirely negative except for hypertension of 230 systolic and 150 diastolic, and generalized arteriosclerosis. Ophthalmoscopic examination showed typical malignant neuroretinitis. Laboratory data revealed evidence of slight renal impairment. There was no anemia. Postmortem examination revealed generalized arteriosclerosis. The kidneys showed slight arteriosclerotic and arteriolosclerotic changes. This patient with marked generalized arteriosclerosis and slight arteriosclerotic and arteriolosclerotic nephritis presented the typical picture of malignant hypertension with renal impairment terminating in bronchopneumonia.

**CASE 5 History** F C (B I H No 23296), a forty-three year old white American garage-man, with a family history of hypertension and vascular disease, and a past history of jaundice fourteen years previously, and of dyspnea on moderate exertion for two years, visited an ophthalmologist on March 30, 1934 complaining of blurring of vision in the right eye of one week's duration. That physician noted the presence of marked retinitis with elevation of the disc four diopters on the right, and marked caliber changes and nicking in the retinal vessels in the left eye. He found the patient's blood pressure to be elevated. The patient was then referred to the Out-Patient Department of the Beth Israel Hospital. He was entirely well until January 1934, when he first noted increasing thirst, nocturia of three to five times a night, temporal headache and attacks of nausea. In March, the headaches became worse, and he suddenly developed the blurring of vision referred to above. He lost eighteen pounds in weight since the onset of the present illness.

Physical examination in the Out-Patient Department was entirely negative except for moderate cardiac enlargement, moderate generalized arteriosclerosis and a blood pressure of 220 systolic and 140 diastolic. Ophthalmoscopic examination revealed hyperemia and edema of the discs, more marked on the right, and peridisc edema. The arterioles showed marked caliber changes and nicking at the arteriovenous crossings. Many fresh and old hemorrhages, as well as patches of exudate, were also noted.

Four urine examinations in the Out-Patient Department revealed a maximum specific gravity of 1.018. A small trace to a trace of albumin was noted in all specimens. The sediment was negative except for occasional leukocytes and rare granular casts. Phenolsulphonphthalein excretion fifteen and thirty minutes following intravenous injection of the dye was 28 and 12 per cent respectively. The red blood cell count was 5,490,000 per cu mm with the hemoglobin of 80 per cent (Tallqvist). The white blood cell count ranged between 9,350 and 12,200 per cu mm with a normal differential cell count and smear. The blood Kahn and Hinton reactions were nega-

tive. The blood nonprotein nitrogen was 33 mg and the blood creatinine 1.2 mg and the blood cholesterol 280 mg per cent.

The patient was observed repeatedly in the Nephritic Clinic of the Out-Patient Department where gradual loss of weight, fatigability and increasing severity of the headaches were noted. The right optic disc underwent secondary optic atrophy while the left became swollen during this period. The blood pressure showed no significant change. He was admitted to the hospital on July 19, 1934.

**Laboratory Data.** The red blood cell count was now 4,300,000 per cu mm with a hemoglobin of 65 per cent (Tallqvist). The white blood cell count was 9,100 per cu mm. The blood nonprotein nitrogen was 53 mg per cent, and the blood creatinine was 2.8 mg per cent. These values fell to 39 and 1.5 mg per cent respectively during the next few days. Phenolsulphonphthalein excretion after two hours and ten minutes following intramuscular injection of the dye was 35 per cent. A urine concentration test revealed a maximum specific gravity of 1.010. Lumbar puncture findings were entirely normal except for an initial pressure of 350 mm of water and a total protein of 40 mg per cent.

X-rays of the skull and kidneys were negative.

**Clinical Course.** The patient was given a house diet with fluids to 5000 cc. His blood pressure fluctuated about 200 systolic and 140 diastolic. His headaches improved markedly with complete bed rest and lumbar puncture. His eyegrounds showed no change during the eleven days of his hospital stay. He was discharged to be followed in the Nephritic Clinic of the Out-Patient Department.

His headaches soon recurred; he continued to lose weight and his vision became progressively worse. Magnesium sulphate by mouth relieved the headaches somewhat. The blood pressure fluctuated about 180 systolic and 120 diastolic. Two months after discharge from the hospital he developed severe persistent projectile vomiting and was therefore readmitted. Physical examination was essentially unchanged. Ophthalmoscopic examination revealed secondary atrophy of the right disc, choking of the left disc and marked retinitis. The blood pressure was 230 systolic and 160 diastolic.

**Laboratory Data.** Fifteen urine examinations revealed a maximum specific gravity of 1.012. All the specimens contained a slight trace to a trace of albumin and occasional erythrocytes, leukocytes and granular casts. Five red blood cell counts ranged between 4,000,000 and 4,360,000 per cu mm with a hemoglobin of 53 to 60 per cent (Tallqvist). The blood nonprotein nitrogen was 56 mg per cent on admission and slowly rose to 90 mg per cent; the blood creatinine rose from 2.8 mg on admission to 4.9 mg per cent several days later. Terminally the blood CO<sub>2</sub> combining power fell from 53.4 to 42.7 volumes per cent. Phenolsulphonphthalein excretion after two hours and ten minutes following intramuscular injection of the dye ranged between five and ten per cent respectively. Lumbar puncture was negative.

**Clinical Course.** The patient was given a bland diet with fluids to 5000 cc. His blood pressure fell to 210 systolic and 140 diastolic about which level it fluctuated. The vomiting soon ceased but recurred as the blood nonprotein nitrogen rose. The patient became drowsy. During the second week of his stay the patient commenced to have attacks of paroxysmal dyspnea. He was digitalized and the fluid intake was reduced to 3000 cc. The drowsiness and vomiting became more severe and the patient finally died on the thirty-fourth day of his hospital stay.

**Autopsy (No A34-109).** Autopsy was performed by Drs. Frehling and Schlesinger. The right kidney weighed 100 and the left 90 grams. The capsules were thickened and were stripped from the parenchyma with difficulty. The surfaces thus exposed were uniformly brownish red in color and appeared coarsely pitted and markedly granular. The cut surfaces revealed the absence of the normal markings. The cortex was poorly defined and measured about 4 mm in thickness. A moderate increase in the pelvic fat was noted. Microscopic examination revealed marked thickening and hyalinization of the media of the afferent arterioles. Similar changes were noted in the larger arterioles. There was moderate thickening of the intima of the arteries. Many of the glomeruli were fibrosed. All stages of this fibrotic process from slight thickening of the tuft to complete fibrosis and hyalinization were noted. There was a large amount of irregular interstitial fibrosis with chronic inflammatory cell infiltration. The tubules showed a varying amount of degenerative change with formation of casts in some areas. There were in addition, a small number of foci of acute arteriolitis with thrombosis of the involved vessel and infiltration with acute and chronic inflammatory cells. In some areas the thrombosed arterioles were completely organized. Similar changes were also observed in a few of the glomeruli and the larger arterioles.

The heart weighed 500 grams and presented marked hypertrophy and dilatation of the left ventricle. The valves were quite normal. Microscopic examination revealed moderate intimal thickening of the small arteries and a small amount of irregular patchy fibrosis with occasional foci of round cell infiltration. The arterioles were not remarkable. There was a moderate amount of thickening of the intima of the aorta.

The lungs were normal except for slight acute bronchitis and a small amount of patchy peribronchial pneumonia. The liver presented only a small amount of central necrosis due to congestion. The capsule of the spleen was thickened. The interstitial fibrous tissue was also increased. The arterioles of the spleen presented marked hyaline thickening of the media with numerous areas of acute arteriolitis. The pancreatic arterioles presented the same picture though to a lesser degree. There was marked intimal thickening in larger arteries of the pancreas with the formation of fresh thrombi in some areas. The prostate gland, gall bladder and retina presented moderate to marked hyaline thickening of the media of the arterioles and a small amount of acute arteriolitis with occasional thrombosis and hemorrhage. There was also a small amount of arteriosclerosis in the adrenal glands. In short there was widespread arteriosclerosis with marked chronic vascular nephritis and cardiac hypertrophy. There was in addition a small amount of acute arteriolitis in the kidneys, pancreas, prostate gland, gall bladder and retina with similar more marked changes in the spleen. A small amount of bronchopneumonia was present.

**Comment.** This middle-aged man entered the hospital with a past history of dyspnea on moderate exertion for two years and with a present illness characterized by nocturia, headache, loss of weight and attacks of nausea all of three months' duration, and blurring of vision of one week's duration. Physical examination was negative except for cardiac hypertrophy, generalized arteriosclerosis, and a blood pressure of 220 systolic and 140 diastolic. Ophthalmoscopic examination revealed typical malignant

neuroretinitis. Laboratory studies showed progressively increasing renal impairment. At postmortem, advanced vascular nephritis and a small amount of acute arteriolitis of the kidneys were noted. There was also widespread arteriosclerosis, cardiac hypertrophy and arteriosclerosis of the parenchymatous organs most of which contained foci of acute arteriolitis. This patient with marked chronic vascular nephritis and a small amount of acute renal arteriolitis, presented the typical picture of malignant hypertension terminating in uremia.

#### DISCUSSION

Malignant hypertension has heretofore been considered a form of primary hypertension. According to Fishberg<sup>5</sup>, all patients with malignant hypertension have a past history of benign, essential hypertension or evidence of its previous existence in the form of cardiac hypertrophy.

We have observed that in addition to patients with malignant *primary* hypertension, there are many others in whom the malignant phase supervenes as the end stage of a previously unrecognized morbid process characterized by *secondary* hypertension.

Thus, the typical clinical picture of malignant hypertension was found in case 1 of our series, but the autopsy revealed chronic glomerular nephritis. Similarly, other authors have pointed out that the same clinical picture may occur with hypertension secondary to acute, subacute or chronic glomerular nephritis<sup>6</sup>.

It has been claimed by some authors<sup>7</sup> that malignant hypertension with renal failure and chronic glomerular nephritis with renal failure may be differentiated by the fact that the latter frequently progresses more slowly and may show remissions in its course. However, cases of acute, subacute, or chronic glomerular nephritis may not infrequently have a very explosive termination in renal failure, at the end of a period of relative quiescence with severe hypertension. It is true that some of these cases of glomerular nephritis may be recognized as such because of the antecedent history of an acute attack with edema, hematuria or hypertension, but in many instances of chronic glomerular nephritis it is not possible to obtain such data. These latter cases of chronic glomerular nephritis with secondary hypertension are indistinguishable clinically from cases of primary malignant hypertension. Such patients are usually regarded as having primary malignant hypertension until the autopsy demonstrates otherwise. MacMahon<sup>18</sup> and Klemperer and Otani<sup>14</sup> have made similar observations.

Longcope<sup>17</sup>, in 1933 reported the case of a young woman of eighteen with a three months' history of vomiting, headache, clouding of vi-

sion, soreness of the back and marked weight loss, and who on physical examination showed severe hypertension, enlargement of the heart and malignant neuroretinitis. She died in uremia and her kidneys showed extreme contraction due to pyelonephritis. The microscopic examination of the kidneys was not described. Longcope states, "It is remarkable to what extent the insufficiency of renal function may advance in many of these patients (with pyelonephritis), without noticeable impairment of the health of the individual. When serious symptoms of renal failure appear, however, the course is often very rapid, and within a period of a few weeks, the patient may die in uremia." Similar cases have been reported by Cain<sup>16</sup>, and Mallory<sup>17</sup>. The latter author noted the presence of acute arteriolitis in the kidneys of his patient.

Certain cases of chronic lead poisoning with severe hypertension may exhibit convulsive seizures or other acute cerebral manifestations. Such patients may present the typical neuroretinopathy of malignant hypertension<sup>18</sup>.

Oppenheimer and Fishberg<sup>19</sup> in 1924, described a patient who presented a short history of severe hypertension with physical findings of severe diastolic hypertension, malignant neuroretinitis and cardiac hypertrophy, with death from cardiac insufficiency, autopsy revealed hypernephroma of the right suprarenal gland, multiple adenomata of the left suprarenal gland, and anatomically intact kidneys. Winkel's<sup>20</sup> case also falls into this category.

Friedberg and Gross<sup>21</sup> series of cases of rheumatic heart disease with periarteritis nodosa contain one (case 4) with a history and physical findings typical of malignant hypertension. The kidneys in this case showed necrotizing arteritis. Reports of other similar cases of periarteritis nodosa with or without rheumatic heart disease are to be found in the literature<sup>22-24</sup>.

MacMahon, Close and Haas<sup>25</sup> state that pituitary basophilism may have some features in common with malignant nephrosclerosis.

Klemperer and Otani<sup>14</sup> have commented on the striking similarity between many of the manifestations of hyperemesis gravidarum and malignant hypertension.

It is apparent, therefore, that the clinical picture of malignant hypertension may occur in a wide variety of diseases in which secondary hypertension occurs, and that the presence of these underlying morbid processes may frequently be unsuspected.

*In addition to those patients who develop the syndrome of malignant hypertension late in the course of either primary or secondary hypertension, there is another group of patients presenting the same clinical picture in whom*



there is absolutely no evidence at necropsy of any long standing previously existing hypertension. Thus, in case 2 of our series postmortem examination showed no evidence of cardiac hypertrophy and no widespread arteriosclerosis. It is reasonable to believe that in this case the syndrome arose "de novo."

It may well be that the reason certain pathologists believe malignant hypertension is a specific disease is the fact that they have grouped together series of pathologically identical cases and have found that they presented similar clinical features. If, however, an attempt is made to group together cases which resemble each other clinically, as has been done in this paper, it will be found that such a group of cases presenting the clinical picture of malignant hypertension will show a wide variety of pathological processes associated with primary or secondary hypertension.

A consideration of all of the foregoing data makes it possible to classify all patients presenting the clinical picture of malignant hypertension into the following groups:

#### 1 Primary Hypertension

- a Patients with a history or other evidence of long standing essential hypertension
- b Patients with no evidence of long standing hypertension ("de novo group")

#### 2 Secondary Hypertension

- a. Acute, subacute, or chronic glomerular nephritis
- b. Pyelonephritis
- c. Adrenal tumor
- d. Pituitary basophilism
- e. Chronic lead poisoning
- f. Periarteritis nodosa
- g. Hyperemesis gravidarum

The concept that malignant hypertension is a syndrome which may occur in patients with either primary or secondary hypertension explains the wide variety of pathological pictures found in the kidneys of such patients postmortem. The histology of the kidney varies depending upon the duration of the elevation of the blood pressure if it is primary and with the nature of the underlying morbid process if the hypertension is secondary. In some instances, the kidneys are essentially sound (case 2).

Some authors<sup>1, 2, 3, 14</sup> consider the essential pathology of malignant hypertension to consist in necrotizing renal arteriolitis. It has, however, been shown repeatedly<sup>5, 7, 10</sup> that the kidneys of patients with malignant hypertension may contain no such lesions (case 2) or an extremely small number (also cases 3 and 4 of our series). In such instances foci of acute necrotizing arteriolitis may be more numerous

in viscera other than the kidneys (cases 2, 3 and 4), this may also be observed in patients whose kidneys show many such lesions (case 5).

Renal insufficiency was formerly held to be an invariable concomitant of the presence of necrotizing arteriolitis in the kidneys, but this is no longer believed to be true. Murphy and Grill<sup>7</sup> and Klemperer and Otani<sup>14</sup> described such lesions in the kidneys of patients in whom there was not the slightest sign of renal insufficiency. On the other hand, Murphy and Grill<sup>7</sup>, Camm<sup>10</sup>, and Keith, Wagener, and Kernohan<sup>5</sup>, failed to observe renal arteriolar necrosis in a number of instances in which death was definitely due to uremia. Necrotizing arteriolitis has also been frequently found in the kidneys of patients with hypertension secondary to various forms of renal pathology. Such patients may or may not present the typical syndrome of malignant hypertension. Renal necrotizing arteriolitis therefore cannot be considered specific for any single morbid process. Its presence may, however, indicate an unusually severe degree or prolonged duration of hypertension.

The nature of the underlying pathological process responsible for the appearance of the clinical syndrome of malignant hypertension apparently does not influence the course of the syndrome. In all cases the prognosis appears to be uniformly poor.

#### CONCLUSIONS

1 Malignant hypertension is a syndrome which may occur,

a With no evidence of previously existing hypertension

b As the end stage of essential hypertension with or without uremia.

c As the end stage of a miscellaneous group of conditions, characterized by hypertension secondary to acute, subacute or chronic glomerular nephritis, pyelonephritis, adrenal tumor, pituitary basophilism, periarteritis nodosa, hyperemesis gravidarum, chronic lead poisoning, etc.

2 It is impossible to decide during the life of a patient exhibiting the syndrome of malignant hypertension whether the hypertension is primary, or secondary to some unrecognized morbid process.

3 Since malignant hypertension is a syndrome and not a specific disease the renal pathological picture will show wide variation from patient to patient. The presence of acute necrotizing arteriolitis does not establish the diagnosis of primary malignant hypertension, nor does its absence rule it out.

4 Whatever the nature of the underlying pathological process responsible for the appearance of the syndrome of malignant hypertension the prognosis is uniformly poor.



## REFERENCES

- 1 Volhard F und Fahr T Die Brightsche Nierenkrankheit. Klinik, Pathologie Und Atlas Berlin Julius Springer 1914
- 2 Fahr T Über Nephrosklerose Virchows Arch f path Anat 226: 119 1919 Henke und Lubarsch's Hand d path Anat u Hist Berlin 7: 405 1925
- 3 Stern M Über einen besonders akut verlaufenen Fall von Arteriolonekrose der Nieren mit dem makroskopischen Bilde der grossen bunten Niere Virchows Arch f path Anat 251: 718 1924
- 4 Herxheimer G Über Arteriolonekrose der Nieren Virchows Arch f path Anat. 251: 709 1924
- 5 Fishberg A M Hypertension and Nephritis Philadelphia Lea and Febiger 1934
- 6 Keith N M Wagener H. P and Kernohan J W Syndrome of malignant hypertension Arch Int Med 41: 141 (Feb.) 1928
- 7 Murphy F D and Grill J So-called malignant hypertension clinical and morphologic study Arch Int. Med 46: 75 (July) 1930
- 8 Wagener H P Retinitis of malignant hypertension Tr Am Ophth Soc. 25: 349 1927
- 9 Moore R F The retinitis of arteriosclerosis and its relation to renal retinitis and to cerebral vascular disease Quart. J Med 10: 30 (Oct.) 1916 17
- 10 Friedenwald J S Retinal Arteriosclerosis in Arteriosclerosis New York The Macmillan Company p 363 1933
- 11 Fishberg A M and Oppenheimer B S Differentiation and significance of certain ophthalmoscopic pictures in hypertensive diseases Arch Int Med 46: 901 (Dec.) 1930
- 12 Cannady E W and O'Hare J P Critical survey of retinal lesions in chronic glomerular nephritis J A. M A. 103: 6 (July 7) 1934
- 13 MacMahon H. E and Pratt, J H Malignant nephrosclerosis (malignant hypertension) Am. J. M. Sc. 189: 221 (Feb.) 1935
- 14 Klemperer P and Otsani S "Malignant Nephrosclerosis" (Fahr) Arch Path 11: 60 (Jan.) 1931
- 15 Longcope, W T and Winklenwerder W L Clinical features of contracted kidney due to pyelonephritis Bull. Johns Hopkins Hosp 53: 255 (Nov.) 1933
- 16 Cain E F Malignant hypertension the histologic changes in kidneys Arch Int. Med 53: 822 (June) 1934
- 17 Mallory T B Pyelonephritis and hypertension. Cabot Case 18032 New Eng J Med 206: 129 (Jan. 21) 1932
- 18 Oliver T In Allbutt and Rolleston System of Medicine 2: 1052 The Macmillan Company 1912
- 19 Oppenheimer, B S and Fishberg A M Association of hypertension with suprarenal tumors Arch Int. Med. 34: 631 (Nov.) 1924
- 20 Winkel M Virilismus suprarenalis bei einem Adenom der Nebennierenrinde Deutsches Arch f. klin. Med 159: 1, 1928
- 21 Friedberg C K and Gross L Periarthritis nodosa (necrotizing arteritis) associated with rheumatic heart disease with note on abdominal rheumatism. Arch Int. Med 54: 170 (Aug.) 1934
- 22 Bennett G A and Levine S A. Two cases of periarthritis nodosa one with unusual manifestations (meningeal form) Am. J. M. Sc. 177: 853 (June) 1929
- 23 Derick C L, and Haas G M. Diffuse arteritis of syphilitic origin. Am J Path 11: 291 (March) 1935
- 24 Weaver G K and Perry I H Periarthritis nodosa report of case with fatal perirenal hemorrhage. J A. M A 104: 1390 (April 20) 1935
- 25 MacMahon H E Close H G and Haas G Cardiovascular renal changes associated with basophil adenoma of anterior lobe of pituitary (Cushing's syndrome) Am. J Path 10: 177 (March) 1934

## TRAUMATIC RUPTURE OF THE LIVER

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FROM the time of Hippocrates till the latter part of the nineteenth century wounds of the liver were considered as fatal, although isolated cases of spontaneous recovery from serious hepatic injuries were recorded from time to time. An interesting example of this was reported by Fabricius Hildanus<sup>36</sup> in the early part of the seventeenth century. A young man was stabbed during a quarrel and suffered a severe hemorrhage. A large piece of liver appeared in the wound and was removed by forceps. In spite of this fact the patient recovered.

Although many operations have been performed on the liver and with a steadily decreasing mortality it can still be said that surgery of this organ is an imperfectly developed field. From the beginning hepatic surgery has been feared and shunned because of hemorrhage.

Spontaneous hemostasis of a traumatized liver is rare and for the following reasons:

- (a) The thin-walled hepatic veins are without valves and tear easily, gaping without retracting or contracting.
- (b) Blood mixed with bile coagulates slowly.
- (c) The respiratory movements of the diaphragm and abdominal wall produce a continuous variation of blood pressure.

Tillmanns<sup>85</sup> in 1879, after removing wedge-shaped pieces from the livers of animals, closed

the abdominal wound without liver suture. All his animals recovered. He concluded that hepatic wounds are dangerous only when large vessels are involved, and that the low blood pressure and slow current in the liver vessels favor a more rapid hemostasis than in other organs.

Langenbuch<sup>46</sup> in 1888 controlled a severe secondary hemorrhage from the liver with mass ligatures. The patient recovered.

It was discovered during the next decade that animals could survive although large amounts of liver were removed. Ponfick<sup>63</sup> in 1890 found that his experimental animals could live though retaining only one-eighth of their original hepatic tissue. It seemed reasonable, then, that the operator need not fear any marked deleterious effect upon the system from considerable loss of liver substance, and with the control of sepsis, hemorrhage remained as the outstanding danger from hepatic trauma.

Clementi<sup>18</sup> in 1890 first used temporary compression clamps to effect hemostasis. The following year Ullmann<sup>88</sup> employed cautery and the infolding of the wound over a tampon for the same reason.

Kousnetzoff and Penski<sup>48</sup> in 1894 laid great stress upon the use of a supple needle of the type of Hagedorn armed with a thick double thread which was passed back and forth through the liver wound. This needle was blunted so that it would be pushed aside by, rather than transfix, hepatic vessels. He circumstitched the larger vessels in the cut surface and ligated them. The same year while Snegirew<sup>71</sup> was ad-

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vising the use of steam as a hemostatic, Cecherelli<sup>16</sup> and Bianchi were advocating whole bone and later decalcified bone plates on the upper and lower surfaces of the liver with sutures through them, leaving the ends of the sutures long and ligating them over the cut surface. The decalcified bone was usually completely absorbed. Other plates of various sorts have been used ivory, magnesium and even slices of turnip and potato.

In 1902 Carl Beck<sup>4</sup> slit a broad band from each border of the abdominal wound including peritoneum fascia and in some cases also muscle and leaving one end attached to the abdomen. These strips were used as supports for suture material. During the same year Koehler<sup>17</sup> employed compression forceps to crush the liver substance. These forceps were removed after twenty-four hours.

In 1905 while Cullen<sup>18</sup> was using overlapping mattress sutures to effect hemostasis, Gillette<sup>1</sup> was passing ligatures through the liver substance, thence through the abdominal wall. These made an exit between the ribs and were tied around the ribs on the cutaneous surface.

Pringle<sup>64</sup> in 1908 employed digital compression of the portal vein at the foramen of Winslow which completely arrested all bleeding from an extensive laceration of the liver.

In 1912 Boljarski<sup>8</sup> recommended an isolated omental plastic with suture, and Halsted drew omentum through a large perforating wound of the liver with an excellent result, as regards hemostasis.

McDill<sup>66</sup> in the same year clamped the vessels in the gastrohepatic omentum with an enterostomy clamp. He stated that procedures can thus "probably with safety be made entirely bloodless for at least 8 to 10 minutes."

From the fact that so many methods and modifications of methods of hemostasis have been advocated and also from the fact that combinations of three or four methods have been resorted to we must infer that there is no one method which can be relied upon for all occasions.

Though the liver is more frequently injured than any other solid organ, yet rupture of this viscus is one of the rarest reported surgical emergencies. However, it is probably more common than the reported cases would indicate as hepatic lacerations without distinctive symptoms undoubtedly pass undiagnosed and are included under the general caption of shock. It appears approximately once in every thirteen hundred cases brought to the accident room of any large general hospital, yet in a series of 365 cases of subcutaneous injury of solid viscera studied by Edler<sup>23</sup> the liver was injured in over fifty per cent.

The liver's large size, its friability and above all its fixed position between the unyielding prominent vertebral column posteriorly and the

firm costal margin and the abdominal wall anteriorly, all combine to render it particularly vulnerable to external force. The fact that the site of injury is most commonly along the posterior surface where the liver lies in contact with the vertebral column indicates that anteroposterior compression is the commonest cause of laceration.

According to Moynihan<sup>66</sup> the subcutaneous wounds are of three kinds (1) rupture of liver tissue with laceration of Glisson's capsule, (2) separation of the capsule with subcapsular hemorrhage (3) central rupture leading to hematoma and thence to abscess or cyst. He further states that the right lobe is injured six times as often as the left. Occasionally cases are first seen at quite an interval after injury. These would obviously be in the groups designated as No 2 or No 3.

Robertson and Graham<sup>67</sup> report the case of a boy of fourteen who, three weeks after an automobile accident was found to have a large tumor in the right upper abdomen. He had suffered no undue pain. On incising the liver capsule "two quarts of old blood and bile were evacuated." His convalescence was complicated by a sinus which drained old blood and bile for five months.

A similar case is that of a girl who suffered an abdominal injury while coasting. During the next four weeks she occasionally vomited bright blood and had persistent epistaxis. She developed a marked anemia and a high fever. Autopsy showed an immense cavity in the right lobe of the liver.

If the tumor occurs soon after the injury it can be assumed that the content is blood. If it is late in forming bile will constitute an important volume of the content of the cavity. Here marsupialization might be employed.

When traumatized the liver has a tendency to split or crack in a stellate manner with massive hemorrhage accompanied by varying amounts of bile. Frequently other abdominal viscera or thoracic organs or the diaphragm are also injured thus producing more or less serious complications which may mask symptoms referable to the injured liver.

Aside from acute anemia and shock, the high mortality in these cases may be in part caused by gastrointestinal stasis with its resulting toxemia as an effect of the trauma in the peritoneal cavity or leakage of bile. Another factor which keeps the mortality high is an imperfect estimate of the gravity of the situation when the case is first seen, for, occasionally a relatively trivial trauma may cause rupture or severe hepatic injury may be accompanied by comparatively insignificant primary symptoms. There may be little or no pain or shock at first and the individual may keep on for several hours with his usual activities without suffering much inconvenience. Robin<sup>68</sup> describes a case of a man who fell across a ditch striking his abdo-

men He suffered only slight discomfort, walked to a car and was driven home More than twelve hours later he was found to be bleeding severely from hepatic rupture

#### SYMPTOMATOLOGY

The chief clinical features are as follows (1) Pain in the right upper quadrant, though the pain may be generalized throughout the abdomen or not present at all McKnight<sup>50</sup> states that, if the convex portion of the right lobe is injured, pain is referred to the right scapular region while if the concave portion is involved the discomfort is referred to the waistline anteriorly Bloch<sup>7</sup> reports a case of ruptured liver in which the maximum tenderness was in the left lower quadrant (2) Boardlike hardness and exquisite tenderness over the involved area as a rule (3) Increase in liver dullness, upward or downward (4) Shock, due to the single impact or to the flooding of the peritoneal cavity with blood or bile, though there have been many reports of cases of ruptured liver with little or no clinical signs of this phenomenon Noble reports the case of an individual struck by an automobile who showed at the time of the accident no evidence of shock or, in fact, of any injury at all Twenty-four hours later laparotomy revealed a rent in the region of the hilus Death ensued five hours after the operation The degree of immediate shock, therefore, does not represent the injury often enough to be a guide in cases where no shock is observed Free exposure and hemostasis at the earliest possible moment is advised (5) A sharp rise in the leucocyte count and a slower fall in the erythrocyte count and hemoglobin The leucocytic reaction presents a characteristic curve reaching a height of 150 per cent to 300 per cent within the first ten hours (6) Jaundice, though this phenomenon seldom appears before the third or fourth day, if at all McKnight<sup>50</sup> advances the theory that the jaundice may be due to the shattering of Glisson's capsule He reasons that as a result of this laceration the secretory pressure of the liver is decreased and the bile dammed back and forced into the lymphatic channels It may, of course, also be due to hepatic sepsis! Andersson<sup>1</sup> reports the case of a laborer who developed jaundice two weeks after an abdominal injury Exploratory laparotomy nine days later revealed a liver abscess The hepatic capsule was intact (7) It must be remembered that liver rupture is sometimes accompanied by a slow pulse McKnight<sup>50</sup> cites the case of an individual who had a pulse rate of seventy twelve hours after the injury though seven hours later a quart of blood was found in the peritoneal cavity Bradycardia has been produced in dogs by causing hepatic injury, but only when there was a profuse discharge of blood and bile into the free peritoneal cavity.

Thorotrast (25 per cent thorium dioxide) has been employed as a diagnostic aid but its use apparently is not without danger Burke and Madigan<sup>14</sup> in 1933 report what is probably the first case of liver rupture in which thorotrast was thus used They state that the patient died of peritonitis on the sixth day after operation Stewart<sup>76</sup> et al, describe eight cases of trauma to the liver in which thorotrast was employed Seven of these died but Stewart declares that "none of these deaths is directly attributable to thorotrast"

The thorotrast was found to be deposited in the endothelial cells of the liver and spleen Stewart<sup>76</sup> believes that this medium probably remains permanently in the endothelial cells of the liver

Tripoli<sup>86</sup>, on the other hand, injected 25 cc of this solution into each of fifteen individuals "with no immediate or late untoward results" These cases were not, however, complicated by liver trauma

#### DIFFERENTIAL DIAGNOSIS

(1) Simple shock Hourly blood counts will aid in deciding upon or rejecting this diagnosis

(2) Simple traumatism to abdominal wall Blood examination will help here also White<sup>89</sup> has also employed diagnostic aspiration of the peritoneal cavity with a large needle

(3) Splenic Rupture Though the pain and tenderness are usually in the left upper quadrant of the abdomen, the symptoms here may be identical with hepatic rupture and the lack of localizing signs, of course, does not rule out trauma to the liver

#### TREATMENT

When possible, immediate operation is essential The importance of early recognition and prompt institution of surgical measures can best be emphasized by Thole's<sup>82</sup> statistics He demonstrated from a study of 260 cases of ruptured liver that if operation takes place within six hours the mortality is 40 per cent, between seven and twelve hours it is 50 per cent, while between thirteen and twenty-four hours it is 67 per cent After twenty-four hours the mortality rapidly mounts to 86 per cent, though cases have been operated on with recovery two to thirty days after liver rupture

If blood cannot be obtained from other sources, autotransfusion of blood may be employed However, the presence of extravasated bile and the possibility of the presence of the contents of hollow viscera should make this a procedure to be done only after careful abdominal exploration This technic was advocated by Thies<sup>81</sup> in Germany in 1911 and used by Ogilvie<sup>87</sup> in England in 1922 White<sup>88</sup>, in 1920, was probably the first to employ autotransfusion in a case of liver rupture in the

United States Bloch<sup>7</sup> reports a similar case with recovery in 1930, and Robin<sup>8</sup> one in 1934

It may be found, on opening the abdomen, that the hemorrhage has ceased and that a careful removal of the blood and an abdominal closure are all that is necessary

If the bleeding is not severe a gauze pack may be sufficient to check the hemorrhage. The hepatoduodenal ligament may be compressed while the packing is inserted. Graham<sup>9</sup> states that this ligament may be safely compressed for a half hour. It is probably well to remove the pack after forty eight hours under general anesthesia. Drainage introduces infection and occasionally causes a secondary hemorrhage. Robin<sup>8</sup> describes a case in which the pack was left in for two weeks. A liver abscess resulted. The third week the patient had a series of secondary hemorrhages.

If the bleeding is checked when the pack is removed, a piece of rubber may then be inserted to the level of peritoneum in order to take care of a possible later leakage of bile.

If the pack does not check the hemorrhage, suture of the liver should be attempted, employing if possible a large blunt needle.

If a large amount of liver tissue had been damaged it is probably well to administer glucose freely. It has been clearly demonstrated that hepatectomized animals die because of a glucose deficiency.

#### PROGNOSIS

This seems to depend on

- The amount and rate of hemorrhage
- The escape of bile into the peritoneal cavity which may be a contributory cause of paralytic ileus
- The amount of destruction of liver tissue.
- The presence or absence of injury to structures other than the liver

An extraordinary instance of multiple injury with recovery is reported by Gemmill and Martin<sup>10</sup>. The patient, a woman of twenty-six, was injured by an automobile. There was eversion of intestine severe laceration of the liver and a torn right kidney. The intestine was returned to the abdomen and the liver and kidney sutured. The patient is said to have had an uneventful recovery in forty-six days.

(e) Careful attention to postoperative complications

The following are case reports of two instances of ruptured liver

J. T. CASE 1 Aged 20 years single Entered October 29 1933

**History** While playing football the patient was hit across the abdomen by an opponent. This was the first play of the game. The patient played during the remainder of the half but

sat on the sidelines during the second half. He felt pain in the region of the umbilicus and a desire to urinate but was unable to do so. After the game was over he lay down on a bench and had difficulty in getting up again. He then rode home. The pain in the region of the umbilicus persisted. He entered the office of one of us (F. J.) at which time an internal injury was suspected and he was referred to the hospital walking in three and a half hours after the injury. His pulse was then 100 and his blood pressure 92/60. During the night his blood pressure and pulse readings were as follows:

10 00 P.M. Blood pressure—98/64 Pulse—88  
1 30 A.M. Blood pressure—78/48 Pulse—104  
5 30 A.M. Blood pressure—80/52 Pulse—100

One of us (W. M. S.) was called in consultation at six o'clock the morning following entrance

**Physical Examination** At entrance to the hospital the patient's skin was very pale—grayish white. He was apparently in great pain. Head—skull and scalp negative. Eyes—pupils equal. Ears—no bleeding. Nose—no bleeding. Mouth—negative. Neck—negative. Chest—lungs clear. No rales. Heart—normal sounds. Good quality. No murmurs. Abdomen—extremely tender and spastic, particularly over the right upper quadrant. No tenderness in flanks. No distention. Extremities—normal. Rectal—negative. Urine—no blood. Fourteen hours after the accident the leucocyte count was 36,000.

A catheter specimen showed no blood.

The spasticity and the tenderness of the whole abdomen, particularly the right upper quadrant, and the high white count suggested that the boy had a ruptured viscus probably the liver. Despite the fact that his blood and pulse had remained essentially the same for four hours one of us (F. J.) noticed that his general appearance was distinctly worse. It was decided therefore to operate. Given 1000 cc. 10 per cent glucose intravenously before the operation.

**Operation** (15 hours after the accident) (W. M. S.)

About one and a half litres of blood in the peritoneal cavity. On the posterior surface of the right lobe of the liver there was a good sized adherent blood clot. This was not disturbed. Transfused with 500 cc. of whole blood. Six hours after the operation. Blood pressure—114/75. Pulse—118.

November 1st. Pain in the left arm and up to shoulder which persisted for three or four days. Examination of arm negative. Blood pressure—130/62. Pulse—96.

Urine—negative. Blood count—8,000 000. Hgb—45.

November 1st. 2,500 000 Hgb—50  
2nd. 3,200 000 Hgb—55  
3rd. 3,750 000 Hgb—55

Uneventful convalescence otherwise. Discharged on the fourteenth day.

When seen one and one-half years after the operation, the patient had no symptoms and had a well healed wound

R J CASE 2 Female Admitted April 15, 1934

**History** Patient was thrown out of an automobile when it turned sharply and tipped over. She arrived at the hospital within thirty minutes of the accident.

**Physical Examination** At entrance her skin was clammy and her pulse almost imperceptible, its rate being about 110. Her blood pressure registered zero. She was semiconscious and could just describe tender areas of abdomen. There were abrasions on forehead and right arm and a laceration at the lateral canthus of the right eye.

Skull—negative

Pupillary reactions—normal

Ears and nose—no bleeding

Mouth—no injuries

Chest—lungs clear No râles

Heart—very rapid Sounds normal

Abdomen—quite rigid, markedly so in the right upper quadrant, where there was much tenderness and spasm

There was no blood in urine

The examination of the abdomen suggested a ruptured viscus, probably liver. She was getting rapidly worse. It was felt that a white count this early after injury would not aid in a decision as to therapy, for if it were relatively normal we would disregard it. If it were high we would operate anyway as soon as intravenous fluid and, if necessary, transfusion put her in good condition. Exploratory laparotomy, we felt, was urgent.

She was given 1000 cc of 10 per cent glucose intravenously after which the blood pressure rose to 90/50. Her pulse was of fair quality during the operation, but rose from 116 to 134.

**Operation** (W. M. S.) A tear was found in the postero-inferior surface of the right lobe, and bleeding steadily. This was packed with the gauze ends of two cigarette wicks, which caused adequate hemostasis. She was then transfused with 500 cc of whole blood.

Forty-eight hours after the operation, the cigarette wicks were taken out and a rubber drain was placed through the peritoneal level.

She was in a precarious condition for the first three days and was given intravenous glucose, hypodermoclyses and rectal fluid.

April 17th W C—19,000 R C—22 Hgb—55

19th W C—7,600 R C—23 Hgb—55

21st R C—31 Hgb—55

27th Clay colored stool, but none thereafter

27th Vaginal bleeding

29th Still some vaginal bleeding

May 1st. Dilatation and curettage for incomplete miscarriage (F. J.)

16th W C—10,800 R C—32 Hgb—55

18th. Transfusion of 500 cc of whole blood.

23rd W C—7,800 R C—38 Hgb—75

**Temperature** From the first to the eleventh day—

from 100.2° down to 98.6°

From the eleventh day to the thirtieth day—

up to 102°

From the thirtieth day to the thirty-ninth day—

from 102° down to 98.6°

**Bile** Bile from the wound from the first to the twelfth day postoperative

**Vomiting** Vomiting small amount from the time of the operation for thirteen days

Discharged well on the forty-second day

When seen one year after the operation, the patient had no symptoms and had a well healed wound

## REFERENCES

- Andersson I. Über zentrale Leberrupturen und ihre Komplikationen vorzugsweise Abszesse (On central ruptures of the liver and their complications). *Brunns Beitr. z. klin. Chir.* 135: 696 1925-1926
- Anschütz, W. Über die Resektion der Leber. *Samml. klin. Vortr. n. F.* p. 356 1903
- Bachy. Huit observations d'ecatement du foie (Eight cases of ruptured liver). *Bull. et mém. Soc. nat. de chir.* 59: 1367 (Nov. 26) 1933
- Beck, Carl. Surgery of the liver. *J. A. M. A.* 38: 1063 (April) 1902
- Bertrand F. Ecatement traumatique du foie (Traumatic rupture of liver case). *Bull. et mém. Soc. nat. de chir.* 59: 366 (March 11) 1933
- Blanchet T. Rotture sottocutanea del fegato (Subcutaneous rupture of liver etiology symptomatology and therapy). *Rassegna internaz. di clin. e terap.* 13: 621 (June 30) 1932
- Bloch O. E. Ruptured liver with recovery. *Kentucky M. J.* 28: 152 (March) 1930
- Boljarski N. Ueber Leberverletzungen in klinischer und experimenteller Hinsicht, unter besonderer Berücksichtigung der isolierten Netzplastik. *Arch. f. klin. Chir.* 93: 507 1910
- Bollman Jesse L. Experimental observations on glucose as a therapeutic agent. *Surg. Clin. N. A.* 5: 871 1925
- Brandberg R. Beitrag zur Klinik der traumatischen Leberverletzungen bei unverletzter Kapsel (Traumatic subcapsular rupture). *Acta chir. Scandinav.* 63: 321 1928
- Brewer G. E. Contusions of abdomen—associated with visceral injury. *Illinois M. J.* 48: 70 (July) 1925
- Brocq, P. Quatre observations de rupture traumatique du foie. Trois guérisons, une mort. (Traumatic rupture of liver 4 cases). *Bull. et mém. Soc. nat. de chir.* 59: 584 (April 15) 1933
- Burghardt F. Priority for own blood transfusion. *Zentralbl. f. Gynäk.* 44: 724 (July 3) 1920
- Burke W. F., and Madigan J. P. The roentgenologic diagnosis of rupture of the liver and spleen as visualized by thorotrast. *Radiology* 21: 580 (Dec.) 1933
- Cantelmo O. Su di un cole toraco peritoneo secondario progressivo da frattura costale con rottura freno-epatica. (Secondary bile collections in thorax and peritoneum resulting from costal fracture with phreno-hepatic rupture). *Ann. Ital. di chir.* 11: 1047 (Sept. 30) 1932
- Ceccherelli and Bianchi. 11 Internat. Congress Rome 1894
- Cheyne and Burghard. Manual of Surgical Treatment. Part VI. Sec. 11. 107 1904
- Clementi. *Zentralbl. f. Chir.* 17: 651 653 1890
- Cullen T. S. Surgery of the liver. A series of liver cases in which it was necessary to remove a segment of the liver or to suture torn areas. *Surg. Gynec. & Obst.* 41: 573 1907
- Deaver J. B. and Ashhurst, A. P. C. Surgery of Upper Abdomen. Second Edition. p. 593 595 1921
- Delagenière, Y. Déchirures multiples du foie. Trois interventions pour des épanchements successifs en deux mois et demi. Guérison. (Multiple rupture of liver 3 successive interventions in 2½ months). *Bull. et mém. Soc. nat. de chir.* 59: 567 (April 8) 1933
- Demel R. Über die Anzeigstellung zum operativen Eingriff bei stumpfen Bauchverletzungen. *Arch. f. klin. Chir.* 135: 542 1925
- Eberle D. Transfusion and reinfusion of blood. *Schweiz. med. Wchnschr.* 50: 961 (Oct. 21) 1920
- Ecarius. Über subcutane Leberrupturen. (Subcutaneous rupture of liver). *Arch. f. klin. Chir.* 172: 766 1933
- Edler L. Die traumatischen Verletzungen der parenchymatösen Unterleibsorgane. *Arch. f. klin. Chir.* 34: 343 1887
- Erdély J. Recovery from multiple ruptures of liver with intestinal injury. diagnosis and treatment of subcutaneous rupture of liver. *Deutsche Ztschr. f. Chir.* 188: 110 1926
- Einhorn Max, and Stewart, W. H. On hepatography. *M. J. & Rec.* 123: 430 1927
- Frank J. A new technique for operations upon the liver. *Surg. Gynec. & Obst.* 11: 418 1910
- Friedemann, M. Reinfusion of extravasated blood. *Zentralbl. f. Gynäk.* 44: 398 (April 17) 1920
- Gemmell W. F. and Martin T. A. Traumatic rupture of the liver and kidney with evisceration complicating pregnancy. *Am. J. Obst. & Gynec.* 88: 113 (July) 1933
- Gillette W. J. Surgery of the liver. *Surg. Gynec. Obst.* 1: 361 1905
- Graham A. J. Subcutaneous rupture of liver. *Ann. Surg.* 86: 51 (July) 1927
- Grimault, L. Un cas de rupture traumatique du foie opération précoce. Excision et suture de la brèche hépatique. Guérison. (Traumatic rupture of liver excision and suture recovery). *Bull. et mém. Soc. nat. de chir.* 53: 1107 (Oct. 29) 1927
- Henschen K. Rücktransfusion des körperligen Blutes bei den schweren Massenblutungen der Brust und Bauchhöhle. *Zentralbl. f. Chir.* 43: 201 1916
- Herbst R. Zur Klinik und Therapie der subcutanen Leber-ruptur. (Clinical aspects and treatment of subcutaneous rupture of liver). *Deutsche Ztschr. f. Chir.* 241: 692 1933
- Hildanus Fabricius. *Clit. Gurli. Geschichte der Chir.* 8: 725 1898

- 37 Holmberg, D. Ruptures of liver in new-born observed at General Lying in Hospital in Helsingfors from 1924 to 1931. *Finska Lak. sällsk. handl.* 78: 1957 (Nov.) 1933
- 38 Kadrnika, B. Hepatocentography roentgenologic demonstration of parenchyma of spleen and liver by means of a new intravenous contrast medium (thorotrast). *Radiology* 18: 371 (Feb.) 1932
- 39 Keen, W. V. W. On resection of the liver especially for hepatic tumors, with the report of a successful case of resection for an adenoma of the bile-ducts, and a table of twenty recorded cases of hepatic operations. *Denton M. & S. J.* 125: 407 189
- 40 Kelly, J. A.: Ruptured liver internal hemorrhage. *Clin. North America* 8: 985 (Aug.) 1918
- 41 Kocher, *Chirurgische Operationslehre*, Vierte Aufl., Fourth Edition. Jena: Verlag von Gustav Fischer 190 p 348
- 42 Kounetsoff, L. L. *Chir. S. Peterb.* 8: 838 1901
- 43 Kounetsoff, M., et Penaki, J. Sur la résection partielle du foie. *Rev. de chir.* 15: 501, 554, 1916
- 44 Kreuter, Zur Wiederinfusion abdominalen Blutungen. *München Med. Wchnschr.* 63: 1498 1916
- 45 Kulenkampf, D. Reinfusion of extravasated blood. *Zentralbl. f. Gynäk.* 44: 296 (April 17) 1916
- 46 Langerhans, C.: Ein Fall von Resektion eines linksseitigen Schindrippers der Leber. *Hellings. Berl. klin. Wchnschr.* 3: 37 (Jan. 14) 1888
- 47 Lichtenstein, Eigenbluttransfusion bei Extrauterin gravidität und Uterusruptur. *München med. Wchnschr.* 63: 1697 (Nov.) 3 1916
- 48 McCracken, J. C. Rupture of the spleen. *Ann. Surg.* 79: 30 1921
- 49 McMill, J. R. Bloodless surgery of the liver. An experimental study of the possibility of excision of maximum amounts of liver tissue with the usual instruments in hand in any hospital. *J. A. M. A.* 69: 1-53 (Oct. 1) 1911
- 50 McKnight, R. B. Postoperative physiological studies in a case of traumatic rupture of the liver with recovery. *Am. J. Surg.* 8: 442 (March) 1930
- 51 McNitt, H. J. R. Report of two cases of ruptured liver in the newborn. *Am. J. Obst. & Gynec.* 23: 421 (March) 1932
- 52 Martinez Vargas, Desgarro del hígado por la presión de un automóvil. Colapso por hemorragia. Laparotomía. Curación. (Rupture of liver in automobile accident collapse following hemorrhage recovery after laparotomy). *Arch. espan. de pediat.* 18: 357 (May 31) 1921
- 53 M. et W. H. and Streamer, C. W. Primary carcinoma of liver with spontaneous rupture. *J. A. M. A.* 100: 1684 (May 27) 1923
- 54 Meyer, H. S. Rupture of liver in new-born. *Arch. Pediat.* 50: 614 (Nov.) 1933
- 55 Moynihan, B.: *Abdominal Operations*, Fourth Edition. Philadelphia: W. B. Saunders Co. 3: 227 1916
- 56 Noble, T. H. Jr. Traumatic rupture of liver in children. *Indianapolis M. J.* 35: 81 (April) 1932
- 57 Ogilvie, W. H. Spontaneous rupture of splenic vein in case of enlarged liver and spleen. *Guy's Hosp. Rep.* 72: 115 (April) 1919
- 58 Oka, M.: Klinische Anwendung der "Lanographie" einer neuen Methode zur röntgenologischen Darstellung von Milz und Leber. *Fortschr. a. d. Geb. d. Röntgenstrahlen* 41: 892 (Juno) 1920
- 59 Payr, E., and Martins, A.: Experimentelle und klinische Beiträge zur Leberstich- und Leberresektion (Laparotomie plattentastet). *Arch. f. klin. Chir. Berl.* 71: 862 1906
- 60 Pfannenstiel, Med. Centr. Ztg. Berl. 67: 177 1893.
- 61 Pichon, R., et Cachin, M. Rupture grave du foie après traumatisme insignifiant. (Grave rupture after insignificant trauma.) *Ann. de méd. lég.* 18: 618 (Nov.) 1922.
- 62 Pinn, H. A., and Darlow, H. C. Death from rupture of liver in newborn infant. *Brit. M. J.* 1: 887 (May 14) 1925
- 63 Pondick, Surgery of the liver. *Lancet* 1: 861, 1890
- 64 Pringle, J. H.: Notes on the arrest of hepatic hemorrhage due to trauma. *Ann. Surg.* 48: 542 1908
- 65 Radt, Röntgenologische Sichtbarmachung von Leber und Milz mit einer neuen Kontrastfüllung. Deutsche med. Wchnschr. 48: 3026 1920
- 66 Robin, I. G.: Case of ruptured liver due to trivial violence. *Guy's Hosp. Rep.* 84: 100 (Jan.) 1924
- 67 Robertson, D. E. and Graham, R. R. Rupture of liver without tear of capsula. *Ann. Surg.* 98: 899 (Nov.) 1923
- 68 Schöfler, Arthur. Rücktransfusion des körpereigenen Blutes nach Massenblutungen in die grossen Körperhöhlen. *Zentralbl. f. Chir.* 43: 417 (May 17) 1916
- 69 Schroeder, W. E.: The progress of liver hemostasis—reports of cases (ressection sutures, etc.). *Surg. Gynec. & Obst.* 2: 57 1906
- 70 Schweitzer, B. Erfahrungen mit der Eigenbluttransfusion bei Extrauterin gravidität. *München med. Wchnschr.* 68: 689 (Juno) 1921
- 71 Siegfried, W. F.: Der Dampf als blutstillendes Mittel. *Deutsche med. Wchnschr.* 30: 747 1894
- 72 Sotgiel, A. La rotture traumatique du foie (Traumatic rupture of liver). *Cosp. maggiore* 20: 541 (Sept.) 1932.
- 73 Stamm, M. Cartilage plates from the scapula of the calf for liver and spleen suture. *Surg. Gynec. & Obst.* 1: 6 9 1905
- 74 Steele, G. H. Ruptured liver suture. *Brit. M. J.* 2: 115 (Aug. 9) 1920
- 75 Steiger, W.: Traumatic anemic necrotic infarction of liver after subcutaneous rupture. *Wien. klin. Wchnschr.* 85: 1309 19 57 1906
- 76 Stewart, W. H. Einhorn, M. and Illick, H. E.: Hepatography and iemography following injection of thorium dioxide salt (thorotrast). *Am. J. Roentgenol.* 27: 53 (Jan.) 1932.
- 77 Idem
- 78 Strauss, A. (Basel): Ueber Verblutung aus den Gallenwegen. (Rupture of liver: death from hemorrhage.) *Monatsschr. f. Unfallh.* 36: 433 (Oct.) 1919
- 79 Stull, G. B.: Rupture of liver with subdiaphragmatic hemorrhage. *Pennsylvania M. J.* 35: 87 (Nov.) 1932
- 80 Terrier, F. et Auvray, M. Les tumeurs du foie au point de vue chirurgical. étude sur la résection du foie. *Rev. de chir.* 18: 403 1898
- 81 Thies, J. Zur Behandlung der Extrauterin gravidität. *Zentralbl. f. Gynäk.* 33: 1191, 1914
- 82 Thiele, F. Die Verletzungen der Leber und der Gallenwege. Stuttgart: Verlag von Ferdinand Enke, 1912
- 83 Thorlakson, P. H. T., and Hay, A. W. S. Rupture of liver. *Canad. M. A. J.* 20: 593 (June) 1919
- 84 Tiffany, L. M.: The removal of a solid tumor from the liver by laparotomy. *Maryland M. J.* 23: 621 1890
- 85 Tillmans, H. Experimentelle und anatomische Untersuchungen über den Wunden der Leber und Niere. Ein Beitrag zur Lehre von der antiseptischen Wundheilung. *Virchows Archiv* 78: 437 1879
- 86 Tripoli, C. J. Haam, E. and Lehman, E. D.: Roentgenographic visualization of the liver and spleen in the human. A preliminary report. *Am. J. Roentgenol.* 27: 265 (Feb.) 1932
- 87 Tücher, Bull. et inf. Soc. de chir. de Paris 1897
- 88 Ullmann, E. M. Resection der Leber wegen Gumma. *Wien. Med. Woch.* 58: 2344 1902
- 89 White, Charles S. Rupture of the liver With report of a case in which autotransfusion was employed. *Surg. Gynec. Obst.* 36: 442 19 2
- 90 Woodside, C. J. A.: Traumatic rupture of duodenum and liver; subcapsular abscess; recovery. *Brit. M. J.* 2: 1225 (Dec. 31) 1927
- 91 Wright, A. M. and Livingston, E. M. The leucocytosis of internal hemorrhage. *New York State J. Med.* 23: 258 (July) 19 3
- 92 Wüsten, J. Zur Klinik und Pathologie der so genannten Leberruptur (Clinical and pathologic study of traumatic sub-capsular rupture case). *Beitr. z. klin. Chir.* 185: 4 4, 1931

## BOSTON DISPENSARY VARICOSE VEIN CLINICS

## THE ORGANIZATION OF A VARICOSE VEIN CLINIC

BY HILBERT F. DAY, M.D.\*

THE Vein Clinic at the Boston Dispensary has been a success because of its organization and because it has continued uninterruptedly for so long. It was one of the first clinics in Boston to appreciate the advantages of the injection treatment of varicose veins and to start treating patients by this method.

At the Boston Dispensary, we consider that organization depends upon

- 1 Personnel
- 2 Quarters
- 3 Equipment
- 4 The methods of treatment.
- 5 Follow-up

The continuation of the Clinic has been made possible by the sustained interest of the personnel as well as that of the institution. The service rendered its patients has maintained the demand for this form of treatment.

As to *Personnel*, we have found that the best organization is to have one surgeon who is responsible for his associates' and assistants' attendance at the clinics and who himself is in charge of part of the work. His service runs throughout the year and this enables him to see that uniform care is given to the patients and a proper division of work carried out. All of our doctors in charge of the Clinic have been for several years in this work. Only doctors who have received special training are allowed to inject veins. Students, internes or graduate students are not allowed to do so until they have observed the methods for a number of times and then only under strict supervision. No doctor is allowed to be in charge of a clinic who has had less than six months' experience in this type of work. We have found that it requires an even longer time to train a man so that he has proper judgment in deciding the type of treatment to institute, and to make him capable of doing his best work.

Our Vein Clinic has been fortunate in having for a long time the same nurse in attendance, one who understands how to help each man and who knows the patients. We think that such a nurse is essential in the smooth running of the Clinic. A volunteer clerk, also, is quite necessary. The volunteer clerk should have some social training so as to be able to meet the patients pleasantly and to handle them properly. This worker, under direction, attends to the follow-up of patients through correspondence, particularly in relation to the completion of treatments. When a larger problem arises, it is

handled by a trained social worker. Problems which come under this heading are transportation, the obtaining of the dressings for home care, aid toward bed rest, and the general social problems of relief.

*Equipment* Ordinary tables on which the patient may sit or lie are necessary, also stools of various sizes. A dressing table with one or two shelves for bandages, sheet-wadding and ointment jars should be provided for each cubicle, or the table should be so arranged that it can be easily moved from one cubicle to another. On the top of this table, there should be a sterile sheet and on it a sufficient number of syringes and needles prepared for use. On one shelf of the table there should be a blood pressure apparatus, a stethoscope, tourniquets and sterile gauze. The various solutions used for injections, plus adrenalin (for use in case of an untoward reaction) should be conveniently at hand.

*Method of Treatment* All new cases are examined in one day by the head of the Clinic, who then maps out for each patient the necessary medical and laboratory work preliminary to their treatment. They are then referred to the Clinic which is in the charge of a doctor particularly interested in some special form of treatment, such as high ligation, multiple injections, the treatment of ulcers and the treatment of phlebitis.

We believe that regular conferences should be held at which the whole staff gives reports on progress in the various methods used and where new methods of treatment are discussed. As to solutions used, we believe that well tried out solutions should be employed until new ones have proved themselves better. For instance, we at first used salt solution for injections, but later the use of quinine urethane became the rule. Now various other solutions are being tried out. In the case of ulcers, at first a simple supporting bandage was used. Now we are sure that a sponge plus adhesive plaster speeds up the healing of an ulcer.

*Follow-up* We have found that it is necessary to keep in touch with our patients because they have a tendency to disappear from the Clinic after their primary symptoms have been relieved and before a complete obliteration of the veins, including the long saphenous in the thigh, has been accomplished.

Finally, I would say that the reasons for the success of this Clinic are the special training of the men who take care of it and the adequate follow-up.

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## THE TREATMENT OF THE VARICOSE ULCER\*

BY EDWARD T. WHITNEY, M.D.,† AND PETER A. CONSALES, M.D.†

FOR success in the treatment of varicose ulcers, the underlying pathology must be recognized. In the first place, the flow of blood in the saphenous veins is downward instead of upward<sup>1</sup> and this puts such an added burden on the deep veins that a second factor is produced, namely, a *generalized* chronic passive congestion of the lower leg and foot. Early in the disease, no definite signs of this chronic passive congestion are present although the symptoms of fatigue, aching and cramps of the lower legs are probably the result of this latter condition. Later on, however, edema, induration of the tissues and discoloration appear with an increase of the symptoms.

A third factor is a *local* passive congestion due to some trauma, skin infection, phlebitis, cellulitis or lymphangitis. The trauma does not need to be very severe because it requires only the smallest amount of added congestion so to diminish the nutrition of the skin that it breaks down. The two most common skin infections in this location which predispose to ulcer formation are the staphylococcus and the epidermophyton, either singly or in symbiosis.<sup>2</sup> A superficial phlebitis temporarily improves the circulation as it stops the reverse flow of the blood in the saphenous veins but after this infection thrombus is re-canalized, the resulting situation is even worse than it was before, in that, the vein walls are dilated even further their tone is diminished even more and the chronic passive congestion becomes even more serious than it was previously.

A fourth underlying factor is the tendency of the skin edges to separate once the continuity of the skin has been broken. This is readily observed when the skin is incised. The skin edges of these ulcers tend to separate constantly and the wear and tear on the epithelial margins must, naturally, be very great.

Treatment should correct all of these conditions. To start with, there is always some skin infection in and around an untreated ulcer and more likely than not, a fungus is there as well, so that a fungicide, as well as a germicide, is called for and, as we are going to cover the whole ulcer leaving no drainage, a generous amount of this antiseptic is necessary. In the clinic, we use a ten per cent mercurochrome ointment or one per cent gentian violet ointment, while in private practice we employ one of the other mercurials such as merthiolate.

The ointment is applied to the ulcer and to the skin surrounding the ulcer for a distance of one to two inches. Over all of this are laid strips of adhesive one inch wide, overlapping. This word "laid" is used advisedly because no tension must be put on the skin

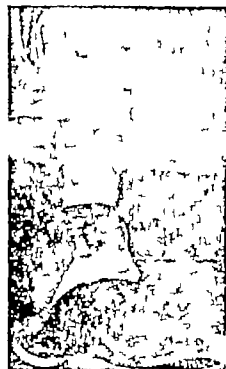


FIG. 1. Mr. B.—Before treatment.



FIG. 2. The left leg is that of Mr. B. after six treatments. The right leg is that of a man treated elsewhere by confinement in bed for eleven weeks. They both had the same sized ulcer in the same location and with the same number of varicosities. Mr. B. lost no time from work.

The adhesive serves four purposes. First, it keeps the skin edges from separating farther, secondly, it keeps the germicidal ointment in place and prevents it from drying, thirdly, it keeps the ulcer flooded with its own healing secretion and, fourthly, it supplies a base for the application of the sponge which follows. This sponge should be approximately one inch larger

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in diameter than that of the ulcer and should be approximately one inch in thickness. It is laid on the adhesive over the ulcer and then is strapped on with more adhesive, enough pressure being applied to reduce its width by about one-half. McPheeters<sup>3</sup> is responsible for popularizing the sponge treatment in this country, but his directions call for placing fluffy gauze over the ulcer, and in our hands it has been found that such a course in many cases causes gangrene of the skin because too much pressure was produced by the gauze at one particular point. Our modification of strapping the sponge on over adhesive never produces any such gangrene. The object of the sponge is to control the local chronic passive congestion in the base of the ulcer and in the tissues immediately surrounding the ulcer. Furthermore, it presses the newly growing skin edges down into the granulation tissue, providing a thick, well-nourished layer of skin intimately fastened to the underlying tissues rather than a thin, one-celled layer which is easily raised by trauma or infection.



FIG 3 Ulcer covered with antiseptic ointment

Injection of the varicosities immediately proximal to the ulcer is made at the first visit and further injection is made at each dressing until all of the varicosities in both the leg and thigh have been obliterated. Personally, we believe in the multiple injections of all of the veins entering the ulcer area with a small amount of sclerosing fluid rather than the injection of a larger amount of fluid at some one point. If it is found that ligation is also indicated, such a procedure can be accomplished at the same time that the ulcer is being treated.

Having dressed the ulcer and having injected the veins, the leg must be bandaged in order to overcome the generalized chronic passive congestion. This can be accomplished in several ways. In the clinic we use sheet wadding and gauze bandage. Private patients, if they can afford it, may have some form of elastic adhesive bandage. The ordinary ace and Bender bandages do not serve the purpose well enough, in our experience, and elastic or canvas stockings are too expensive to soil. Whatever band-

age is chosen should be put on by the doctor treating the patient, as it is almost impossible for the patient to apply a bandage with just the right amount of compression, in fact, a great many doctors require considerable experience before they are able to bandage a leg correctly. Such a bandage is an art, and every one has his own method. Personally, we like to put on a figure of eight going up the leg, and to cover it with spiral coming down. This makes two definite layers of gauze running in opposite directions, and the friction has a tendency to keep the gauze in place. When such a bandage is applied correctly and firmly, the patient will return at the end of a week with the bandage in as good condition as it was when applied.

If the ulcer is large and with an offensive odor, this whole dressing should be changed twice a week and later on every five to seven days. We have found in private practice that at the end of the fifth day the dressing has a tendency to become uncomfortable, the antiseptic ointment has lost its power and without drainage the germs have begun to multiply again, so that the ideal time for changing is approximately just short of a week. In the clinic, it, of necessity, has to be a week. Either or carbon tetrachloride is used to clean the skin and ulcer at the time of dressing.

Modifications of this treatment must be used for varying conditions. Often the staphylococcus bores little holes in the skin beneath the adhesive beyond the area covered by the antiseptic ointment and when this becomes serious, a good scrub with carbon tetrachloride and an application of a drying powder is applied, covered with gauze only. At the end of a few days, it will be found that this condition has entirely disappeared. Occasionally, patients show idiosyncrasies to various procedures included in the treatment. One here and there cannot stand the sponge, another cannot stand mercurochrome ointment and others cannot stand adhesive plaster. Although many patients state that their skin cannot stand adhesive, it will be found that such statements frequently arise from the fact that staphylococci are growing beneath the skin. A plentiful application of the antiseptic ointment prevents this so that after the first dressing such patients stand the adhesive well enough. Cases which have eczema surrounding the ulcer clear up very nicely following the application of the antiseptic ointment and the adhesive, but in these cases drainage must be allowed at first by not overlapping the adhesive. Many a weeping eczema has been found to have disappeared by the time the ulcer is healed with no other treatment than that given the ulcer.

Occasionally, a large ulcer in the lower part of the leg occurs, with considerable fibrous tissue surrounding it, which does not respond to this type of treatment. Such an ulcer is usually preceded by a deep phlebitis, and the Ho-

man's operation, or a modification thereof, is about the only method of attack.

The after-care of these ulcer cases is very important. In the first place, after it has entirely healed, the tender skin needs the protection of adhesive for several weeks and this should be changed once a week, never less often than

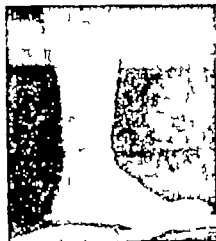


FIG. 4 Ointment covered with adhesive

once in ten days, because the skin has a tendency to macerate if the adhesive is left on for a longer period. A very small amount of antiseptic ointment and a layer of adhesive is all that is necessary. However, all the varicose ties should be obliterated, and even then the use of a canvas or elastic stocking or bandage should



FIG. 5 Sponge being strapped on.

be continued if there is lymphatic blockage. As we have said before, all legs following deep phlebitis are prone to ulcer formation probably as a result of the lymphatic system disturbance so that these swollen postphlebitic legs need careful support for years and maybe for life. This often becomes increasingly important if they show a tendency to ulcer formation. Further protection for the leg can be given, especially in the case of a male patient, by having him wear a leather puttee under his trousers. We have fifteen or twenty men in New England wearing leather puttees in this manner.

They are all men who perform some type of manual labor and who have had a recurrence of ulcers due to trauma.

Incidentally, other denudations of the lower leg, not of the varicose variety, such as burns or wide, incised wounds, can be treated to advantage by this method after the active process has quieted down and granulation is beginning to take place.

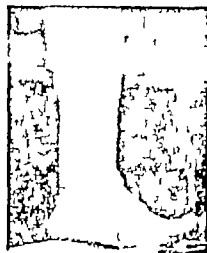


FIG. 6 The whole covered with a supporting bandage.

We see all healed ulcer cases on an average, every three months, whether they need treatment or not, as many tender pigmented areas have served as forewarnings of trouble, and preventive measures have been instituted early enough to produce successful results.

The length of time required to heal an ulcer definitely depends upon its size, location, chronicity, whether complicated by lymphatic blockage, whether surrounded by much inflammatory fibrosis and induration, and on the amount of local infection in and around it. Those over or distal to the malleoli are particularly stubborn probably because of the wear and tear on the skin edges from the frequent motion of the ankle.

The success of this treatment can be judged from the fact that for nearly three years it has been a standard method in this clinic and in our private work and from the fact that the clinic ulcer cases alone have increased from ten to fifteen a week to fifty to sixty. Such numbers speak for themselves.

#### REFERENCES

1. McPheeters H. O., Merkert, C. E. and Lundblad R. A.: The mechanics of the reverse flow of blood in varicose veins as proved by blood pressure readings. *Surg. Gynec. Obst.* 85: 98-105.
2. Stitt, E. H.: *Practical Bacteriology*. Blood Work and Animal Parasitology. Philadelphia: Blakiston's Company 1930.
3. McPheeters H. O.: *Varicose Veins with Special Reference to the Injection Treatment*. Philadelphia: F. A. Davis Company 1931.

## THE TREATMENT OF PHLEBITIS\*

BY EDWARD T. WHITNEY, M.D.†

IN order to treat phlebitis properly, it is necessary to recognize the distinction between the phlebitis of non-varicose veins and that of varicose veins.

Phlebitis of the *non-varicose* variety is usually the deep phlebitis of the iliac or femoral veins and sometimes the saphenous. Homans<sup>1</sup> and others<sup>2</sup> have repeatedly shown that not only is the vein damaged but that the lymphatic system surrounding the vein has also been injured. This latter damage, however, results in obstruction or blockade of the lymphatics.<sup>2</sup> The damage is often irreparable and produces a chronic passive congestion of this system. The sign of such a congestion is a brawny edema of the lower leg, either in whole or in certain spots, notably the calf (Diagram No 1).

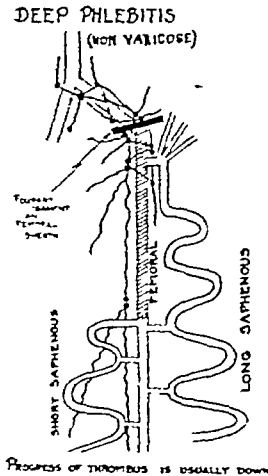


DIAGRAM NO 1 showing location of a deep phlebitis and the anatomy of related lymphatics. Note how the vessels including the lymphatic ducts pass through a bottleneck of fibrous tissue at the femoral sheath. Contracting scar tissue in this area may completely obstruct the lymphatics especially those in close relationship with the femoral vein from the knee up.

In the vein, a red thrombosis is formed.<sup>3</sup> Such a thrombosis is usually made up of blood elements with very few fibrous elements. The intima may not be entirely destroyed so that the clot may be incased within the vein wall rather than being attached everywhere to the vein wall.<sup>3</sup> Such a thrombosis may extend in the direction of the current as far as the nearest large tributary from which a rapid stream is coming and it may travel distally as far as there is any stagnant blood. It is recanalized fairly quickly in three ways, first by the natural contraction away from the vein wall of the clot itself<sup>4</sup>, secondly by solution of the clot by enzymes from the leucocytes within the

clot itself<sup>5</sup>, thirdly, by regeneration of any intima that has not been destroyed.<sup>3</sup> The end result in the vein is usually some loss of tone, some possible narrowing and some impairment of the valves.

Treatment must be based upon the principle of helping nature overcome this pathology. This is best accomplished, first, by the application of heat and rest in bed and later by an elastic support for at least several months and perhaps for life. A surprisingly large percentage of our ulcer cases are the result of neglected resolved phlebitis of the deep variety.<sup>1, 6</sup> As a rule, however, this is because of the lymphatic system blockage. Veins are recanalized much more easily than lymphatics are remade or new anastomoses formed. Stagnant lymph lowers skin resistance and allows infection which is ordinarily saprophytic to become parasitic. The result is death of the skin and an ulcer.

In our opinion, if such a phlebitis follows an operation or a delivery, the surgeon or obstetrician should assume the responsibility for it and should supervise after-care as long as it is found to be necessary. So much for the phlebitis of the non-varicose variety.

The phlebitis in a varicose vein presents an entirely different situation. In the first place, embolus rarely occurs for the simple reason that the course of the blood stream is down rather than up. Usually, the phlebitis starts low down in the varicosity and progresses upward, stopping every now and then where the stream becomes somewhat more rapid at the junction of the varicosity and a communicating vein (Diagram No 2). The damage to the

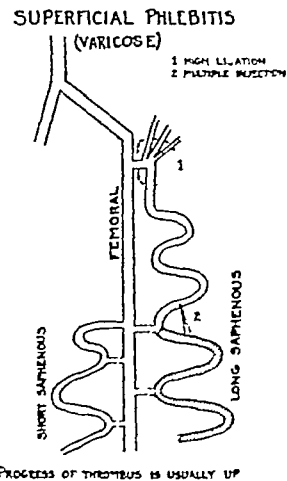


DIAGRAM NO 2 showing location of varicose vein phlebitis and areas where treatment can be instituted.

lymphatic system is not so important as it is in deep phlebitis because only some of the smaller channels, or ducts, are affected and

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anastomosis between these smaller ducts is more frequent.

Treatment in this type of phlebitis should prevent any extension of the process up the venous system, thereby confining it within the smallest space possible. There are four ways of doing this: first, by excision of the phlebitic vein<sup>1</sup>, secondly, by ligating either well above the affected area or just distal to the femoro-saphenous opening, thirdly by collapsing the varicosity by very tightly strapping two or three thicknesses of felt padding over the vein wall above the phlebitis, fourthly by injecting above the affected area<sup>2</sup>, thereby producing what Theis<sup>3</sup> calls a white thrombus. Such a thrombus is composed mostly of fibrous or organizing elements and, therefore is of a



FIGURE NO. 1. A case of varicose vein phlebitis a few days old. It is being injected in five places just above the proximal border of redness and tenderness. As the difference in color between the phlebitic area and the normal area does not appear in a photograph a crescentic line has been superimposed indicating the proximal border of the phlebitis.

more permanent nature than the red or mixed thrombus of the phlebitis. Any one of the latter three obliterations practically immobilizes the phlebitic process and causes it to quiet down within a very few days. The method of choice, where possible, is the injection as it is of a fairly permanent nature and does not necessitate any operative procedure. These patients formerly were kept in bed for from three to six or seven weeks with an icebag on the affected part, but we know now that this is not necessary, because, aside from the theoretical considerations, a great many of these patients come into the clinic with a phlebitis of many days or weeks' standing and no harm has come to them.

Having confined or put at rest the phlebitic

process, our next step should be to eliminate the underlying pathology which caused the phlebitis. This pathology consists of a chronic passive congestion due to varicosities and a toxic or infectious element. The chronic passive con-



FIGURE NO. 2. Same leg as in figure no. 1. After a lapse of two weeks following injection.

gestion is treated by further injection, ligation if indicated, and support, and the focus of infection whether local or distant, should be eliminated.

This method of treating phlebitis in varicose veins prevents a three to six weeks' period of total disability confines the phlebitic or infectious process to the smallest possible space, prevents chronicity or the recurrence of phlebitis after recanalization and prevents future ulceration.

#### REFERENCES

1. Homans J. A. A Textbook of Surgery. Springfield: Charles C. Thomas, 1931.
2. Nelson Loose-Leaf Living Surgery. New York: Thomas Nelson & Sons, 1925.
3. The operative treatment of varicose veins and ulcers based upon a classification of these lesions. *Surg. Gynec. Obst.* 22: 143, 1916.
4. Thrombophlebitis of the lower extremities. *Ann. Surg.* 87: 641 (May) 1918.
5. Matar, R. L. The surgical treatment of elephantiasis and elephantoid states dependent upon chronic obstruction of the lymphatic and venous channels. *Am. J. Trop. Dis.* 15: 40, 1918.
6. Theis, F. V. Basis for recurrence of varices in the various forms of thrombophlebitis. *Ann. Surg.* 83: 82, 1922.
7. Boyd, William. *Surgical Pathology*. Philadelphia: W. B. Saunders Company, 1916.
8. Frazer, C. H. Thrombosis, embolism, erysipelas, and tetanus. *Keen's Surgery* 6: 61, 1913.
9. Trout, H. H. Ulcers due to varicose veins and lymphatic blockage. *Arch. Surg.* 17: 2281, 1922.
10. McPheeters, H. P., Merkitt, C. E., and Lundblad, R. A. The mechanics of the reverse flow of blood in varicose veins as proved by blood pressure readings. *Surg. Gynec. Obst.* 28: 298, 1919.
11. O'Neil, R. F. Thrombophlebitis in varicose veins. *New Eng. J. Med.* 204: 1293 (June 18) 1931.

## HIGH LIGATION IN THE TREATMENT OF VARICOSE VEINS\*

BY WALTER S. LEVENSON, M.D.†

A FEW years ago the injection treatment of varicose veins became popular in this country. Its popularity was due in a great measure to the fact that a conservative ambulatory procedure was offered in place of a radical surgical operation, necessitating hospitalization and disability. We shared this wave of popularity and enthusiastically entertained visions of relieving a great mass of patients suffering from varicose veins who, for one reason or another, could not absent themselves from their occupations, and who had for years received palliation by numberless procedures. Aside from these considerations, we felt that reports from other clinics here and abroad showed results at least as satisfactory as those to be hoped for by surgery. As time went on, it became quite obvious in our own clinic, as well as in others, that in a certain percentage of cases permanent results were not being obtained, and that patients were returning to the clinic for treatments over a surprisingly long period. Various sclerosing agents and various techniques were used, but it became quite apparent that more radical measures were indicated.

Mindful of the suggestions of De Takats and McPheeters and others, we decided to combine with injection treatment the high ligation of the saphenous vein in selected cases. At the same time, a series of cases was to be treated by the multiple injection method, discussed elsewhere. It was felt that because of the hydrostatic pressure continuously present in the saphenous vein, particularly in the thigh, sometimes injection in those large varices did not work to their best advantage, and that apparently well thrombosed veins recanalized and small branches dilated in from three months to a year.

Therefore, patients with saphenous veins with incompetent valves, but with competent perforating veins, were selected for ligation. New patients and patients who had been previously injected were included.

### TECHNIQUE

Under the usual aseptic technique, infiltration anesthesia with one per cent novocaine solution is obtained. Usually not more than ten to fifteen cc is necessary. An incision is made about two inches long, two fingers below and parallel to the inguinal ligament with the center over the saphenous vein where it dips through the fossa ovalis. The junction of the saphenous vein and the femoral vein is exposed and the saphenous vein held up by means of a tape moistened in saline solution. Three or four tributaries which are usually constant are isolated and doubly ligated with fine silk and cut between the ligatures. Directly at the junction of the saphenous vein and the femoral vein, the saphenous vein is doubly ligated with number 6 black silk. The saphenous vein is then clamped across distal to these ligatures and transected between the ligatures and the clamp. At this point, the distal segment of the saphenous vein can be injected with ten to thirty cc. of a mixture of dextrose and sodium chloride. After the injection, the saphenous vein is ligated with silk below the clamp and a segment of vein about one-half inch long is removed. The subcutaneous structures are approximated with fine, plain catgut and the skin with interrupted dermol or clips. A collodion dressing is applied and compressed with adhesive plaster and flat gauze sponges. In twenty-four hours the patient is allowed up out of bed and usually goes home in about four to five hours after that, making a total hospital stay after operation of about thirty hours. Ace bandages are applied to the extremity, and the patient is seen again in the clinic in about three days.

Surprisingly little pain is complained of by these patients postoperatively, if no injection is made at the time of operation. At most, only moderate pain is noted if injection of the lower segment is carried out as described above. It is satisfying to observe that even after this operative procedure has been carried out without injection of the saphenous vein in the thigh, a vein which previous to operation was easily palpable is difficult to find, indicating that the back pressure has been controlled. About one week after operation, injections are started again according to our accepted techniques.

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THE MULTIPLE INJECTION METHOD OF  
TREATING VARICOSE VEINS\*

BY S. SEYMOUR HORLICK, M.D.†

BY the multiple injection method we refer to the procedure described by McPheeters<sup>1</sup> in his book "Varicose Veins." This method has as its basis the injection of a sclerosing solution into many points along the course of varicose veins, at a single sitting, to produce massive obliteration of their lumina. The advantages in using this method are primarily to reduce time over which treatment is necessary and, secondarily to make for more efficient obliteration of these pathologic veins.

Statistical data as to the length of time over which treatment is given are lacking in the literature of varicose veins. Faxon's<sup>2</sup> carefully prepared report of 314 cases at the Massachusetts General Hospital shows an average of about seven injections per patient, with two or three injections per visit. This particular report shows sixty three per cent recurrence. From our experience, the number of injections would account in good part for the large percentage of recurrence. It is almost inconceivable that one can obliterate the entire system of varicose veins with an average of seven injections.

From our observation of the other clinics in Boston, we find that the patient makes periodic visits spaced from one to four weeks and, usually, then receives only a single injection and that into the most prominent, or most easily found, varicose vein. At the next visit, the treatment may have no relation to the preceding one and this haphazard method is pursued until the patient no longer returns because he is either tired of so many injections or satisfied since the most noticeable veins have disappeared. We found certain patients who had returned at intervals for five years and were still being treated. This makes us feel that a definite plan of procedure should be mapped out at the first visit and carried out to its completion as promptly as possible.

Theoretically, there is only one absolute contraindication to the injection treatment. That is inadequacy of the deep circulation. There are, however, more contraindications to the use of multiple injections. From a routine examination, one may find that the patient has diabetes, in which case sugar solutions should not be used. The patient may have nephritis, in which case concentrated salines should not be injected in large amounts. Patients with heart disease are often benefited by obliteration

of their varicose veins but as a rule should not be subjected to multiple injections because the treatment is a long one, one-half hour or more, and may tire them excessively. The treatment is further contraindicated in neurotic patients because of cramps and venitis, which is often incident to good obliteration. Also in cases of active phlebitis of infectious origin. It has aptly been stated<sup>3</sup> "Never treat any patient with varicose veins by the injection method so radically, completely or extensively that she will be incapacitated or bedridden, for, in so doing, one great advantage, that of being an ambulatory treatment, is lost."

Given a patient suitable for multiple injections, the technique is not difficult, but it requires considerable attention to details. An assistant greatly facilitates the work. The time consumed at each visit is necessarily long but the results compensate for it.

Our technique is that described by McPheeters<sup>1</sup> except for a few minor variations. Briefly it is as follows. The patient is placed in an erect position and the points where injections are to be made are marked with mercurochrome solution or tincture of iodine so that one may know where to inject when the veins are subsequently collapsed. The patient lies down and the extremity to be treated is elevated and stripped of blood. Two tourniquets are applied about six to eight inches apart, starting at the foot or ankle. These must not be applied so tightly as to cut off the deep circulation, for serious trouble might ensue from the sclerosing solution finding its way to a corresponding segment of the deep circulation. After this, the leg is lowered and the points previously marked are injected between the tourniquets with the solution to be used. Pads of gauze are strapped over each puncture wound. This done, the distal of the two tourniquets is removed and the leg again elevated and stripped of blood. The tourniquet previously removed is then applied about six to eight inches above the one left in place and the leg lowered. This segment is then injected as was the lower one. This procedure is followed up the leg and thigh until the veins are injected to the groin. The most proximal of the tourniquets is left in place and the whole extremity is firmly and evenly bandaged from toes to groin. The ace or elastoplast bandage is ideal for this purpose. In our clinic because the cost of these latter is prohibitive, we use sheet wadding and ordinary bandage with satisfactory results. When the bandage is applied the tourniquet is removed. By this means the veins have been injected while collapsed and have been kept collapsed, as near

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ly as possible, by the bandage. The resulting thrombus will thus be smaller in diameter. It is advisable to keep the bandage in place until the next visit to the clinic. At the ensuing visit, small varicose veins, so-called "pick-ups", missed at first, may be individually injected without the use of tourniquets. If the veins of both legs were varicose and only one done at the first visit, the other may be done at the same time as the "pick-ups".

It is important to obliterate the internal saphenous vein thoroughly. This may frequently be found, when not palpable or seen, by the technique described by McPheeters<sup>4</sup>, the so-called "percussion pulse transmitted". This is obtained by percussing a distended loop in the calf or lower thigh with one hand while the other is held flat over the location of the internal saphenous vein. A distinct fluid wave is produced within the vein which is felt by the palpating hand.

A vein, size 3\* or 4\* in McPheeters' classification, when treated by single injection while distended, will more readily recanalize than the same vein collapsed. In general, it may be stated that the greater the diameter and the shorter the length of the thrombus, the greater will be the probability of recanalization. This is due to pressure created by the weight of a column of blood above the thrombus. If the whole column of blood was thrombosed at the same time in a collapsed system of veins, recanalization is lessened because the thrombus would be narrower, more extensive and, therefore, more resistant to the back pressure.

The patients chosen for multiple injections in our clinic have been those with extensive varicose veins, who showed no signs of heart or kidney disease, active phlebitis or neurosis. Many of those who were barred may well have been treated had it not been for the limitations of facilities for handling large numbers of long treatment cases.

The solutions used in our series of cases were twenty per cent sodium chloride, five per cent sodium morrhuate and seventy-five per cent invert sugar. Needless to say, sclerosing solutions that are toxic in moderate or large dosage, such as quinine hydrochloride and urethane, or the salicylates, must not be used. Quinine hydrochloride and urethane has been used for injecting the "pick-up" veins missed at the multiple treatment. We found that ten cc of sodium morrhuate in one fourth to one half cc dosage at each point is suitable for the average case. In more severe cases we supplement this with twenty per cent sodium chloride solution. The

latter solution gives an excellent firm thrombus but, because of the severe cramps it causes, we prefer the sodium morrhuate. We have not seen toxic manifestations from this large amount of the morrhuate solution. None of these solutions will produce a slough if the technique is properly executed, and *any of them may produce a slough* if the solution finds its way outside the vein lumen.

One point not sufficiently recognized should here be emphasized. The destructive action of the sclerosing solution on the vein wall continues as long as the solution is in contact with it. The longer the action, the greater the destruction. Hence, it is important to keep the solution localized in a segment of vein just long enough to produce damage to the intima and not erosion through it to destroy the thinned-out media. It is in these cases that one sees severe perivenitis and slough, even though the surgeon was certain he was within the vein.

It is gratifying to note that patients who receive multiple injections suffered less post-injection discomfort. This is probably due to the support afforded by the bandage. Cosmetically the results are superior to those produced by the single injection method.

In an attempt to compare the duration of time consumed in treating patients by the single and multiple injection method, fifty cases of the former, picked at random from the records of the vein clinic of the Boston Dispensary, have been classified. Those records which showed the patients to have advanced myocardial disease, nephritis in any form, neurosis or active phlebitis were excluded. Fifty-one consecutive cases, treated both privately and in the Boston Dispensary Clinic by the multiple injection method, were similarly classified. The private cases were treated by the same technique, with the same solutions and by the same operator as were the clinic patients. Only those records were analyzed which showed that the patient was discharged except for follow-up.

From this analysis, the average patient by the single method received 19.52 injections at 21.76 visits, covering a span of 82.22 weeks. By the multiple injection method, it was found that the patient did receive an average of 44.11 injections at 4.76 visits, covering 4.17 weeks.

In this series of fifty-one cases treated by multiple injections, there were four recurrences and only in those who showed a double Trendelenburg. Patient No. 5 of the Multiple Schedule showed slight recurrence in twelve months. Patient No. 8 showed recurrence in sixteen months. Patient No. 25 showed slight recurrence after twelve months. Patient No. 51 showed slight recurrence after eight months. Excluding three patients who had not received follow-up examinations, the recurrence rate is 8.33 per cent.

\*McPheeters' Classification of Veins  
Size 1.  $\frac{1}{4}$  centimeter in diameter  
Size 2.  $\frac{1}{2}$  to 1 centimeter in diameter  
Size 3.  $1\frac{1}{2}$  to 2 centimeters in diameter  
Size 4.  $2\frac{1}{2}$  to 3 centimeters in diameter

SINGLE INJECTION SCHEDULE						MULTIPLE INJECTION SCHEDULE					
Case No	Age	Sex	No Injections	No Visits	Duration in Weeks	Case No	Age	Sex	No. Injections	No Visits	Duration in Weeks
1	47	F	10	10	28	1	54	F	45	4	3
2	37	F	15	15	32	2	50	M	56	5	3
3	53	F	8	8	40	3	43	F	26	2	1
4	36	F	24	23	42	4	25	F	35	3	3
5	40	M	7	8	9	5	36	F	64	5	4
6	44	F	33	24	55	6	29	M	32	2	1
7	47	F	14	14	68	7	64	F	81	7	8
8	49	F	9	10	*8	8	51	F	35	3	4
9	43	F	27	27	100	9	25	F	20	2	2
10	47	M	10	11	60	10	49	M	51	4	3
11	34	F	27	27	104	11	47	F	47	6	4
12	52	M	35	36	150	12	30	F	24	2	1
13	44	F	8	8	20	13	69	F	134	11	8
14	37	F	18	19	64	14	42	M	50	6	4
15	56	M	48	55	160	15	51	F	58	5	4
16	45	F	98	123	1+	16	64	F	44	4	4
17	45	F	46	46	154	17	77	M	43	3	2
18	26	F	27	28	10	18	28	F	66	7	5
19	37	F	33	38	162	19	37	F	81	10	12
20	54	F	5	7	40	20	64	F	36	3	2
21	62	M	20	29	144	21	51	F	30	4	3
2*	54	F	30	38	214	22	57	F	36	4	3
23	46	M	5	6	88	23	61	M	44	6	6
24	31	F	25	28	17	24	43	M	24	2	1
25	34	F	3	4	156	25	63	F	44	6	4
26	30	F	9	10	169	26	47	F	46	6	4
27	53	F	4	4	104	27	54	M	34	3	2
28	47	F	15	15	56	28	39	F	28	2	1
29	50	F	5	5	36	29	56	F	54	4	3
30	60	M	12	12	44	30	54	F	61	5	6
31	39	F	5	5	36	31	62	F	44	4	4
32	74	F	3	2	12	32	64	F	35	3	2
33	68	F	4	4	14	33	62	F	70	6	5
34	50	F	10	10	36	34	58	F	40	4	6
35	35	F	3	3	15	35	35	F	44	5	4
36	44	F	30	39	230	36	56	F	46	5	4
37	89	F	13	15	44	37	20	M	23	2	1
38	50	F	23	24	40	38	45	F	70	6	7
39	64	F	16	16	54	39	58	M	54	5	4
40	24	F	12	13	62	40	53	F	34	3	3
41	16	M	4	4	24	41	62	F	30	3	2
42	30	F	14	14	42	42	80	F	21	2	1
43	39	F	10	10	76	43	50	F	40	4	4
44	46	F	118	127	324	44	69	F	66	8	8
45	64	F	12	12	34	45	52	F	52	9	11
46	45	M	16	18	74	46	67	M	29	4	3
47	44	F	30	38	100	47	33	F	23	3	4
48	50	M	10	10	42	48	40	F	24	3	9
49	60	F	15	15	50	49	50	F	15	8	8
50	54	M	14	14	74	50	48	F	28	6	5
						51.	55	F	31	9	8
Averages	45.53	M 22% F 78%	19.52	21.76	82.22	Averages	50.47	M 21.56% F 78.44%	44.11	4.76	4.17

It should be remembered that the cases here reported were a selected group. They were, in the main part, advanced cases of varicose veins. We should like to examine and report the rate of recurrence in these same patients three to five years hence. The results obtained up to the present, however, are extremely gratifying.

## REFERENCES

1. McPheters, H. O. Varicose Veins with Special Reference to the Injection Treatment. Philadelphia: F. A. Davis Company, 1931.
2. Faxon, H. H. End results in the injection treatment of varicose veins. New Eng. J. Med. 203: 257 (Feb. 16) 1932.
3. Source Unknown.
4. McPheters, H. O., Merkert, C. E., and Lundblad, R. A. Causes of failure in injection treatment of varicose veins. J. A. M. A. 86: 1114 (April 4) 1925.



## NEW ENGLAND SURGICAL SOCIETY

PERSONAL EXPERIENCES WITH TUMOR OF  
THE BLADDER\*

BY J DELLINGER BARNEY, M D †

THE literature of tumor of the bladder is already extensive and is growing rapidly. Many studies have been made of large series of cases, the largest and most recent being that collected and analyzed by the Carcinoma Registry of the American Urological Association (*J Urol* 31 423 [April] 1934). The conclusion of most urologists of experience is essentially the same, namely that recurrence, no matter what the treatment, is very frequent, that five-year cures are relatively few in number (15 to 30 per cent), and that there is a high operative mortality. A further point of agreement, perhaps one of the most important is that it is uncommon to see a case in its earliest and therefore most favorable stage.

In view of all this I do not feel that what I shall have to say will contribute anything new or strikingly different from what has already been reported. I do feel, however, that an experience of about twenty-five years with a series of some 250 cases enables me to express an opinion on certain aspects of the question.

Although this is to be by no means a statistical study, a few figures must be given to impress certain old truths upon you. That tumors of the bladder are seen infrequently even by the urologist is shown by the fact that they comprise only about three per cent of all urological cases. Most are seen first by the family doctor, by the internist, or by the general surgeon. I have already stated that it is common experience to find many of these patients with well-advanced cancer before they are finally seen. It is important, therefore, to consider the possibility of improving on this situation. It is not unfair to say that the blame for delay rests partly on the doctor and partly on the patient. To anticipate a little let me say that all studies of such cases show that hematuria, gross or microscopic, intermittent or constant, is the initial and presenting symptom in about eighty per cent. It is also important to know that in various studies of cases of hematuria as a symptom, malignant disease of some part of the urinary tract is responsible in about seventy-five per cent. It follows not only that we must be constantly on the watch for blood in the urine, but also that we must advise the patient to have the source of bleeding investigated. In the event of microscopic

blood, involving as it does for its discovery a careful microscopic examination of the sediment, it is not enough to attribute it to a "cold" or a "strain" or some such unlikely cause. We must bear in mind its possible significance, thereby giving the patient the unquestionable advantage of early interference with a situation fraught with disastrous possibilities. Too often are all concerned lulled into a sense of false security by the fact that the bleeding stops after the administration of medicine, or by a period of rest. Experience shows clearly that the bleeding from bladder tumor is very frequently intermittent, and will let up spontaneously for a greater or less length of time. Not only this but there is no drug yet discovered which will influence hematuria favorably. The physician however is handicapped by the fact that the patient may not realize that there is blood in the urine, even sometimes in considerable quantity, therefore and quite naturally not seeking advice. It is also a fact that human nature, being what it is, many patients shrink from consulting the doctor because of their fear of being hurt or of being told some unpleasant news. The situation is difficult, and the only solution I can suggest is (a) more widespread use of the annual or semi-annual routine physical examination, and (b) more frequent and more forceful spread of the facts before both the profession and the laity.

Many other writers have shown the apparently unnecessary delay in making the diagnosis in tumors of the bladder. In my own cases sixty-six patients said they had had symptoms, consisting not alone of hematuria, but also of dysuria, frequency, loss of weight, et cetera, lasting anywhere from one to twenty years, in a smaller number symptoms had been noted for many months. In a series of 902 cases reviewed by the Carcinoma Registry of the American Urological Association, a diagnosis based on complete examination was made within one month from the beginning of symptoms in only 10.8 per cent, while in 48.3 per cent the diagnosis was delayed for more than a year. Such a situation would appear to be wholly unnecessary in view of the diagnostic and therapeutic attainments of today. Let us all work together for its improvement.

But there are other symptoms, almost as common, which, together with hematuria, characterize tumor of the bladder. I refer to frequency of urination, occurring in over seventy per cent of my cases, and dysuria, found in over

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forty per cent. We have, therefore a very definite diagnostic triad, with hematuria forming the largest leg, on which to base a probable diagnosis, and one which can be confirmed sometimes by abdominal examination, more often by rectal or vaginal examination, and always by cystoscopic study. As a matter of fact in my own series of 250 cases, rectal examination in the male was suggestive or definitely indicative of tumor by way of induration, nodularity or thickening in forty six per cent, vaginal examination yielded similarly positive findings in forty four per cent. In this connection it is also desirable to emphasize the importance of bimanual examination, either rectal or vaginal as in twenty nine per cent of my cases thus showed evidences of a mass in the bladder.

In the series of 902 cases already referred to loss of weight was noted in 251 or 27.8 per cent, and gastro-intestinal symptoms in 128 or 14.1 per cent.

The hematuria, gross or microscopic of bladder tumor is frequently referred to as a 'painless hematuria.' And so it is in many instances especially in the early stages of the disease. When found it is almost pathognomonic. But we have also seen that it is accompanied in many cases by other significant symptoms, the natural history of which I would like to dwell upon for a moment. It is easy to see how such a highly vascular structure, often rapidly growing, as a bladder tumor should bleed. Frequency and dysuria are the natural sequences being induced by necrosis of the growth with subsequent infection, which involves not only the neoplasm but the bladder as well. This condition is shown by the fact that not only blood but also pus and albumin are found in more than half of any group of cases.

That the bladder symptoms are probably induced not only by infection, but also by the position of the tumor is demonstrated by the fact that these tumors originate in the trigonum in from one-quarter to one-third of the cases, and on the lateral walls and bladder neck in from one third to one-half of the cases. That the position of the tumor near or actually within what one might call in rough language the "business end" of the bladder is an important contributing factor to the disturbance of urinary function, is shown by the fact that in those rather infrequent instances where the neoplasm is in the vault of the bladder (about 75 per cent), urinary symptoms, even hematuria, are far less conspicuous until the disease is well advanced.

From what has gone before it is now possible to see why we find loss of weight and gastrointestinal disturbances so frequent a factor in these cases. Long-continued hematuria, interspersed with exacerbations of sometimes marked severity, together with infection are factors sufficiently important. But in addition

to this we have another element and that is kidney damage. That this is not infrequent has long been recognized, more especially in recent years, since the advent of intravenous pyelography. By this method of investigation one can readily establish not only its presence, but also its extent, and whether one or both kidneys share in the destructive process. Not only is renal involvement demonstrated in this way, but it is also shown by the fact that the nonprotein nitrogen or urea nitrogen figure is abnormally high in the great majority of cases. In the 902 cases already mentioned the blood chemistry was investigated in 546. In 472 the results were indicative of serious kidney damage sometimes excessive. Further evidence of renal impairment is borne out by autopsy observations. In the series mentioned there were seventy nine postmortems of which twenty-six showed infection or dilatation or both of one or both kidneys and ureters. As additional evidence I cite the statement by Smith and Mintz (*Am J Surg* 20 55 [April] 1933) that in "86 cases in which the condition of the kidneys was shown at autopsy, both kidneys were normal in but nine."

Various factors contribute to this destruction of the upper urinary tract. That actual obstruction of the ureter by the pressure or actual invasion of the growth is a factor is shown by the fact that it was found in eleven of the seventy nine autopsies referred to. Where actual mechanical obstruction cannot be found the changes may well be induced by severe infection, by obstructing lesions at the bladder neck, and by cicatrization both of the latter conditions sometimes resulting from the operation.

Here therefore is a partial explanation of a high operative mortality thirty per cent or more. Other factors in the order of their frequency are circulatory accidents, pneumonia, peritonitis, shock and sepsis. Before proceeding to the next phase of this problem I can only emphasize again the enormous importance of an early diagnosis if we are to enable the patient to escape the disasters which are bound to overtake him if he waits long enough. Delay in the recognition of these tumors is a prime factor in this very high operative mortality.

Throughout my remarks I have referred to "tumors" of the bladder, meaning by this carcinoma. I think it is generally accepted that all epithelial tumors of the bladder are at least potentially malignant, regardless of their apparently benign appearance under the microscope. Although these are classified as Grade I, II, III, or IV according to their content of differentiated and undifferentiated epithelium, experience shows that the grade of malignancy by this classification seems to bear no definite relation to their tendency to metastasize. It seems to be a fact, however, that cancer of the vault of the

bladder is generally of a higher grade of malignancy than that elsewhere. For this reason and because through lack of symptoms they are apt to be well advanced when discovered, the prognosis is less favorable than for those in other parts of the bladder. It also seems to be a fact that the papillary type of carcinoma is far less likely to form metastases than the squamous type. Furthermore experience shows that while "less than half of the tumors" in the trigone, bladder neck and lateral walls are "highly malignant", seventy-five per cent of those in the vault show the higher grades of malignancy. Still another point to be emphasized is that while about one-third of all bladder tumors are multiple and that only about one out of three of these is highly malignant, almost one-half of the single tumors (these constituting about two-thirds of any given series) are of grades III or IV.

In this connection and before proceeding to other phases of this important subject, it is worthy of note that in the series of 902 cases studied by the Carcinoma Registry nearly half of the tumors had attained a diameter of more than 5 cm when they were first observed. Here again is an indication of delay in their recognition, for to reach such a size the tumor must have existed over a considerable period of time. This, together with the fact that experience has shown that the results in tumors of less than 2 cm are much more favorable, offers still another argument for prompt diagnosis and early intervention.

Although it has generally been believed that bladder tumors metastasize infrequently or only late in the disease, autopsy observations and recent intensive studies by various authorities show that metastases occur in at least ten per cent of cases. In a series of thirty-four autopsies reported by Smith and Mintz, metastases were found sixteen times (47 per cent). We do not yet know the entire story, for even the relatively few who come to autopsy can be so thoroughly examined as to be sure that no metastases exist. These deposits are found far more frequently in the bones than elsewhere, with the lungs, regional lymph nodes, liver, retroperitoneal nodes and peritoneum next in order of frequency. Nor is it impossible to exclude metastases, even though the tumor of the bladder has at least been temporarily eradicated. A patient of mine, a physician, died of metastatic cancer of the brain some months after his third operation for cancer of the bladder and when a recent cystoscopy showed no evidence of recurrence.

Treatment of cancer of the bladder resolves itself into five categories. A very few small lesions, sometimes accidentally discovered, of the pedunculated and so-called benign epithelial group can be cured by fulguration through the

cystoscope. These may be or may become multiple. I have had several of these definitely cured as shown by the elapse of more than five years without recurrence. Only recently however I saw a woman whose tumor I fulgurated five years ago, and who now, after complete freedom from neoplasm, has developed two small growths similar to those first seen.

In very unusual instances a sessile or infiltrating growth of small size (not over 1 cm in diameter) and in a readily accessible position may be cured by the cystoscopic implantation into its base of one, two or three radon seeds. Although I have had a few such cases result favorably to date, I feel it is justifiable to advise an operation as offering greater chance of permanent cure.

The external application of roentgen rays has been tried in certain cases both as a therapeutic measure and as a preoperative procedure with the idea that it will retard growth and by the production of a fibrosis make metastases at least by way of the lymph channels less likely. While the last word has not yet been said on this method of treatment, I think it is of little value and should be abandoned unless as a last and sole resort. It is, however, of considerable value in relieving the distressing cystitis of advanced cases, and the pain produced by metastases.

Wide resection of the growth with ample margins of healthy tissue is, when possible, the best method of removal. It does, however, result in a mortality of about thirty per cent and cannot be applied in those cases where the tumor is located in the trigone, bladder neck or low lateral wall.

Fulguration, by which I mean removal of the growth with the cautery loop, with or without the implantation of radium seeds in the base, carries a somewhat lower mortality but gives no greater prospect of cure than resection. This method of treatment is peculiarly suited to those tumors which are found in situations not suited for wide resection and which we have seen form the bulk of the cases.

The highest mortality (about 40 per cent) seems to occur where chief reliance is placed on the implantation of radium seeds in large numbers and where only that portion of the tumor which protrudes above the level of the bladder mucosa can be removed by cautery loop or knife. Here we have various factors contributing to the mortality among which toxemia both from radium necrosis and from sepsis are the most important. Not only this but even if the patient does not die, he may be made wretched by the severity and long duration of the radium burns.

As a matter of fact the final results do not seem to be better by one method of treatment than another, and in approaching a case the surgeon must be prepared to make use of any

or all of the procedures touched upon. When we realize that a recurrence of nearly fifty per cent takes place after any form of treatment, that only about one-third of the cases treated survive for five years or more, and that there is an operative mortality of over thirty per cent, we realize that a very real problem confronts us. Because of this we must give it our most serious thought. Not infrequently the most unfavorable sort of a case will turn out most satisfactorily, on the other hand what seems to be a more easily controlled tumor will prove to be of the most vicious variety.

Before closing I wish to say a word about total cystectomy which, theoretically speaking, should offer a satisfactory solution of our problem. But like all other apparently good things it has its drawbacks. Even in the supposedly favorable case there may be undemonstrable metastases. Then, too, when we say cystectomy we mean also one or two additional preliminary and major operations for the diversion of the

urinary stream. Having survived these ordeals removal of the bladder itself may tip the scales, coming as it does in the footsteps of other surgical procedures of real magnitude. In spite of this I think we are all convinced that it offers the only definite hope of cure in certain carefully selected cases. After all, the patient will surely die if he is not cured of cancer, and in the process will drag out a most wretched existence. Should we not therefore give him all the chance that surgery offers to obtain definite and permanent relief?

The length of time required and difficulties encountered in the follow up of patients, whether private or hospital cases, is well known. While this undertaking has been begun it is by no means complete. Not only this but it involves a good deal more than a mere statement as to how long a patient lived after operation. This aspect of the subject will therefore be dealt with at a later time in another communication.

## NEW HAMPSHIRE MEDICAL SOCIETY

### PRESIDENT'S ADDRESS\*

BY FREDERICK P. LORD, M.D.†

ONE of the temptations of an occasion like this, where opportunity is given me or is forced upon me, to talk before the members of this Society with no discussion to follow, is to get rid of any wild and pet ideas which I may be harboring. There is no lack of such of course, on my part, but I have decided to resist this special manner of suicide.

The logical procedure would be for me to talk about the one thing concerning which I may be supposed to speak with some authority. As I thought of you listening to a long paper on some anatomical subject, in which I should be enthusiastically interested, I tried to picture your state of mind, feeling you were brought back again to your medical school days. I feared I should need to ask to have the doors locked before I could finish the paper.

Then there is the perennial subject, a vitally important one, to which you have frequently listened at this annual meeting and elsewhere, The Socialization of Medicine. Certainly I have my own ideas on the subject, and here is a chance to recount them. But can I give you anything really vital and conclusive on this highly debatable subject, concerning which an eminent authority is going to speak to you later? I am inclined to think that I may even

receive your thanks if I do not venture on this broad field at this time.

The experiences of the recent years during which I have had considerable to do with this Society, and especially for this past year, as I have met with various committees, visited many of the county societies and tried to understand the problems and questions that have come up for consideration, have caused me to ponder about this Society, its organization, its membership, its history, its past policies, its present trend and its future course.

Historically it is an old institution, dating back almost to the year of the signing of the Constitution of this country, and thus it possesses the strength, and perhaps the weakness, of such a tradition.

In size it is small, as such societies run, with less than five hundred members on its roster. We live in a rather sparsely settled and agricultural region, having but few cities, none of them of any great size. I presume that the average doctor works in a place where there are no more than two other doctors close at hand, and it is only occasionally that he sees other medical men than those in his own town. The time and opportunity for such practitioners to meet other doctors, with whom to discuss medical matters, give and receive ideas with respect to their profession, are not very common. Most of them have to be decidedly sufficient unto themselves, and they must carry on

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largely on their own momentum, so to speak. Vacations are not frequent or long and are often nonexistent, it is hard to get away from their patients, and for one reason or another they rarely close the office door for more than an occasional day off. Such a life leads to a very real sense of responsibility to their work and their patients, and it also tends to make the doctors somewhat individualistic, relying upon their own efforts, their own judgments and their own ideas and information.

With this background this Society's membership is naturally a more or less loosely bound organization, meeting as a whole but once a year, and in its county units, often not more than twice. Unlike a Rotary Club, for example, which meets every week, it is not reasonable to expect that our smaller groups or the whole Society would be as unified or as active in its functions or policies as the former. And men so occupied with their exacting and arduous daily life, seldom have an opportunity to work shoulder to shoulder with men of their own special interests and training and do not naturally make these rare gatherings a vital factor in their existence. Time is not offered for the exchange of ideas, the formulation of policies, opportunity is not available for ironing out individual differences or making reasonable compromises toward some special end, all of which are necessary for any creative and cooperative results.

The organization of this body, due to its size, and to the few opportunities for assembling, has necessarily been so devised that the greater part of its legislative and deliberative functions is carried out by a group of about thirty men, elected representatives from each local group. Such functions cannot be carried out by a sort of town meeting among several hundred members gathering once a year. The executive work is done by a few special officers and a considerable number of committees. Information of what is done by the House of Delegates and by the special officers and committees is given out by an annual report, issued a year after the meeting has taken place, by monthly publication in a medical journal and at times may be given by special bulletins from the Secretary.

The long history, the character of our membership, and the type of organization of this Society, it seems to me, tend to make it difficult for timely, effective and speedy action where such action may be needed. Also it is not reasonable to expect that such a body would be highly efficient in bringing about a common attitude or its expression on any particular subject.

What the situation has been in the past in this regard is a fair question to ask. Our one gathering each year, such as the present occasion, brings us together to hear a splendid med-

ical program, which we all enjoy, and from which we profit professionally, there is no doubt of that.

Our legislative body meets, adjusts its constitution and by-laws, elects its officers and committees, discusses routine affairs, entertains propositions from its committees, passes resolutions, deplores this or that tendency, recommends certain procedures, some of them of decided value and importance and adjourns for a year, necessarily leaving to its committees the function of carrying out its wishes. So far as the rest of the Society is concerned this usually seems to be the end of it. Some committees meet and work conscientiously, others less so, but all are handicapped by the fact that there seems little general knowledge on the part of the members of the Society, and perhaps too little interest, in what they are trying to do. Little help from among the members seems to be available, considerable opposition seems evident in some cases, and the next year seems to begin about where things were the year before.

I question whether as a group we have not been several laps behind the rest of our State in general, whether we have not preferred to continue things as they have been, without much thought as to what are the demands and wishes of the public, their reasons therefor, whether we have not preferred to let others go ahead, against our opposition or indifference, rather than to study the matters in question, enter into the public discussion, and attempt to use our influence along the lines in which our special training and experience would naturally make us leaders.

If various projects, that have to do with things medical, have been carried on by others than ourselves and in ways which we think are unwise or improperly handled, have we been willing to accept the existing fact that these procedures are in being, and to do our part as citizens as well as specialists in bettering them? Have we been feeling that we belong to a profession which requires perhaps the most laborious and extended period of preparation of any, which carries a tremendous individual responsibility, which is more generous of its time and skill than perhaps any other, and that our position for these reasons is sacrosanct? Have we been feeling that our practices and traditions are to be left as they are, need no adaptation to a changing world, that others should accept our attitude without question, and, if they do not, we should ignore the fact and go on as ever? I ask these questions as being healthy for ourselves, for it is often well that we make examination along the lines where we feel the most secure. Sometimes it comes out under such a process that we can readjust our perspective a little and see even our familiar and accepted path under a different light.

One can easily say that a doctor who is not today carrying on medical practice is not a

suitable person to carry on such queries let alone to pass judgment on such matters. This is a natural comment to which I can only answer that my recollections of my struggles for several years in the practice of medicine are by no means forgotten, that my regular work is in teaching young men who are to make their living as practicing physicians, and that my deep interest is and always has been in my profession ever since the days when I first studied medicine. My experiences during this past year with many of the problems that have come to the practitioner have brought close to me their significance to other doctors who are making their living by active practice.

If I am painting a somber and discouraging picture of the New Hampshire Medical Society, it is not with the idea of trying to point out any personal feeling that matters are necessarily hopeless or too discouraging, but rather that I feel there are signs of a very definite improvement already along some lines and there are possibilities for much further progress. It is for this reason that I have taken the liberty to speak so frankly at the outset.

I want to say at this time that, as I have seen our organization in recent years in a sort of close-up view, I feel certain that we do not lack men, able, informed, interested and willing to work along with the rest toward an improvement of conditions, where such seem to be needed. The heterogeneity and individualism of our Society is not by any means a factor that is altogether harmful or that cannot be overcome where it is a hindrance. What then can be done and along what lines can we make further and more definite progress?

Let me call your attention to certain far-reaching tendencies that have appeared in the last few years in our Society. When this State launched its Relief Program there were many new problems and many new procedures were established, some of which were a cause for great dissatisfaction on the part of our profession. We might have allowed things to remain in that situation, individually harboring feelings of injustice, or we might have passed a resolution, letting it go at that. Instead there was instituted a committee, headed by our able president of last year, which worked hard and long over the new regulations, doing its best to point out the difficulties, to correct them as much as possible, attempting to inform the medical men of the State as to the meaning of the more vague provisions, and to explain as far as possible where explanation could be made. This committee not only acted as interpreter to our profession, but it went to the State authorities, who had the matter in charge, doing its best to alter and improve in so far as they were able to do so.

At the same time there was introduced an other new factor, namely a Special County Com-

mittee in each County Society, whose function it was to handle this problem in its details in its own province, to keep in touch with the State Committee of their Society, and at times to clean house in its own County, where evidence was forthcoming that any individual member was not following properly the regulations which the rest of us were trying to carry through.

Many mistakes were made in the administration of this new law, no one will deny that many injustices and inequalities were present, and a deal of unhappy feeling was stirred up. I am not attempting to pass judgment in any way upon Bill 417, or upon its administration in detail, even if I felt more competent to do so. That particular law is a thing of the past. What I do want to call attention to is the fact that in our relation to this law we have set up what is practically a new procedure.

During the past year this device has again been resorted to by our Society in two other similar instances, namely in regard to Child Health and to Maternity and Infancy Work of a medical nature relating to pre-school and school children and also to maternal and infant care, is being done by agencies of this State other than our own profession, agencies which we rather presumptuously call lay groups. In both cases there was formed a special committee of this Society whose function was to work with these lay officials. I might add that in one case at least such a committee from our organization was asked for by the lay body which was to carry out the work in order that they might have the benefit of the advice and help of the medical profession. It is a good guess that such a request, the desire for such cooperation, would never have occurred had it not been for the work of the Committee on State Medical Relief of the previous year.

In the hurried and state wide work on Child Health, County Society Committees were also established in each of the ten Counties, as in the case of the Welfare work, and for the same reason. The County machinery was new and not always simple to use. While in some Counties it was not availed of, in other Counties these committees were active and made real accomplishments. Again I want to state that I am not attempting here to judge the details of these procedures, but I feel that the plan helped, that there was a very real cooperation and that in the work of the Department of Education, with the aid of our Society, the task was simplified and friction was lessened by means of our new and somewhat creaky machinery.

It may well be that many or all of these State lay projects were not altogether what they might have been, the work of the various committees was not entirely satisfactory to the members themselves, or to many of the members of this

Society, the difficulties were certainly many. Nevertheless, this development on the part of the New Hampshire Medical Society of coordinating committees of this nature, to work with organizations outside our own is packed with possibilities of the greatest value to the future, both for our organization, and, I dare hope, for the public in general.

There is being brought to the attention of our members at this annual meeting a tentative plan of schedules and regulations, which it is hoped will help to carry out the administration of State Relief in the future. This plan has been worked out by our representatives in conference with the State Relief Commission and representatives of the County Commissioners. Again I do not wish to discuss here the provisions of that agreement—you will hear of them at another time—but I wish to point out that it is the result of a deliberate and careful attempt on the part of our own committee to present the case for the medical profession to the officials having this relief in charge, and an attempt on their part to meet our suggestions and advice as presented to them by active practitioners who know the history of the past two years in this matter and who are acquainted with the opinions and feelings of our profession throughout the State. This sort of co-operation, with the desire on both sides to come to a fair agreement, is inherent in this set-up, and I think we are entitled to feel that it has in it germs of real benefit to all concerned.

Although it may not be entirely satisfactory to any one—what arrangements of this sort ever can be so?—it promises well and carries with it a chance for further alterations where they may be needed. It seems to be the logical and only proper way by which such a measure can be carried along to its fitting conclusion. Where mistakes are made, where injustice is done, there exists through the machinery of the County and State Committees on Relief of our Society an opportunity to call attention to them and to have them considered on their merits, with hopes for remedy.

At this point I want to speak of what I believe is a necessary further step which we must always be ready to take, if we are to do our own part in making such a scheme successful. I think I feel as strongly as does any one here that the members of our profession as a rule are willing to do their part, as they always have in this less remunerative portion of their work, that they are intending to act fairly and to work with the machinery that is set up by the State. If there are any among us who, through misinformation or through deliberate intent, do not carry on their work fairly or who may be tempted to utilize the existing system for selfish ends, I think our organization ought to be willing to correct the one who is misinformed

and to censure or penalize the one who is remiss. If we are not willing to do this, we are not doing our part in this group with which the State is working. It means that our County and State Committees may need on occasion to use frank and direct means. I do not surmise that such situations will often arise, but when they do we should be ready to do our part.

The benefits of this procedure where the two parties concerned, the State or lay group and this profession, have gone over the ground together is shown in the recognition of certain factors concerning which there has been much said during the past two years. As regards Welfare for example, the patient, if it is an acute case, is allowed to have the privilege of choosing his own physician, he may receive the first visit without having to wait for special permission from a third party, and as an acute case he may continue with his own doctor at the hospital. The physician does not have to ring up a local official when making his first call on a relief case. Reasonable fees for his work are proposed for the doctor, who in many cases of this nature would formerly have received nothing, and opportunity is offered for adjustment of fees in special cases where question arises.

These provisions represent a reasonable set-up in the care of relief cases by the doctors of this State, and they provide means for further change if, and when, such changes seem desirable. Once more, I am not trying to evaluate in detail the scheme here referred to, but I am calling attention to the fact that this Society has now in existence and actually at work machinery which has been successful to a degree, at least, and which has not as a rule been previously much used or to such good effect. This machinery is capable of further usefulness, both to institute and modify existing arrangements, and similar machinery can be set up for other and new purposes when this is needed.

How does all this bear on the future? We are all well aware that other innovations are being discussed which may affect profoundly the practice of medicine. During the past year the officers of this Society have given much consideration to these problems and have attempted to learn what is the opinion of its members. To that end there have been many meetings of the Committee on Public Relations, Public Policy and Legislation, other members, representing the Society more widely, have been called for a special meeting, discussions have been held among the County Societies, and finally it was thought that these matters were sufficiently important and imminent to call an extra session of the House of Delegates to consider these vital questions.

The officers have attempted, by special bulletins to the members, to call their attention to these problems and some of the evidence bear-

ing upon them, to record the official decisions of the House of Delegates, to interpret to the public our opinions in so far as we can interpret them, and to see that at least the public is aware of the fact that we are interested in such things and are carefully studying them. The officers realize that they are your representatives, and that, even if they should wish to move faster, they cannot rightly make any head way unless the Society as a whole moves with them. The officers are not ashamed of their intent and they have found it difficult going. The rightful interpretation of five hundred minds on burning questions is no simple thing and if your officers have made mistakes we trust you will tell them.

We may not expect that the various new proposals for Socialized Medicine, Sickness Insurance, etc., will become law, or we may feel that they will surely be in existence within a relatively short time. We may like or dislike them. We may do our best to prevent their coming into being or we may wish to expedite the process. It may be, as some have said, that it will make no difference what we think or do as to the final outcome of such measures. I am not inclined to think that this statement is entirely true.

In so far as we have a collective opinion in regard to the proposed measure of Socialized Medicine let us state these opinions and do so where it will have the greatest effect. It is not unnatural that we, as a profession should feel that in such matters we have not only a right to voice our beliefs, but that we have a definite obligation to do so as being a group who are especially and peculiarly familiar with many of the problems that arise in regard to Sickness Insurance, for example.

What further can we do? I think that what we have already done, the machinery that we have already set up and used, is the clear and self respecting answer to this question. After the preliminary stages of discussion are over and when this Country or State decides to embark upon any form of Sickness Insurance then is the time for us to give our advice and co-operation through our constituted representatives.

These representatives will work with the State authorities we certainly will make an effort to that end—attempting to use our best wisdom in helping to direct the manner in which the laws shall be carried out. Where unfairness and injury are present we can by this means have a real chance to remedy such conditions, to speak for the best interests of those who are most concerned, and to carry on our fundamental work, which is to do all we can for the better health of our patients, who are the people of this State and who I do not hesitate to say need and I hope desire our services.

I hope that this partial attempt to analyze our Society, its history, its membership and

its organization, will not be regarded as too unkind or too pessimistic. Such a backward glance seemed to me to be a necessary step in order to bring out our difficulties, and to show the means we have been utilizing to overcome so far as possible these difficulties. It points the way also to what can further be done along these lines toward keeping all of our members better informed, in closer touch with each other and with their elected officials toward the erection and maintenance of a proper organization which can cause us to be heard, and toward the use of representatives who will keep us in close and friendly touch with the other agencies with whom we may desire to work.

I do not mean that such a device should be used simply to line our own pocketbooks, although I feel it is only fair and right that our interests should be vigorously presented and worked for, but if we physicians wish that our profession be advanced, that public health be best looked after that we have an opportunity to make ourselves felt through our own organization, it is well that we examine into our own official body as carefully as we do into that of a patient, that we look into all the facts that bear on the case, make our diagnosis and be prepared to institute methods of treatment which will do the most good.

## RECENT DEATHS

**SNOW**—SAMUEL DRYDEN SNOW M.D., aged sixty five medical referee of Carroll County was found dead at his home in North Conway on September 20 1935. He had lived alone since the death of his wife, Louise (Berry) Snow last December.

Dr Snow had been a resident of North Conway for the past thirty years, going there originally as resident physician at the tuberculosis sanatorium. He graduated from the Dartmouth Medical School in 1897.

One son Dryden Snow who is educational adviser at the Glen CCC camp survives him.

**TOWLE**—GEORGE H. TOWLE, M.D., was born in Deerfield, N. H., August 7 1873 a son of Dr George H. and Pantha (Tucker) Towle. He received his early education in the Deerfield public schools and prepared for Dartmouth at Coe's Northwood Academy and Tilton School. He studied medicine at Dartmouth and later pursued his medical studies at both Bowdoin Medical School and the University of Vermont. He received his M.D. from the latter institution in 1900.

Dr Towle had practiced in Newmarket for thirty three years at the time of his death October 29 1935 and had been one of its prominent citizens. He was deeply interested in civic affairs and was a member of the Board of Selectmen. He also served as a member of the School Board which position he was holding at the time of his death.

Survivors are the widow a brother in Manchester and a sister in Deerfield.



# CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C CABOT, M.D

TRACY B MALLORY, M.D., *Editor*

CASE 21461

## PRESENTATION OF CASE

The patient, a white American girl about twenty years of age, complained of fever and abdominal discomfort

She became ill while attending a boarding school and was admitted to the school infirmary with slight fever and malaise. She improved after a few days and was permitted to resume her studies in preparation for graduation. Several days later, however, she again became ill with mild diarrhea, vague upper abdominal discomfort, occasional emesis and complete anorexia. Shortly afterward she developed weakness in both hands and feet which progressed rapidly to a point where she was unable to feed herself. She was sent home, where her temperature ranged daily between  $100^{\circ}$  and  $103^{\circ}$  and the pulse varied erratically from 90 to 130. Her gastrointestinal symptoms gradually increased in severity.

At the end of two weeks, physical examination showed a thin, pale, apprehensive girl in no apparent discomfort. There was slight puffiness of her upper eyelids. The ears were normal. The throat exhibited nothing of significance. There were no palpable nodes in the neck. The breasts were normal. Other than a few transient atelectatic râles the lungs were negative. The heart was not enlarged. A soft systolic murmur was heard along the left sternal margin. The blood pressure was 90/64. Examination of the abdomen was negative and no pelvic examination was done. There was bilateral wrist and foot drop with atrophy of the extensor muscles of these parts. The reflexes were normal. The specific reflexes elicited were not recorded.

Examination of the blood showed a red cell count of 3,500,000 to 4,000,000. The white cell count was 14,000 to 23,000. A blood smear showed moderate achromia and an apparent increase in platelets. There were 45 to 60 per cent eosinophils. A stool examination was negative for pus, blood and parasites. Blood cultures showed no growth. The spinal fluid contained two cells per cubic millimeter. There was no increase in the protein content. The globu-

lin and Wassermann tests were negative. Sections of gastrocnemius muscle were negative for trichinosis.

After six weeks the patient's fever fell by lysis but the pulse continued to range widely between 90 and 130. When she had been afebrile for two weeks she was permitted to sit upon the edge of her bed. Gentle massage was instituted for the wrist and foot drop and she was carried out-of-doors once daily. She began to gain weight and obviously became stronger. Her appetite improved although she vomited once and had a short spell of mild diarrhea. One morning she was suddenly seized with a series of convulsive attacks and died before medical attention could be obtained.

## DIFFERENTIAL DIAGNOSIS

DR ALFRED KRANES. This history suggests several possibilities, none of them too convincingly. The first thing that comes to mind, because of the symptoms of generalized infection and bilateral weakness of the hands and feet, is poliomyelitis, of course. There are, however, a number of things here that seem to be somewhat against that. In the first place, it says that she was preparing for graduation. I take it that that was some time in the spring of the year which would make it unusual for poliomyelitis, although it does occur. Secondly, she does not have any headache or pains in the extremities which we associate with poliomyelitis and which most cases do have, and then again the apparent severity of the gastrointestinal symptoms after the paralysis had developed is against it.

Another possibility is poisoning of some kind. Arsenic for instance produces a rather severe gastroenteritis and also peripheral neuritis, but we have no history for that. The onset is rather gradual and not sudden as one would expect with a case of arsenic poisoning. The peripheral neuritis of arsenic poisoning is just as much a sensory neuritis as a motor neuritis, so I think that is probably unlikely.

Can this be a paralysis or peripheral neuritis secondary to deficiency or avitaminosis which we occasionally see in cases of ulcerative colitis? I think that is exceedingly improbable because the peripheral weakness was too marked and there was not enough in the way of gastrointestinal symptoms, not enough diarrhea to account for this degree of weakness. There is nothing else that I can suggest from that history.

It would be a little more helpful if we were told something about the sensory examination. Inasmuch as that is not mentioned here and since she has no sensory symptoms I shall assume that there was no sensory impairment whatsoever. Aside from the bilateral foot and wrist drop the other important feature in that

history is the hypotension which is somewhat unusual for a girl of that age. Poliomyelitis does occasionally produce a hypotension when it involves the vasomotor center, but we have no evidence in this case of any medullary involvement. I think that is probably not the case. The hypotension of course suggests the possibility of Addison's disease. She does have gastrointestinal symptoms, weakness and hypotension but that is all there is in favor of it. There is no pigmentation. The rather rapid onset with fever and the weakness described here is not the usual type of weakness one would expect in a case of Addison's disease, so I think that is also very unlikely.

Nothing is said about the hemoglobin. Of course, the startling thing in the laboratory examination is the very striking eosinophilia. The lumbar puncture, done apparently two weeks after the onset of her illness, does not really rule out poliomyelitis. The spinal fluid might have been abnormal to start with and returned to normal but the other things I mentioned seem to make it improbable. The eosinophilia is very interesting and there are really very few diseases with which I am acquainted which will produce that striking degree of eosinophilia. The most common cause is trichinosis. I think if we knew nothing else except that the patient had 45 to 60 per cent eosinophils and made a diagnosis of trichinosis we would be right in a vast majority of cases. The other, though far more unusual cause is periarteritis nodosa and there are a number of things in this picture that such a diagnosis might explain.

This is a rather unusual story, a distinctly unusual mode of death for a girl of twenty. I do not know that I can offer any explanation for this picture but I think that in our differential diagnosis we have to keep in mind that this patient was suffering from a disease which affected her gastrointestinal tract, her neuromuscular system, possibly her cardiovascular system and which in addition produced a fever, leukocytosis and a very high eosinophilia. As far as I know there are only two diseases which are at all consistent with that clinical picture and they are trichinosis and periarteritis nodosa, one a rather common disease of known etiology which is not usually fatal and which produces this variegated picture by the dissemination of the larvae throughout the body by the blood stream, the other a rare disease of unknown etiology which produces very bizarre clinical pictures and is practically always fatal. I think I will have to confine myself to the discussion of these two possibilities. I do not know anything else that would give this picture.

Can it be periarteritis nodosa? She had gastrointestinal symptoms and central nerve involvement and this high eosinophilia. This certainly is not the usual picture of periarteritis

nodosa, if one may speak of "a usual picture" in such a rare disease. They usually have a longer course and rarely die within eight weeks as this patient did, usually from four to eight months up to a year and sometimes even longer. So that that seems to be against it. She does not have what most of the patients with periarteritis nodosa have, that is severe pain in the extremities, muscular cramps. She does have what appears to be a peripheral neuritis although we are not quite sure of that. The peripheral neuritis of periarteritis nodosa is mainly a sensory affair and rarely leads to wrist drop and motor signs. The abdominal pain of periarteritis is usually different from this, usually severe abdominal cramps and not mild discomfort and diarrhea. She has none of the urinary findings and none of the cardiovascular findings. They frequently have angina which this patient does not have. Can periarteritis produce this sudden type of death? I think it could with involvement of the cerebral blood vessels. The patient with this disease occasionally dies rather suddenly with profuse subarachnoid hemorrhage, but even with severe subarachnoid hemorrhage one would not expect the patient to die quite so rapidly. On the whole I think that diagnosis is unlikely.

Can trichinosis explain this picture? I do not see anything in there that is inconsistent with that diagnosis. This patient has a number of complaints that people with trichinosis frequently have, abdominal discomfort and diarrhea, fever, malaise and the very high eosinophilia, also puffiness of the eyelids. Is there anything there against the diagnosis of trichinosis? The one thing we usually expect our patients with trichinosis to have is rather severe pain in the extremities, just as in periarteritis, but I have seen a number of them that had no pain whatever. I can recall several who have had no pain but who were later proved to have trichinosis by biopsy and skin test. I do not think that rules it out. As a matter of fact trichinosis is picked up so very commonly when hunted for routinely at postmortem examination that the series ranges all the way from seventeen to thirty per cent in routine autopsy reports. These patients rarely present a history of trichinae infection. How about the negative biopsy? I do not think that rules it out either because we have had patients on whom the diagnosis was eventually established who have had negative biopsies. I recall one we had on the West Medical service who had four biopsies before the diagnosis was established so that a patient can have trichinosis and a negative muscle biopsy. The unusual bilateral foot and wrist drop we do not associate with trichinosis and yet there have been patients with just that symptom. One patient at the City Hospital was thought to have poliomyelitis for a while and later turned out to have trichinosis. She had bilateral wrist and foot

drop and as one reads the stories of the German epidemics this very severe muscular weakness is not uncommon in severe cases. Some of them become so severe that the patient is unable to sit up in bed not because of pain but because of very profound muscular weakness. So that I think that can fit in with trichinosis. Just what the mechanism of that weakness or paralysis is, is not very clear. Apparently it was not a real peripheral neuritis, that is the nerves themselves are not involved. It seems to be entirely a muscular affair.

If this patient did have trichinosis, how do we account for that rather sudden death? Trichinosis ordinarily does not do that. She died in a series of convulsions which leads us to think there must be some involvement of the central nervous system. Up to that time there was no indication of any involvement at all—negative spinal fluid, no reflex changes and probably no sensory changes, although I cannot be sure of that. We know that the trichinae are occasionally found in the central nervous system. They have been recovered from the cerebrospinal fluid and the brain substance itself and cases have been described where patients died of diffuse encephalitis, but there is no evidence of such a process here. Patients who die with encephalitis in the course of trichinosis usually present the picture of coma, delirium and ocular palsy, none of which this patient had. Trichinosis also produces thrombosis of the peripheral blood vessels and one wonders if it cannot do the same thing in the brain with the cerebral blood vessels and there again I must mention the fact that cases of trichinosis have been described during the course of which the patients have had hemiplegia the nature of which has not adequately been explained. But this is not the picture of cerebral thrombosis and I do not think anything will be found in the brain to account for this type of death. The usual mode of exitus in patients with trichinosis is diffuse myocarditis and we do have some evidence here that there is myocardial involvement. There is that single isolated low blood pressure. It would be extremely interesting to have more blood pressures during the convalescence of this patient. The fact that this patient had a pulse of 90 to 130 while afebrile makes one wonder about the possibility of myocardial involvement in this case. I think it also would be of interest if we had an electrocardiogram some time during the course of the disease because patients with trichinosis frequently show striking cardiographic changes which later return to normal with convalescence. I think this death could have been caused by a sudden acute myocardial failure. If the patient had trichinosis I believe it would be a logical type of death. Trichinae are frequently found in the myocardium if properly digested though not usually in microscopic sections but the myocar-

dial changes are almost always found. That is about the best explanation I have to offer.

DR TRACY B. MALLORY: We have given Dr. Kranes the compliment of a very difficult case and I think his discussion is so complete there is nothing to add.

DR JAMES H. MEANS: May I add one thing in the list of differential diagnoses? We have seen at least one very bizarre leukemia with extraordinary eosinophilia with cells that were abnormal. I think that is unlikely but I merely mention it as being worthy of the list of diagnoses to be considered.

#### DR ALFRED KRANES' DIAGNOSES

- (1) Trichinosis or
- (2) Periarteritis nodosa

#### PATHOLOGIC DIAGNOSIS

Periarteritis nodosa of the coronary arteries

#### PATHOLOGIC DISCUSSION

DR MALLORY: I am sorry Dr. Roy Wheeler is not here. This was his case and he himself did the autopsy outside the hospital and sent in some of the organs to me. The heart was normal in size, but as you looked at the surface you could see along the coronary arteries small beads one and two millimeters in diameter. These were separated by intervals of four or five millimeters of normal vessel and then another bead. In cutting through the arteries at the points of beading it was obvious that in some instances they were thrombosed, in other instances not. Microscopically the picture is absolutely typical of so-called periarteritis nodosa. The condition is really a panarteritis, the most important feature of which is necrosis of the media with the formation of mural aneurysms rather than the periarterial inflammation. A few lesions were also found in some slides of the liver. Unfortunately we did not receive specimens from the other organs, and the brain was not examined.

There is one other possibility of diagnosis in a case of this type that came to my attention within the last year from a very interesting case they had at the Faulkner Hospital with a somewhat similar history. The patient had signs of myocardial weakness with rather more pain in the muscles and rather less weakness than this patient, but some of both. He developed grossly palpable nodules along some of the arteries of the scalp. He had, like this patient, an eosinophilia of 50 per cent. I was told about the case and made of course a snap diagnosis of periarteritis nodosa and urged them to do a biopsy. They did one and the nodules from the scalp vessels proved to be perhaps the prettiest rheumatic nodules I have ever seen. The patient improved for some time and then suddenly died. Dr. Hazzard has al-

lowed me to see sections of the case and there are scattered throughout the heart very numerous Aschoff bodies. There are a few Aschoff bodies to be found in the diaphragm and in the kidney, and there are other lesions that very strongly suggest periarteritis nodosa. On the other hand the lesions of small vessels in rheumatic fever are so similar microscopically to some of the pictures in periarteritis nodosa that it would be difficult to distinguish between the two. I have been unable to make up my mind whether it is rheumatic fever plus periarteritis nodosa or whether an occasional case of atypical rheumatic fever may give that picture.

## CASE 21462

## PRESENTATION OF CASE

*First Admission* A forty six year old Finnish laborer was admitted complaining of vomiting and lack of appetite.

He had been well until twelve weeks prior to entry when he suffered from an attack of "grippe" which confined him to bed for two days. The attack consisted only of malaise but at its termination he developed an abscess in the right groin which was incised by his physician. It continued to drain purulent material for three weeks after which it healed spontaneously. He developed anorexia which was associated with nausea, occasional emesis and a sensation of light-headedness. He returned to bed shortly after his abscess was incised and remained there for nine weeks. Vomiting, which at first occurred irregularly, increased in frequency until he vomited two to three times each day. During the ten weeks before admission he developed a nocturia of two to three times. Two weeks before admission he began to vomit everything ingested. Slight swelling of the ankles appeared. There were occasional attacks of "dizziness." He became progressively weaker and developed slight dyspnea on exertion. In the three months preceding his admission his weight had dropped from 165 to 135 pounds.

He had had incision and drainage of a left inguinal abscess forty years before entry. Seventeen years later he was seen in the Outpatient Department where he presented a story of morning cough with blood tinged sputum and pain in the chest of two years' duration. Inconstant rales at the right top and slight dullness of the left were found on examination. These findings were not confirmed subsequently and the cough gradually subsided. Because of multiple caries and apical abscesses his teeth were extracted three years before entry.

Physical examination showed a well-developed but poorly nourished man with evidence of re-

cent weight loss. His skin was dry and scaling and there was fairly marked pallor of the mucous membrane. The heart was negative except for slight accentuation of the aortic second sound. The blood pressure was 110/90. There was a sharp scoliosis of the third to fifth dorsal vertebrae with a convexity to the right. The lungs were clear. The liver edge was irregular and was found to be 3 centimeters beneath the costal margin in the midclavicular line. An ill defined globular mass which moved slightly with respiration was felt in the epigastrium just above the umbilicus. (Neither the abdominal mass nor the liver edge was demonstrable at subsequent examinations.) There were recent scars in the right inguinal region and old healed scars in the left. An eczematoid eruption was observed on the right lower leg.

The temperature was 98.6°, the pulse 84. The respirations were 20.

Examination of the urine showed a specific gravity of 1.008 and a large trace of albumin. The sediment contained three to five white blood cells, a rare red blood cell and an occasional hyaline and granular cast. A urine concentration test exhibited fixation of the specific gravity at 1.008 to 1.009. The blood showed a red cell count of 4,900,000 with a hemoglobin of 70 per cent. The white cell count was 9,500, 71 per cent polymorphonuclears. The stools were negative. A Hinton test was negative. The nonprotein nitrogen of the blood was 80 milligrams, the serum protein 4.1 grams per cent. The chlorides were equivalent to 110 cubic centimeters N/10 chloride per 100 cubic centimeters. An intravenous phenolsulphonephthalein test showed excretion of 10 per cent of the dye in two hours. An intracutaneous injection of old tuberculin in a dilution of 1:40,000 was negative. The icterus index was 2. A liver function test showed 0 to 5 per cent retention. The van den Bergh was normal.

An intravenous pyelogram was interpreted as demonstrating non-concentrating kidneys of normal size. An x ray of the gastrointestinal tract exhibited no abnormality of the esophagus, stomach or duodenum. A barium enema showed ballooning of the rectum, spasm of the sigmoid and unusually poor emptying. No lesions could be demonstrated.

The patient continued to vomit solid food at intervals but his appetite improved. On the fifth day another phenolsulphonephthalein test showed no excretion of the dye in two hours. The nonprotein nitrogen of the blood was 68 milligrams. The red blood cell count was 3,600,000, with a hemoglobin of 80 per cent. He was given glucose intravenously and tincture of belladonna by mouth and the vomiting eventually ceased on the eighth day. The temperature, pulse and respirations remained normal throughout the hospital stay. His anorexia

and weakness subsided and he was discharged home at the end of the second week

*Second Admission*, two and a half months later

Shortly after his return to his home he began to vomit again with progressively increasing frequency. He became quite weak and developed an intolerable generalized itching of the skin. He was somewhat drowsy at times. Two weeks before entry a tender swelling had appeared on his right cheek at the corner of the mouth. This had grown larger, ruptured externally and exuded purulent material.

Physical examination showed a sick looking, pale, drowsy, air hungry man who scratched himself continually. The skin was dry and scaly and contained a few brownish blotches. There were scattered deposits of fine white granular material on the skin surface. Retinal edema was observed in the left fundus. Examination of the right side was not recorded. An abscess draining white creamy pus was present at the right corner of the mouth. There was an indurated tender swelling at the left corner of the mouth also. The lungs were clear. The heart was not enlarged and the sounds were distant. A basal systolic murmur was heard. The pulse was feeble. There was no edema. The blood pressure was 125/90.

The temperature was 98.8°, the pulse 95. The respirations were 20.

Examination of the blood showed a red cell count of 2,400,000, with a hemoglobin of 50 per cent. The white cell count was 20,000. There were 76 per cent polymorphonuclears, 11 per cent lymphocytes and 13 per cent eosinophils. The blood chlorides were equivalent to 115 cubic centimeters N/10 chloride per 100 cubic centimeters. The serum protein was 4.6 grams per cent, the nonprotein nitrogen of the blood 150 milligrams per cent, and the carbon dioxide combining power was 20 volumes per cent.

The patient was given 2,000 cubic centimeters of 10 per cent glucose solution intravenously. He failed rapidly, his temperature dropping to 97°, and died thirty-six hours after admission.

#### DIFFERENTIAL DIAGNOSIS

DR FULLER ALBRIGHT. The whole problem in this case will be to find out why he has renal insufficiency, what type, not whether he has that condition. The vomiting and lack of appetite will turn out, as we read more of the history, to be obviously due to chronic uremia.

Since his illness started with infection you immediately think of glomerulonephritis as opposed to other types of renal disease.

With a draining abscess in the groin one cannot help thinking of lymphogranuloma inguinale, which recently seems to be turning up on all sides in this hospital. It may be due to an old tuberculous gland or anything else.

With all these recurrent abscesses we are now thinking a little bit of amyloid.

Low blood pressure is against chronic glomerulonephritis.

An indefinite mass in the epigastrium usually means nothing.

"The sediment contained three to five white blood cells, a rare red blood cell and an occasional hyaline and granular cast." This pretty definitely puts it in a chronic nephritis group as opposed to various urological conditions.

We are surprised to see that the red cell count was normal.

"The nonprotein nitrogen of the blood was 80 milligrams, the serum protein 4.1 grams per cent." A kidney that has difficulty in excreting nonprotein nitrogen, and does not hold back protein. The chlorides are elevated. You would expect this value to be slightly high with the serum protein so low.

He has a very low renal function.

I do not think there is any question but that our trouble is with the kidney. I do not think he has uremia due to vomiting and dehydration alone. I think from the kidney findings that the pathology must be in the kidney. I think that all these other studies are aside from the point.

"The skin was dry and scaly and contained a few brownish blotches." Some superficial infection I imagine.

"Retinal edema was observed in the left fundus." The fundi are certainly surprisingly lacking in change.

There is no evidence of hypertension as yet. He now has very marked anemia. He undoubtedly had a lot of infection. It is not unlikely that a terminal septicemia or something set in.

It is a little hard to explain why the blood chlorides should be up to 115. He had marked terminal acidosis as so many of these patients have. I am surprised to see the chlorides that high.

I should think the most likely thing that Dr Mallory will tell us is that the kidney is of the same type primarily, as that in Dr Baker's case, a kidney about normal in size, the so called pale white kidney,—a chronic glomerulonephritis that went through a nephrotic stage and ended in typical uremia with these infections to contribute. I should not be too surprised if he told us he had amyloid disease. Consistent with this were the very low protein, the terminal rise in blood nonprotein nitrogen, and absence of eyeground changes. He had perhaps an etiology for amyloid. I think we have to consider the other insidious conditions that will destroy kidneys, multiple myeloma certainly is to be considered but with that you would expect a high serum protein rather than low. Hyperparathyroidism has to be considered but I think I would have heard of it if it had been hyperparathyroidism.

## X RAY INTERPRETATION

DR. GEORGE W. HOLMES There are one or two things that I might point out. As Dr. Albright suggested, there is nothing of particular importance in the x ray. You can see the kidney outlines on both sides and although we are not able to state definitely the size of the kidney from x ray film, you can detect gross changes. The size here appears to be normal. This is the edge of the liver and it does not seem to be enlarged. Again the x ray evidence of enlargement of the liver is of uncertain value. The question was raised as to the presence or absence of trouble with the spine. We have lateral and anteroposterior views of the spine; they show scoliosis but no evidence of disease. Here is the film of the chest which also shows quite marked scoliosis but no evidence of disease of the lungs. In other words, no primary tuberculous infection of the lungs, nothing to suggest that the other lesions were of tuberculous origin.

## CLINICAL DISCUSSION

DR. ALFRED O. LUDWIG When this man first came into the wards there was a discussion as to what the diagnosis might be because of the anemia and blood pressure. We finally felt that it was chronic glomerulonephritis. He was followed for a time in the Outpatient Department and later we sent him into the house again with the opinion that he was in a terminal stage of chronic glomerulonephritis and some secondary infection. We still were concerned at that time that the blood pressure was not higher. He lacked eyeground changes.

## CLINICAL DIAGNOSES

Chronic glomerulonephritis  
Uremia.

## DR. FULLER ALBRIGHT'S DIAGNOSES

Chronic glomerulonephritis.

## ANATOMIC DIAGNOSES

Chronic amyloid nephrosis, with contracted kidneys  
Bronchopneumonia.  
Lymphangiectasis of the small intestine

## PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY Very obviously there are discrepancies in the clinical picture. The diastolic blood pressure is high, but the

systolic is quite low. The serum proteins are certainly very low for a chronic glomerulonephritis, and he did show typical retinitis.

At autopsy we found moderately shrunken kidneys. The pair weighed 150 grams. On the other hand the surface was only slightly granular, not so markedly so as one would expect, the tissue was rather firm and had a slightly waxy consistency. The sections have served only to increase the mystery a bit more. The picture is a peculiar one in that the most striking feature of the kidney is the persistence of glomeruli, which are all hyalinized, and almost complete absence of convoluted tubules. Ordinarily when the glomerulus is sclerosed and hyalinized in chronic nephritis, it eventually disappears, the time of disappearance probably taking two or three years. As it loses its function the corresponding tubules atrophy and disappear, and one is left with a fibrous scar which is usually rather densely infiltrated with lymphocytes. Not only the convoluted tubule but the corresponding Henle's loop and collecting tubule disappear. In this man, however, Henle's loops were well preserved, the collecting tubules seem actually to have proliferated a bit and the convoluted tubules are all gone. With ordinary stains the glomeruli are apparently characteristic of amyloid disease but with the amyloid reaction they give a very feeble and not entirely characteristic stain. There is no amyloid in the follicles of the spleen, the commonest place, and none in the liver. On the other hand the adrenals are full of amyloid. The renal picture suggests that at some time in the past something has specifically knocked out the convoluted tubules. The findings seem to fit the assumption of a contracted kidney based on an old tubular nephritis, a diagnosis that was often made fifteen years ago but which has gone completely out of fashion now.

It should be remembered, moreover, that in amyloid nephrosis the tubules regularly show more or less severe lipoid degeneration, a condition which might well be followed by atrophy. Fahr as a matter of fact, describes "amyloid Schrumpfneure" in which the shrinkage is due to tubular atrophy, and such a diagnosis is, I think, our best bet on this case.

This man did have some pathology in the gastrointestinal tract in the form of multiple polypoid projections which on section seem to be greatly dilated lymphatics in the small intestine. He had a terminal bronchopneumonia, a normal sized heart. The other organs were essentially negative.

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## COLLEGIATE PREMEDICAL EDUCATIONS

THE proposal of the Board of Registration in Medicine that the requirements for premedical education shall be raised from mere high school to include two years of collegiate work takes one back to 1918 when this requirement was generally adopted for approved medical schools. The previous formal step had been taken in 1914 when one year of college became the requirement.

It is interesting to note that although the evaluating bodies whose opinion is generally accepted have not raised their formal requirements since 1918, many medical schools require more than two years of premedical collegiate work for their own students and a very considerable number of candidates for medical school present four years of college credits and the baccalaureate degree. This raising of the in-

formal requirements so high above the formal, is due to the great demand for medical education, far greater than medical schools now in existence can supply.

The specific content of the two collegiate years is often not stated except that it shall include physics, chemistry, and biology. These subjects were formerly taught, in so far as they were taught, in the medical curriculum. At least as far back as 1893, they came to be formally, though not universally, relegated to the premedical schools. By 1922, the conviction had become so widespread, that the physician should have at least an acquaintance with these fundamental sciences, that Massachusetts became aware of the situation, and there were introduced into the list of statutory subjects for examination these three, physics, chemistry and biology. As a high school education became a requirement at the same time, a mere casual familiarity with science was deemed sufficient.

If one reviews the laws of the states, one finds that only eight have failed to make statutory provision for the two years of college. In six of the eight, however, the boards of registration have, under the statute and in the exercise of their discretion, refused to accept graduates of schools which do not have this requirement. Massachusetts stands almost alone in clinging to the low standards which, over forty years ago, nearly half a century, enlightened institutions outgrew.

With the progress of knowledge, the burden of knowledge and training on the medical student and the physician has become heavier, to such an extent that few, if any, are able to become well-qualified physicians without the formal education now generally required. The day has gone by, when anyone without formal training in physics, chemistry and biology can provide for himself an adequate foundation for his work in the medical school.

There is another consideration to which more explicit attention should be given. Why has medicine made such rapid progress in recent years? The reasons may be summarized briefly in the statement that the closer association of the university departments of these premedical sciences with the medical schools and the application of their ideas to medicine have resulted in a remarkable fertilization in both the preclinical sciences and in their application in practice. Indeed the result of the impact of science on the art of medicine in the past twenty-five years has been one of the remarkable phenomena of the twentieth century. It is now impossible to understand modern medicine without insight into the introductory and basic sciences.

Since this formal education in science is necessary and is so regarded by the State, Massachusetts should also require that it be more nearly adequate, that is, of collegiate grade.

## CELSUS DE MEDICINA

Of the three great medical figures of the Classical Period—Hippocrates, Galen and Celsus—the least is known about the life of the latter. The author of a great medical treatise, which profoundly affected the practice of medicine throughout the ages and even down to our time, may not have been even a practitioner of the art. Quintilian states that he wrote on many other subjects than medicine and from this statement it has been inferred that Celsus was merely a general editor of an encyclopaedia, perhaps not even the author of *De Medicina*. Dr. W. G. Spencer, who has recently translated the first four books of *De Medicina*\* takes the view, based on a number of passages in his work that Celsus was "a learned and experienced medical practitioner" even allowing for the less sharp distinction drawn between the professional and amateur in his day. The book would "seem to indicate that he himself regularly attended patients, and wrote with the authority of a practising physician."

Whatever views we may hold about the authorship of *De Medicina*, all agree that the book has had great influence as a text of medical practice. A number of manuscripts exist testifying to its popularity before the days of printed books. Before 1600, moreover, it was printed four times, the *editio princeps* at Florence in 1478. Three of these incunables are in the Boston Medical Library in the Bulfinch Collection. When printing became more common, edition after edition came off the presses forty-nine before 1841. The best translations before Spencer's, were those by James Greive in many issues, and by G. F. Collier. Required reading for applicants for license by the Royal College of Surgeons, many interlinear translations were printed in the eighteenth and nineteenth centuries in England. Scholarly comments on Celsus have been written by Daremberg, Marx and others, much of interest about the man, his book and his time will be found in Allbutt's *Greek Medicine in Rome* and in Payne's article on Roman medicine in the *Cambridge Companion to Latin Studies*. Finally we have the readable translation by the London surgeon, W. G. Spencer, a worthy addition to that section of the medical historian's library of *Celsusiana*.

\**Celsus De Medicina* with an English Translation by W. G. Spencer. In two volumes. Volume I. Loeb Classical Library. Cambridge, Mass. Harvard University Press, 1928. XIV 499 pages.

## THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

DEROW, HARRY A. M.B., M.D. Boston University School of Medicine 1927. Assistant Physician Beth Israel Hospital. Instructor in

Medicine, Harvard University Medical School. Address 475 Commonwealth Avenue, Boston. Associated with him is

ALTSCHULE, MARK D. B.S. M.D. Harvard University Medical School 1933. Assistant in Medicine, Harvard University Medical School. Resident in Medical Research, Beth Israel Hospital. Address 330 Brookline Avenue, Boston. Their subject is "Malignant Hypertension." Page 951.

SHEDDEN, WILLIAM M. A.B., M.D. Harvard University Medical School 1920. F.A.C.S. Assistant in Anatomy, Harvard University Medical School. Instructor in Surgery, Tufts College Medical School. Assistant Surgeon to Out-Patients, Massachusetts General Hospital. Chief of Tumor Clinic, Boston Dispensary. Address 270 Commonwealth Avenue, Boston. Associated with him is

JOHNSTON, FULTON. M.D. Harvard University Medical School, 1927. Member of the Emerson Hospital Staff. Address 8 Sudbury Road, Concord, Mass. Their subject is "Traumatic Rupture of the Liver." Page 960.

DAY, HILBERT F. Ph.B., M.D. Harvard University Medical School 1905. F.A.C.S. Professor of Clinical Surgery, Tufts College Medical School. Surgeon in Chief, Boston Dispensary. Senior Surgeon, Cambridge Hospital. Surgeon, Boston Floating Hospital. Consulting Surgeon, Massachusetts State Prison Colony, Norfolk, Mass. His subject is "The Organization of a Varicose Vein Clinic." Page 966. Address 412 Beacon Street, Boston.

WHITNEY, EDWARD T. A.B., A.M., M.D. Harvard University Medical School 1924. Assistant Surgeon, Boston Dispensary. Surgeon, New England Telephone and Telegraph Co. Address 587 Beacon Street, Boston. Associated with him is

CONNALES, PETER A. M.D. Tufts College Medical School 1922. Junior Surgeon, Boston Dispensary. Address 481 Beacon Street, Boston. Their subject is "The Treatment of the Varicose Ulcer." Page 967.

WHITNEY, EDWARD T. Record appears above. His subject is "The Treatment of Phlebitis." Page 970.

LEVENSOM, WALTER S. A.B., M.D. Harvard University Medical School 1922. F.A.C.S. Assistant in Surgery, Harvard University Medical School. Instructor in Surgery and Anatomy, Tufts College Medical School. Surgeon, Out-Patient Department and Junior Visiting Surgeon, Beth Israel Hospital. Surgeon, Boston Dispensary. Assistant Surgeon, Boston Floating Hospital. His subject is "High Ligation in the Treatment of Varicose Veins." Page



972 Address 370 Commonwealth Avenue, Boston

HORLICK, S SEYMOUR A.B, M D Tufts College Medical School 1928 Junior Assistant Surgeon, Boston Dispensary and Beth Israel Hospital His subject is "The Multiple Injection Method of Treating Varicose Veins" Page 973 Address 1860 Commonwealth Avenue, Boston

BARNEY, J DELLINGER A B, M D Harvard University Medical School 1904 F A C S Chief of Service, Urological Department, Massachusetts General Hospital. Assistant Professor of Genito-Urinary Surgery, Harvard University Medical School His subject is "Personal Experiences with Tumor of the Bladder" Page 976 Address 87 Marlboro Street, Boston

LORD FREDERIC P A B, M D Dartmouth College Medical School 1903 Professor of Anatomy, Dartmouth College Medical School 1911- President, New Hampshire Medical Society 1934-1935 His subject is "President's Address" Page 979 Address 39 College Street, Hanover, New Hampshire

## The Massachusetts Medical Society

### SECTION OF OBSTETRICS AND GYNECOLOGY\*

C J KICKHAM, M.D., <i>Chairman</i>	R. S. TITUS, M.D., <i>Secretary</i>
524 Commonwealth Ave., Boston, Mass	472 Commonwealth Ave., Boston, Mass

### CONTRACEPTION AND STERILITY

One of the striking things that appears in the study of sterility is the increase in its frequency which has occurred during the last decade or two. Statistics are unreliable at best but it seems fair to say that there has been an increase from 10 per cent to 15 per cent, or even 17 per cent. Such a change deserves careful study. Unfortunately the statistical sources of our information are so uncertain as to be practically worthless, but the impression which one gathers from talking with both members of many sterile couples may at least indicate the trends, if not the causes, of this phenomenon.

Of these sterile couples there is hardly a single one nowadays that has not employed some measure designed to prevent conception. Twenty years ago this was not the case though even at that time probably 50 per cent, or two-thirds of the couples, had done so. This immediately

raises the question whether the prolonged use of any contraceptive technique, no matter how carefully employed, may not, by denying the natural changes in the woman's pelvic organs which pregnancy initiates, produce a sort of functional sterility. It is my firm belief that it does. It is also my belief that the longer birth control has been practiced, the longer this period of functional sterility will last. This is a common experience with those couples who eventually do conceive without assistance. In most instances it is temporary but in some, where a minor catarrh develops in the cervical canal, where there is congestion from a retroversion, or where other such minor conditions arise, such a functional sterility becomes permanent unless treated. The great increase in numbers of women who, though menstruating regularly, rarely ovulate would seem to postulate hormone changes as possibly resulting from a denial of pregnancy while the sexual stimulation of marriage still persists. In other cases changes in the life of the woman from great activity in business to the relative ease of keeping house for two people, together with dietary indiscretions, predispose toward great changes in nutrition or metabolism, and thus often affects fertility. Then, too, there is the effect of time and business cares on male fertility. In many cases of which we have careful records male fertility has decreased to a dangerously low level under the stress and strain of modern business conditions in a relatively short time.

If we can accept these trends as following from prolonged use of birth control early in marriage, it would seem that we as physicians had a duty to broadcast this information. As far as one can judge from numerous conversations with young people who are about to become married there is practically speaking not a single couple, unless forbidden by religion, that does not contemplate postponement of having a family. Quite apart from whatever our attitude may be as to the morality of such a course, it would seem imperative for us to protest against the possible consequences of sterility and ill health which may, and often do, follow.

### THIRD ANNUAL POSTGRADUATE MEDICAL EXTENSION COURSE

The following sessions have been arranged by the Committee for the week beginning November 17

#### Barnstable

Sunday, November 17, at 4 00 P M, at the Cape Cod Hospital, Hyannis Subject Kidney and Bladder Diseases, A (Medical) Acute Nephritis — Etiology, Diagnosis and Treatment. Nephrosis and Its Treatment. Instructor L B Ellis J I B Vail, Chairman.

\*A series of short selected articles by members of the Section is being published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the Section.

**Bristol South (Fall River Section)**

Monday November 18 at 4 00 P.M. at the Stevens Clinic of the Union Hospital Fall River Subject Lung Diseases (a) Differential Diagnosis and Treatment of Lobar Pneumonia (b) The Surgical Problems of Empyema. Instructors Maxwell Finland and H F Newton. Eugene A. McCarthy Sub-Chairman

**Essex North**

Friday November 22 at 4 00 P.M., at the Hotel Bartlett, 95 Main Street, Haverhill. Subject Kidney and Bladder Diseases A (Surgical) Hematuria Its Significance in Surgical Diseases of Kidney and Bladder Instructor F H. Colby Francis W Anthony Chairman.

**Essex South**

Tuesday November 19 at 4 00 P.M., in the Nurses' Home of the Salem Hospital Salem Subject Diseases of the Liver Surgical Problems in Diagnosis of Acute Disease of Gall Bladder and Liver Instructors C M Jones and L S McKittrick Walter G Phippen, Chairman

**Hampden**

Thursday November 21 at 4 00 PM at the Academy of Medicine Professional Building 20 Maple Street, Springfield and at 8 00 P.M., at the Holyoke City Hospital, Holyoke. Subject Lung Diseases (a) Differential Diagnosis and Treatment of Lobar Pneumonia. (b) The Surgical Problems of Empyema Instructors R. H. Sweet and D S King George L. Schadt and George D Henderson Chairmen

**Hampshire**

Wednesday November 20 at 4 15 P.M., in the Nurses Home of the Cooley Dickinson Hospital Northampton Subject Pediatrics Abdominal Disease in Childhood Medical and Surgical Aspects Instructors P H. Sylvester and T H Lanman. Robert B. Brigham, Chairman.

**Middlesex South**

Tuesday November 19 at 4 15 P.M. at the Cambridge Hospital, Cambridge Subject Cancer of Breast and Uterus Sarcoma of Bone Lymphoma and Leukemia. Their Early Diagnosis Discussion of Life History of Cancer and Grades of Malignancy Instructors J V Meigs, C. E Dumas and Dudley Merrill. Edmund H. Robbins Chairman.

**Norfolk South**

Monday November 18 at 8 30 P.M. at the Quincy City Hospital Quincy Subject Pediatrics The Neonatal State and Its Diseases Medical and Surgical Aspects Instructors J L Morse and W E. Ladd. David L. Belding Chairman.

**Plymouth**

Tuesday November 19 at 4 00 P.M., at the Brookton Hospital, Brockton Subject Arthritis (a) Medical Care of Patient in the Home (b) Orthopedic Treatment in Hospital and Aids in Home Treatment. Instructors R. T. Monroe and W T Green. W H. Pulsifer Chairman.

**Worcester North**

Friday November 22, at 4 30 P.M., at the Burbank Hospital Fitchburg Subject Psychiatry Management of Psychic States in the Care of General Diseases Especially Chronic Disorders Subpsychotic States Instructors G O Caner and Maurice Fremont Smith. Edward A. Adams Chairman.

**MISCELLANY**

**MEDICAL HISTORICAL PAGEANT**

A public performance of the fifth annual medical historical pageant presented by medical students of Tufts College Medical School under the direction of Dr Benjamin Spector will be given at the Boston Medical Library on Monday evening November 18 at eight o'clock.

The performance will be under the auspices of the Boston Medical History Club and a demonstration of manuscripts and books having to do with the characters in the play will be made by James F Ballard Director of the Boston Medical Library

These pageants are unique in their method of preparation and presentation The students write their own scripts after parts have been assigned to them by Dr Spector The characters are costumed in the correct dress of the periods which they represent.

The current pageant has to do with the quotation "Story of Early Medicine in Massachusetts" which is divided into three epochs: the Colonial (1620-1700) the Pre-Revolutionary period (1700-1775) and the Post Revolutionary period (1775-1846)

In the Colonial Period will be found the Indian Medicine Man, Deacon Samuel Fuller of Plymouth, the two Governors Winthrop and the Reverend Thomas Thatcher of Boston.

The Pre-Revolutionary Period is subdivided into Smallpox Inoculation Midwifery and Obstetrics and Apprenticeship in Medicine

The Post Revolutionary Period is also subdivided into Cowpox Vaccination the Ether Demonstration, and Oliver Wendell Holmes and Puerperal Fever

All interested persons and their friends are cordially invited to attend the performance at the Boston Medical Library

**A RESOLUTION ADOPTED BY THE MASSACHUSETTS MEDICO-LEGAL SOCIETY**

Whereas The sale by druggists and dispensing by physicians of strychnine alone or incorporated with other drugs in laxative and tonic tablets with

chocolate or sugar coatings has resulted in many fatalities among children, innocent of their potency and attracted by the candied coatings, and

Whereas, The known therapeutic value of strychnine in no wise justifies such loss of life, suffering, and sorrow,

Be it, by the Massachusetts Medico Legal Society in regular meeting assembled

Resolved, 1 That it go on record as discountenancing the sale or dispensing of strychnine in any form which covers or conceals its taste or without being clearly labeled as to name, amount, in each dose, and the warning "poison" if dosage is exceeded, and treatment if excess is accidentally taken

2 That the copies of this resolution be published in *The New England Journal of Medicine* and that the Massachusetts Pharmaceutical Society and the Massachusetts Medical Society be invited to cooperate in preventing the sale or dispensing of this drug in concealed, dangerous form

October 2, 1935

#### ANTERIOR POLIOMYELITIS CASES REPORTED FOR THE WEEK ENDING NOVEMBER 9, 1935

City or Town	No of Cases
Fall River _____	2
Brockton _____	3
Belmont _____	2
Boston _____	4
Chelsea _____	1
Concord _____	1
Malden _____	1
Melrose _____	1
Newton _____	2
Lawrence _____	1
Lynn _____	4
Methuen _____	2
Middleton _____	1
Worcester _____	1
Total _____	26

#### TOTAL CASES FOR YEAR

January-June _____	14
July _____	46
August _____	481
September _____	537
October _____	237
November _____	34
Total _____	1349

#### HEALTH SURVEY\*

##### MEMORANDUM FOR THE MASSACHUSETTS MEDICAL SOCIETY

Plans have been prepared for a survey of the extent of disabling illness and a study of public

health and medical facilities in nineteen States. The survey is to be conducted under the auspices of the United States Public Health Service as a project financed by the Works Progress Administration.

The survey follows closely the well-established policy of the Public Health Service and employs essentially the same methods which have long been used by the Service. It is, in fact, a continuation of activities which have been carried on from time to time over a period of nearly twenty years. Examples of these activities are

1. Surveys of State, city and county health departments at the request of State or local communities
2. Epidemiological studies. Frequently these studies have embraced a more detailed inquiry into economic, industrial, racial, and other influences affecting the spread of disease than that contemplated in the present study
3. Numerous reports based upon physical examinations of school children and industrial workers to determine the extent of disease and physical impairment. These studies were limited to certain diseases and to certain groups of population and, therefore, only partially depict the true health situation
4. Morbidity studies. These studies were first undertaken fifteen years ago and relate to selected groups of the population or to selected areas. In the first as well as the later studies local physicians cooperated fully with the Service in checking statements concerning the nature of illness reported to field enumerators by the families surveyed

The foregoing activities are embodied for the most part in the larger and more comprehensive surveys now being made. Methods that have proved successful in the activities listed above have been adapted and refined for application to that part of the present study which has to do with the collecting of data on the prevalence and distribution of the chronic disabling illnesses among representative groups of the general population. Until now such data have been very meagre or wholly lacking.

The program has been prepared and revised following a conference held by the Surgeon General with Drs Leland and Bauer of the American Medical Association.

The purpose of this memorandum is to acquaint the members of your Society with the objects of the survey and solicit their cooperation in the checking of statements concerning illnesses reported to our enumerators. The cooperation of the medical profession in the areas selected for study is vital to the successful conduct of the study and to the ultimate value of the material collected.

A typical schedule will be sent to the family physician with the request that he check the precise or provisional diagnosis. Physicians will receive

\*Submitted by the Public Health Service

twenty five cents for each schedule properly filled out.

NOTE A copy of the schedule may be consulted in advance of its distribution at the office of Dr. Begg, 8 Fenway Boston Mass. It also appears in the *Journal of the American Medical Association*, October 5 1935

# RÉSUMÉ OF COMMUNICABLE DISEASES IN MASSACHUSETTS FOR SEPTEMBER, 1935

Disease	Sept. 1935	Sept. 1934	5 Yr Aver age*
Anterior Poliomyelitis	540	8	159
Chicken Pox	99	101	89
Diphtheria	19	37	95
Dog Bites	793	756	539
Epidemic Cerebrospinal Meningitis	7	5	6
German Measles	40	19	24
Gonorrhea	553	556	612
Lobar Pneumonia	105	90	87
Measles	51	43	88
Mumps	215	75	99
Scarlet Fever	218	273	305
Syphilis	463	284	321
Tuberculosis, Pulmonary	261	276	295
Tuberculosis, Other Forms	33	38	41
Typhoid Fever	14	22	29
Undulant Fever	3	1	
Whooping Cough	254	506	474

## RARE DISEASES

Anterior poliomyelitis—540 cases (see weekly lists)

*Dysentery (amebic)* was reported from Fitchburg  
1 Middleboro 1 total, 2

*Dysentery (bacillary)* was reported from Boston  
5 Falmouth 1 Worcester 1 total, 7

*Encephalitis lethargica* was reported from Lynn 1  
Uxbridge 1 total 2

*Epidemic cerebrospinal meningitis* was reported  
from Boston, 1 Cambridge, 1 Salem 1 Shrews-  
bury 1 Stockbridge, 1 Taunton 1 West Bridge-  
water 1 total 7

*Malaria* was reported from Chelsea, 1 Revere 1  
total, 2

*Pellagra* was reported from Boston 2  
*Septic sore throat* was reported from Boston 9  
Lynn 1 Mansfield, 1 total 11

*Tetanus* was reported from Great Barrington 1  
Medford 1 Salem 1 total 3

*Trachoma* was reported from Boston 2 Cam-  
bridge, 1 total 3

*Trichinosis* was reported from Arlington, 1 Bos-  
ton 1 Falmouth 1 total 3

*Undulant fever* was reported from Auburn, 1 Clin-  
ton, 1 Worcester 1 total 3

Based on the figures for the preceding 5 years.

Infantile paralysis is now on the decline, having had a September peak.

Diphtheria with the lowest monthly figure ever reported is running 50 per cent lower than in 1934

Lobar pneumonia for the sixth month in a row was reported slightly over last year's figure.

German measles had a September morbidity somewhat over the five-year average. It may be that we are in for another year of increased incidence.

Mumps is running higher than in 1934

Measles, scarlet fever typhoid fever pulmonary tuberculosis tuberculosis other forms and whooping cough were all reported at a lower level than in 1934

Chicken pox and epidemic cerebrospinal meningitis were not remarkable

## CORRESPONDENCE

### ELECTROSURGICAL CHOLECYSTECTOMY

Editor, *New England Journal of Medicine*

In the October issue of your valued *Journal* (No. 14) there appeared an article by Dr. Lester R. Whitaker on "Electrosurgical Cholecystectomy" which discusses my operation. Accuracy demands that I correct certain statements in the article referred to and I hope these comments will be allotted space in your valued columns

Whitaker used a modification of Pribram's procedure in sixteen cases. His results disclose an operative mortality of 18.45 per cent, 31 per cent of infections, and above 50 per cent of bile leaks a decidedly worse record than is obtained from removing the gallbladder with the knife which shows about 2 per cent mortality in selected and a global mortality of 96 per cent in complicated cases

In other words twice as many people succumbed at the hands of Whitaker as in the worst cases operated on by surgeons elsewhere. This statement is based on the exhaustive studies of 12,144 cases of Enderlen and Hots.

I regret to note that in his discussion of my operation (which, by the way I have performed to date on 149 consecutive unselected patients without a single fatality) Dr. Whitaker failed to grasp the rationale and principles underlying my procedure which are as follows

1. An understanding of the differences between fulguration, carbonization and coagulation is a sine qua non

2. The appreciation of the fact that drains are mimical to electrosurgically treated surfaces. This has been pointed out time and again by a number of observers (Kuntzen and Vogel and others) and corroborated by my own researches. Even Pribram whose method Whitaker used admonishes *not to drain*. I believe Whitaker's disregard for this fundamental rule is in a great measure responsible for his failures

Electrocoagulated surfaces within the abdomen agglutinate with contiguous serous surfaces within about three hours after operation. If a drain is introduced, agglutination is frustrated and infection ensues. Electrocoagulated surfaces within the abdomen heal by encapsulation and absorption. Superimposition of the falciform ligament, as is practiced in my operation, helps in accomplishing this result.<sup>2, 3</sup>

Experience contradicts Whitaker's conclusions on the behavior of electrocoagulated tissues.

3 Whitaker's observations are diametrically opposed to those of Baker on the question of postoperative biliary leakage.

4 Whitaker has apparently not read Schörcher's exhaustive studies on the "why" of the absence of shock in electrosurgical maneuvers.<sup>4</sup>

5 In discussing my operation Whitaker says, "Thorek depends upon the collapse and coagulation of the vessel walls to prevent postoperative hemorrhage. It is doubtful that with the cystic artery and its larger branches this would always be sufficient."

The coagulum is likely to loosen sooner than the tie. The fact is that I never coagulate the cystic artery but always ligate it. Again, the coagulum never loosens in undrained, properly performed operations but becomes absorbed.

6 Careful scrutiny of the sixteen cases recorded by Whitaker forces the conclusion that unless one is equipped with a thorough knowledge of the principles underlying electrosurgical methods he had better hold on to the time-honored cold scalpel in surgery of the gallbladder.

MAX THOREK, M.D., *Professor of Surgery,*  
Cook County Graduate School  
of Medicine, Chicago

#### REFERENCES

- 1 Thorek Max Cholecystelectrocoagulectomy without drainage in treatment of gall bladder disease Illinois M J 64: 426 (Nov) 1933
- 2 Thorek Max Electrosurgical obliteration of gallbladder, 75 consecutive unselected cases without mortality J A. M. A 103: 169 (July 21) 1934
- 3 Thorek Max Electrosurgical obliteration of gallbladder Arch Phys Therapy 16: 207 (April) 1935
- 4 Schörcher F Über Schock, Kollaps und Elektroschirurgie. Deutsche Ztschr f Chir 243: 225 (May) 1934

#### A CRITICISM OF AN EDITORIAL ON "POLIO VACCINES"

Editor, *New England Journal of Medicine*,

The *Journal* of October 3 carries an editorial headed "Polio Vaccines." In referring to vaccines, it says, "Thousands of mothers beg for its trial, and the supply of vaccine is limited. Before we again let our eagerness confuse our reason, it may be well to consider some of the facts in the matter."

The editorial then proceeds to make statements that are incorrect and not in accord with the latest work done on "polio" vaccine. The information thus conveyed is incorrect, misleading and not up-to-date.

The editorial states, "If we remember their (Harvard Infantile Paralysis Commission) laboratory experiences correctly, it would seem that the infec-

tion of subinfective amounts of living virulent virus, repeated many times, failed to produce sufficient active immunity to protect a susceptible monkey against subsequent inoculation with a fatal dose of virus."

Flexner and Lewis in 1910<sup>1</sup> reported the successful vaccination of monkeys with subcutaneous and intracutaneous injections of living virus or mixtures of virus and immune serum.

In 1927, Aycock and Kagan<sup>2</sup> did a great deal of work on monkeys, with a virus attenuated with phenol, glycerine and drying. They found that about 25 per cent of the animals were protected, but in another 25 per cent infection developed from the vaccine. In 1933, Kolmer and Rule<sup>3</sup> succeeded in vaccinating one monkey partially and two completely, out of a series of six monkeys by subcutaneous and intracutaneous injections of 2 per cent poliomyelitic cord in 10 per cent sodium ricinoleate. In 1934<sup>4</sup>, Kolmer and Rule vaccinated 18 *Macacus rhesus* monkeys successfully against acute infantile paralysis with subcutaneous and intracutaneous injections of vaccine of living but attenuated virus. The vaccine was composed of 4 per cent suspensions of poliomyelitic monkey spinal cord in sterile 1 per cent solution of sodium ricinoleate.

These 18 monkeys were all immunized without the slightest ill effect and protected completely against infection following the intracerebral injection of about eighteen minimal infective doses of virus given under ether anesthesia about one month after the last dose of vaccine. The disease developed in the unvaccinated controls in from five to nine days after inoculation.

In 1934, Brodie<sup>5</sup> showed by work on monkeys

- 1 A single subinfective intracutaneous inoculation of active poliomyelitis virus containing cord tissue gives rise to an immunity which appears at or soon after the sixth day and reaches its height by the twentieth day.
- 2 The immunity lasts a considerable time, being still present a year later.
- 3 Two doses of active cord tissue given at ten to twenty day intervals give rise to a higher degree of immunity than exists after mild or severe forms of the disease.

Both Kolmer and Brodie tried many methods of making a vaccine, safe for human beings, Brodie finally developing a vaccine from a formaldehyde treated monkey cord, Kolmer developing his from monkey cord using sodium ricinoleate as an attenuating agent.

The Brodie vaccine is a formaldehyde killed virus, the Kolmer, a living, attenuated virus.

After Kolmer had successfully vaccinated 18 monkeys and protected them against injections of virulent polio virus, without any ill effects whatsoever from the vaccine, he felt sure enough of his vaccine to start human work.

He proceeded to do this human work on himself and his co-worker, Anna Rule. First, he took some of his own serum, mixed it with living virus, and

after letting it stand for a time injected it into monkeys intracerebrally. He did the same with the serum of Anna Rule and for controls used salt solution plus the same polio virus. All of the animals developed polio. He then proceeded to vaccinate himself and his associates. Two weeks after the third dose, he performed the serum neutralization tests again. Monkeys were injected as before with his serum plus polio virus another group with her serum plus polio virus and the control group with salt solution plus the polio virus. The Kolmer serum and the Rule serum absolutely protected their monkeys from any illness. The controls developed polio.

He had thus proved that the vaccine had developed in their blood some antiviral substance which protected the monkeys.

The work of both Kolmer and of Brodie has been carefully checked and controlled. I am referring more to the work of Kolmer because I am more familiar with it and have used his vaccine.

Kolmer next proceeded to administer the vaccine to 25 children. Both before and after the vaccination, serum neutralization tests were done to test for antiviral substance in the blood.

These serum neutralization tests were done by mixing 0.5 cc. of serum with 0.5 of 10 per cent suspension of virus. This mixture was allowed to stand about two hours in a water bath at 37° C and then injected intracerebrally into monkeys under ether anesthesia. For controls 0.5 cc. of sterile saline was used with 0.5 cc. of virus let stand in the water bath and used in the same manner.

There were no ill effects from the vaccine except slight fever in some of the children 100.2 the highest, and a few slightly sore arms.

Of fifteen children showing no antibody before vaccination 75 per cent showed sufficient antibody following vaccination to protect the monkey. Serum of the ten children showing the presence of antiviral substance in their blood before vaccination showed much more after vaccination as their serum now protected the monkeys against an intracerebral injection of 50 per cent suspension of virus.

The serum neutralization test on monkeys has so far proved the only test of value in determining whether the blood of the individual contains antibodies. Serum colloidal gold, complement fixation precipitation and skin tests have been shown to be without value.

"The question of fundamental importance," says Kolmer, "is whether antibody in the blood of human beings for monkey passage virus is protective against human virus."

About 30 per cent of 1.6 cases of persons recovering from polio showed no antibody in their sera by monkey virus tests. This report is from the added results of eight different observers and suggests that immunity to the disease can be present without demonstrable amounts of antibody in the blood.

Kolmer states "These results indicate the possi-

bility that antibody in the blood of human beings for monkey passage virus may not protect against human virus and if such should subsequently be proved it would render the present serum neutralization test worthless as an index or measure of resistance to poliomyelitis among human beings."

However Kolmer has found that antibody developed in children by three doses of Kolmer vaccine has completely neutralized a human virus from the 1934 California epidemic.

The editorial proceeds to call attention to a question of simple arithmetic and gives an equation involving monkeys. Mathematics is an exact science but this mathematical problem is based on a false premise.

To quote the editorial "Since for the production of vaccine by present methods one monkey furnishes at the most, sufficient vaccine for ten injections then each single injection would require one-tenth monkey."

Kolmer hoped to be able to prepare vaccine from brain tissue so that a greater amount would be available but experiments showed that virus was absent or in insufficient amounts in brain tissue of monkeys dying of polio so that the source of supply is limited to monkey spinal cord.

However Kolmer states that the spinal cord of one monkey furnishes about 150 cc. of vaccine which is sufficient for the immunization of from forty to seventy-five children depending on age and dosage. As three doses are required for each immunization, each single injection would require from one one-hundred-and-twentieth to one-two-hundred-and-twenty-fifth monkey instead of one-tenth.

Of course it would be impossible to do monkey neutralization tests on all cases before and after vaccinations. It is practical however to do such tests on a percentage of the whole group vaccinated and thus the results could be roughly figured out.

Kolmer's work indicates that the majority of children under ten years of age are devoid of antiviral antibody and probably susceptible.

Because of the fact that polio is a disease that hits only a small percentage of the population and because the disease rarely hits any locality in the same degree two successive years it will take a long time to prove positively the value of any preventive measure.

So far there is no knowledge of anyone carrying antibody in the blood, as shown by serum neutralization tests developing infantile paralysis but as yet only 318 sera have been reported on. On the other hand polio has occurred in individuals known to have no antibody in the blood prior to the disease and Kolmer has had one such case.

There is no doubt that all physicians are reluctant to inject a living though attenuated virus into human beings. In a letter dated September 3 Kolmer states that he and his associates have vaccinated over 6,000 cases—only mild reactions developed or none at all. Immunity develops very rapidly in at least 90 per cent.

My own experience is limited to twenty cases. No monkey neutralization tests were done and therefore the cases are of little value. However, it is of interest to note that not one of the cases showed the least constitutional reaction and the local reaction was so slight as to be unimportant.

The editorial ends, "But we hope that our eagerness will be tempered with reason and that any trial of any preventive or curative agent will be conducted with full and rigid controls, so that we may be spared the disappointment that has too often followed some of our earlier attempts."

I should like to point out that the work of both Kolmer and Brodie<sup>10</sup> has been carefully done and controlled so far as humanly possible.

It is best that we move forward rapidly in an endeavor to prove or disprove the value of the vaccine. It is true that we want to be spared the disappointment if it should fail, but it would be better to risk that disappointment than to proceed too slowly and cautiously, and later awake to find that we have been delaying in the use of a valuable preventive measure.

It would seem logical to select two adjacent primary schools, in several of our cities where epidemiological studies suggest that an infantile paralysis epidemic may occur next year. In the spring vaccinate the children in one school, use the other as a control. School has always adjourned for the summer before the disease becomes prevalent, and the children in adjoining districts would be in contact with each other during the summer. In this manner, the practical value of the vaccine could be determined in the shortest period.

JOHN F. CASEY, M.D.

475 Commonwealth Avenue,

Boston, Mass.,

October 9, 1935

#### REFERENCES

- 1 Flexner S and Lewis P A. Experimental poliomyelitis in monkeys. *J. A. M. A.* 54: 1780 (May 28) 1910
- 2 Avcock W L and Kagan, J R. *J. Immunol.* 14: 85 (Aug.) 1927
- 3 Kolmer J A. and Rule Anna M. *J. Immunol.* 26: 505 (June) 1934
- 4 Kolmer J A. *Am J M Sc.* 188: 510 (Oct.) 1934
- 5 Brodie Maurice. *J. Immunol.* 27: 395 (Oct.) 1934
- 6 Kolmer J A. and Rule Anna M. *J. A. M. A.* 104: 456 (Feb. 9) 1935
- 7 Kolmer J A. and Rule Anna M. *J. Immunol.* 29: 199 (Sept.) 1935
- 8 Kolmer John A. and Rule Anna M. *J. Immunol.* 29: 191 (Sept.) 1935
- 9 Kolmer John A. and Rule Anna M. *J. Immunol.* 29: 175 (Sept.) 1935
- 10 Brodie Maurice and Park, William H. *J. A. M. A.* 105: (Oct. 5) 1935

**EDITORIAL NOTE** The editorial on "polio" vaccines which appeared in the *Journal* of October 3, 1935, asks that the eagerness with which we grasp at any proffered solution of the poliomyelitis problem be tempered with reason. The writer of this editorial feels that merely recommending the trial of a vaccine (even though no assurance of efficacy be given) will be seized upon as a "cure" in view of the recurring surges of alarm. He would have wished for a more convincing demonstration of the efficacy and safety of the vaccine in the experimental animal

before it was released for human use, and rightly goes on to point out some of the statistical difficulties in arriving at a prompt answer to the question of the efficacy of the vaccine.

Dr Casey, on the other hand, in his criticism of the editorial, seems to accept the experimental evidence proffered by the proponents of the vaccine as sufficient justification for its human use, urging that we move forward rapidly in testing it out on children. Unfortunately, the scheme which he proposes to accomplish this—testing out the vaccine in communities shortly to be visited by infantile paralysis—would not be easy of fulfillment.

His own experience with twenty individuals, none of whom showed any general or local reaction to the vaccine, has little bearing on the main question involved, namely, whether the vaccine is a practicable means of preventing infantile paralysis.

#### IS LYMPHOCYTIC MENINGITIS SYMPTOMATIC OF A SYSTEMIC DISEASE?

October 25, 1935

Editor, *New England Journal of Medicine*,

Your editorial entitled "Acute Lymphocytic Meningitis" which appeared in the *Journal*, September 19, 1935, is of considerable importance and the subject is of particular interest to me.

In 1929 when Viets and Watts<sup>1</sup> first reported the syndrome of "acute aseptic meningitis," I was fortunate enough to follow very closely a case with many similar characteristics at the Boston Psychopathic Hospital. This patient showing cerebral symptoms of an organic nature was found to have the typical signs and the blood picture of infectious mononucleosis commonly known as "acute glandular fever," originally described by Longcope<sup>2</sup> in 1922. Because of the uniqueness of the condition this case was reported in detail and published by Dameshek and myself<sup>3</sup> in the *Journal* in 1931 under the title of "Involvement of the Central Nervous System in a Case of Glandular Fever." Reference was made in that article to the earlier communication of Viets and Watts regarding acute lymphocytic meningitis and it was stated that "it is possible that the increase of lymphocytes in the spinal fluid (in such cases) may be associated with a lymphocytosis in the blood although as yet this has not been demonstrated." It was further stated that "the concept of an aseptic meningitis is at best a vague one and almost as all inclusive as the term encephalitis." The concept was emphasized in that article that these conditions were symptomatic of some systemic disease and the suggestion was made that acute lymphocytic meningitis and infectious mononucleosis might be one and the same disease.

During the past few years a number of reports have appeared in the literature concerning the occurrence of this syndrome, variously called aseptic, idiopathic, epidemic and acute lymphocytic meningitis. So far as I am aware there have been no detailed blood studies in such cases and, therefore, it cannot be denied that there may be an etiological

relationship between acute lymphocytic meningitis and infectious mononucleosis. At the same time typical cases of the latter disease have been seen not infrequently and among these there have been no observations on the spinal fluid.

Considerable interest in the subject has developed recently as the result of some experimental investigations on the etiology of acute lymphocytic meningitis. The work of Armstrong<sup>1</sup> of the United States Public Health Service and of Rivers and Scott<sup>2</sup> of the Rockefeller Institute indicates that a filtrable virus is the causative agent of this disease tending to show that the disease is a clinical entity.

It seems to me that the crux of the whole problem lies in the larger concept of various systemic diseases of known and unknown causes, giving rise to changes in the central nervous system. I am inclined to believe that such diseases as infectious mononucleosis still of unknown etiology may produce cerebral changes and conversely so-called acute lymphocytic meningitis like certain of the encephalides is merely symptomatic of some as yet unknown systemic disease.

Very truly yours

SAMUEL H. EPPSTEIN M.D.

415 Commonwealth Avenue,  
Boston Mass

#### REFERENCES

1. Viets, H. R., and Watts, J. W.: J. A. M. A. 93: 1552 (Nov. 16) 1919
2. Lemercrope W. T.: Am. J. M. Sc. 164: 781 (Dec.) 1922
3. Epstein, S. H., and Dameshek, W.: New Eng. J. Med. 186: 1225 (Dec. 1) 1922
4. Armstrong, C., and Little, R. D.: Pub. Health Rep. 49: 1019 (Aug. 31) 1924
5. Rivers, T. M., and Scott, T. F.: M. Science 81: 439 (May 2) 1922.

#### ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON PHARMACY AND CHEMISTRY

Editor *New England Journal of Medicine*,

In addition to the articles enumerated in our letter of September 5 the following have been accepted

Abbott Laboratories

Procaine Hydrochloride — Abbott Tablets 1.14 grains (0.07 Gm.)

Procaine Hydrochloride — Abbott Tablets 2.28 grains (0.15 Gm.)

Ampoules Bismuth Subsalicylate with Butyn—D. R. L. 1 cc.

Robert A. Bernhard

Saf T Top 5% Ferric Chloride in 50% Glycerine 2 cc. and 15 cc.

Saf T Top Isopropyl Alcohol, 98% 2 cc. and 15 cc.

Saf T Top Mercurochrome 2 per cent Solution 15 cc.

Saf T Top Mercurochrome 2 per cent in 25 per cent Glycerine 2 cc. and 15 cc.

Saf T Top Tincture Metaphen, 2 cc. and 15 cc.

Lee Laboratories

Rabies Vaccine Semple Method (Lee)

Lederle Laboratories Inc.

Scarlet Fever Streptococcus Antitoxin, "Globulin-Lederle-Modified"

Refined Diphtheria Toxoid (Alum Precipitated) — Lederle 0.5 cc. vial packages

Wm S Merrell Co

Vioosterol in Oil—Merrell Spertl Process

Ampules Dithane 0.5% in Solution of Sodium Chloride 0.6% 6 cc.

Winthrop Chemical Co., Inc.

Salvarsan 1.2 Gm. tubes

The following products have been accepted by the Council for inclusion in the List of Articles and Brands Accepted by the Council But Not Described in N N R. (New and Nonofficial Remedies 1935 p 445)

Robert A. Bernhard

Saf T Top Tincture Iodine, USP 2 cc. and 15 cc.

Saf T Top Tincture Iodine U S P., 3½% 2 cc. and 15 cc.

Yours sincerely

PAUL NICHOLAS LAFON Secretary

Council on Pharmacy and Chemistry

#### RECENT DEATHS

TUCKER—WILLIS LEROY TUCKER, M.D., of Hinsdale Massachusetts died at his home November 7 1935. He was born in 1872 graduated from the University of Illinois College of Medicine in 1898 and had practiced in Hinsdale for many years.

He served in the World War and had been a member of the board of selectmen and of the school committee in Hinsdale.

ANDREWS—FREDMAN W ANDREWS, M.D., of 50 Peterboro Street Boston, died at the Forest Hills Hospital, November 8 1935.

He was born in Boston the son of Clifford F and Addie (Appleton) Andrews in 1896.

He first qualified as an osteopathic practitioner and is recorded as a physician in the Directory of the American Medical Association but without a record of having an M.D. degree.

He served as official physician to the Back Bay Police Station. He is survived by his widow Mrs. Audrey H. Andrews and a daughter.

#### OBITUARY

##### RESOLUTIONS IN COMMEMORATION OF DR. WALTER A. POLLANO

ADOPTED AT THE NINETY-FOURTH QUARTERLY MEETING  
OF THE ESSEX NORTH DISTRICT MEDICAL SOCIETY

Whereas Dr. Walter A. Pollano died suddenly on June 25 1935 at his home at 233 Haverhill Street, Lawrence, Mass. from a heart attack.

Dr. Pollano was born in Sessa Aurunca, Italy on April 6 1879 and he came to Lawrence when he was twenty-one years old. He was educated in Italy



where he attended the University of Naples In 1915 he became a registered pharmacist and from that time was actively interested in one of the Lawrence drug stores He later studied medicine and received his degree of M D from the Middlesex College of Medicine and Surgery in 1922 He served his in ternership at the Lying-In Hospital in New York. Dr Pollano was affiliated with the American Medi cal Association, and the Massachusetts Medical So ciety becoming a member in 1928 He was also an active member of the Greater Lawrence Medical Association

Whereas, in the death of Dr Walter A Pollano, the Massachusetts Medical Society has lost an hon ored and efficient member, and one held in high es teem and,

Whereas, we keenly feel our loss, and we desire to express some appreciation of his high qualities, his loyalty to his profession, and his friends and,

Whereas, we desire to express our heartfelt sym pathy to his widow and his two small children,

Therefore, be it resolved that this resolution be en tered upon the records of the Society, and that cop ies be sent to his widow, and to *The New England Journal of Medicine*

Signed

N F DeCESARE, M D

N J SCARITO, M D

JOSEPH A SINOLITICO, M D

## NOTICES

### BOSTON UNIVERSITY SCHOOL OF MEDICINE SURGICAL CLINIC AT THE BOSTON CITY HOSPITAL

Friday, November 15, 12-1, Cheever amphitheatre  
Dr William R Morrison, Associate Professor of Surgery, Boston University School of Medicine, will present the following cases

- 1 Intestinal obstruction, with ileostomy
- 2 Fracture of both bones of forearm
- 3 Hypertrophied prostate with multiple urinary calculi

Physicians and medical students are invited

### THE EDWARD K. DUNHAM LECTURESHIP

In 1923 there was founded in memory of Doctor Edward K Dunham (M D, Harvard, 1886), the Ed ward K Dunham Lectureship for the Promotion of the Medical Sciences Among the useful purposes for which the Foundation was established was that of binding closer "the bonds of fellowship and under standing between students and investigators in this and foreign countries" The lecturers are chosen from "eminent investigators and teachers in one of the branches of the Medical Sciences, or of the basic Sciences which contribute toward the advance of Medical Science in the broadest sense" The lec tures, which are given annually, are "free and open to the faculty and students of the Harvard Medical School and College, and all other interested profes sional persons who may profit by them"

The Faculty of Medicine of Harvard University has issued invitations to attend three lectures to be given under the Edward K. Dunham Lectureship for the Promotion of the Medical Sciences on "Re cent Studies on the Functions of the Hypophysis"

Friday, November 22, "What We Have Learned from the Toad Concerning Hypophyseal Functions"

Monday, November 25, "Metabolic Functions of the Hypophysis"

Wednesday, November 27, "The Hypophysis and Diabetes"

At five o'clock at the Harvard Medical School Amphitheater, Building C, by Bernard A Hous say, M D, Professor of Physiology and Director of the Institute of Physiology, University of Buenos Aires

### MEDICAL CLINIC AND STAFF ROUNDS AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 P M on Thursday, November 21, in the amphitheater of the Peter Bent Brigham Hospital, Dr Henry A Christian, Physician in Chief, Hersey Professor of the Theory and Practice of Physic in the Harvard Medical School, will give a medical clinic To it are cordially invited practitioners and medical students

On Saturdays in the wards of the Peter Bent Brigh am Hospital, from 10 to 12, staff rounds will be conducted by Dr. Christian

### UNITED STATES CIVIL SERVICE EXAMINATIONS

The United States Civil Service Commission has announced open competitive examination as follows

#### Public Health Consultants

Applications for various grades of public health consultants, and for public health research assistant, must be on file with the U S Civil Service Com mission, Washington, D C, not later than November 25, 1935

Optional subjects for the consultant positions are maternal and child health, general public health practice, and orthopedics The specialty for the research assistant is maternal and child health.

Vacancies in these positions in the Children's Bureau, Department of Labor, and in the U S Public Health Service, Treasury Department, both in Washington, D C, and in the field, will be filled from these examinations

#### Social Economists

Applications for various grades of social economist positions, Children's Bureau, Department of Labor, must be on file with the U S Civil Service Com mission, Washington, D C, not later than November 18, 1935

Optional subjects are Child welfare administra tion, social service for physically handicapped chil dren, research and demonstration in the prevention and treatment of juvenile delinquency, and re search in problems of child dependency and neglect, or social provision for crippled children  
Certain education and experience are required

Full information may be obtained from the Secretary of the United States Civil Service Board of Examiners at the post office or customhouse in any city which has a post office of the first or the second class or from the United States Civil Service Commission Washington D.C.

## REPORTS AND NOTICES OF MEETINGS

### WORCESTER NORTH DISTRICT MEDICAL SOCIETY

The Worcester North District Medical Society held the most largely attended and most enthusiastic meeting in its history at the State Colony in Gardner Wednesday October 23. The Society was signally honored by the presence of Dr. Charles E. Mongan, President of the Massachusetts Medical Society. Dr. Alexander S. Begg, Secretary of the Massachusetts Medical Society. Dr. William Morrison, Chairman of the Committee of Arrangements for the next annual meeting of the Society, and Dr. M. A. Tighe, Chairman of the Committee on Social Legislation and Insurance, a subcommittee of the Public Relations Committee of the Massachusetts Medical Society. There were about one hundred and forty present. Dr. George P. Norton, President of the Worcester North Society, introduced the speakers and referred to the great honor conferred on the Society by the distinguished guests.

Dr. Mongan showed an intimate knowledge of the history of the local society and recalled that the late Dr. Alfred O. Hitchcock of this city had been president of the state society in 1869 and that Dr. F. H. Thompson Sr., of this city had been a vice-president. He paid a fine tribute to the efforts of the late Dr. Alfred H. Quessy in defeating the Sheppard-Towner bill.

Dr. Mongan said that the state society needs the help of all medical men. The doctor must become politically minded, he said. He no longer can refuse to do his share in great movements many of which cannot be successfully worked out without the cooperation of the physicians.

He argued that conditions in Massachusetts are different from those in many other states and we should work out our own problems.

"The Idealist wants to abolish poverty but it can not be accomplished," he said. "Those who would attempt to carry out their plans along these lines forget that the spirit of America is based on manhood and the acceptance of opportunities. The on fire movement came from Europe and from Oriental countries where all reliance is placed in the head of the country thereby stifling initiative."

"But even in this country the morale has broken down to some extent and persons who a few years ago would spurn government aid now consider it as one of their rights. England has a fine sense of propriety and the English are willing to give for their country. The medical men can do much to

check the present tendency of affairs for they go from home to home, are asked advice and frequently give it.

He asked the members to go to their state representatives or congressmen to prevent bad legislation.

"There is no need of compulsory health insurance in this state, for the doctors have always given the highest type of service. There is a difference between public health and private health. Compulsory health insurance means that everyone with a salary of \$3000 per year or less must have health insurance, the employer and employee each to pay 40 per cent and the state 20 per cent of the cost."

He called for concerted action by the public to defeat the enforcement of the provisions of the compulsory health insurance act.

Dr. Tighe said that the two influences aiding the passage of the compulsory health act were the report of a committee of four appointed by the administration, no one of which committee was a doctor and the depression.

"This latter was duck-soup for the idealists," he said. It was what they were waiting for. As a result, President Roosevelt appointed a national security committee whose task was to cure all the social evils. Since no doctors were on this committee the secretary of labor Miss Perkins appointed her own group, three of whom were doctors but they are sick of their jobs already.

The delegates of the American Medical Association oppose this feature. The Councilors of the Massachusetts Medical Society have joined them in their opposition and the Public Relations Committee has set out on a program of publicity and education of the people to mould public opinion against this iniquitous bill."

Dr. Alexander S. Begg, Secretary of the State Medical Society, gave a brief talk, congratulating the members on the splendid attendance, despite the heavy rainfall.

Dr. Morrison, Chairman of the Committee of Arrangements of the next Annual Meeting of the State Society to be held in Springfield, June 8, 9 and 10, gave a résumé of the plans.

Dr. Thomas R. Donovan, Supervisor of the Board of Censors, announced that the next meeting of the Censors would be held at the Burbank Hospital Thursday November 7 at 4 P.M.

Dr. Edward A. Adams told of the courses given in postgraduate instruction in the district. A motion by Dr. Walter F. Sawyer was passed whereby the cancer clinics of the district will be operated separately.

A splendid buffet lunch was served and a vote of thanks given to the speakers.

FRANCIS W. McMURRAY, M.D., Secretary

### MASSACHUSETTS PSYCHIATRIC SOCIETY

The eleventh annual meeting of the Massachusetts Psychiatric Society was held on October 29, 1936 at the Parker House Boston.

The following officers were elected for the coming year

President, Dr Charles E Thompson.  
Vice President, Dr Oscar J Raeder  
Secretary Treasurer, Dr W Franklin Wood  
Councilors, Dr C Macfie Campbell, Dr Joseph E Barrett.

A large attendance listened with keen interest to Dr George Sarton's illuminating address on "Genius" He showed in the development of his subject the necessity of discounting the psychopathic tendencies in the various types of genius He emphasized the point that the now popular type of "de bunking" biography often lays too much stress on these psychopathic traits and does not sufficiently feature the extraordinary talent of the particular genius, for which alone he is interesting He said that all the traits of such a great man can be imitated except his genius—that is peculiarly his own

OSCAR J RAEDEB, M D, *Secretary-Treasurer*

#### ESSEX SOUTH DISTRICT MEDICAL SOCIETY

A stated meeting of Essex South District Medical Society was held at the Beverly Hospital, November 6, 1935

An interesting and instructive clinic was held at 5 P M, followed by a dinner at 7 P M The guest speakers, at the evening meeting, were Dr Charles E Mongan, President of the Massachusetts Medical Society, Dr Michael A Tighe, Chairman of the Committee on Social Legislation and Insurance, a subcommittee of the Public Relations Committee of the Massachusetts Medical Society and Dr Alexander S Begg, Secretary of the Massachusetts Medical Society

Dr Mongan reminded the members of their splendid professional heritage and of their consequent responsibility for good influence in the community and interest in the community welfare His appeal was for careful appraisal of so-called "economic security", supporting the good in it and preventing the bad

He also appealed for the profession, as a whole, to become professionally and politically conscious for the benefit of the country

Dr Tighe, of Lowell, Mass, reviewed briefly the history of "Compulsory Sickness Insurance" in England and Germany

Citing the vote of the American Medical Association to disapprove all Compulsory Sickness Insurance and the approval of this stand by the Massachusetts Medical Society, he called especial attention to the fact that the Massachusetts Medical Society had initiated a campaign of public education concerning Compulsory Sickness Insurance

He expressed his absolute faith in public opinion when rightly informed and was confident that a high degree of interest in public good existed among the laity and that the press could always be relied upon correctly to interpret this interest, without political bias

Dr Begg complimented the Staff of the Beverly Hospital for the valuable clinic presented to the medical society and graciously offered the facilities of his office in any way that might benefit any district society NATHANIEL POPE BREED, M.D, *Reporter*

#### HAMPDEN DISTRICT MEDICAL SOCIETY

From eighty to ninety members and guests attended a meeting of the Hampden District Medical Society held at the Academy of Medicine, Springfield, October 29, 1935 The President, Dr Theodore S Bacon, presided

The paper for the afternoon was on "Recent Advances in Medicine", by Dr Reginald Fitz, of Boston

Dr Fitz touched rather briefly on the question of State Medicine, its possibilities and its disadvantages He praised the high degree of efficiency attained by organized medicine in the American Expeditionary Forces in the World War He cited diseases formerly considered rather hopeless in which recent advances have radically changed our attitude, e g, arthritis, hypertension, especially of the functional type, and certain formerly obscure endocrine disturbances, also the anemias and cardiovascular renal disease He mentioned dietetics as a field in which marked advances had been made through careful observation and experimental work He is of the opinion that the state of adolescence will yield a rich return if carefully studied It is here that the apparent results of endocrine therapy may be misleading Methods recently introduced for the clinical study of the peripheral circulation and of the blood and blood forming organs in the anemias were mentioned and the present status of classification of the anemias, which fall roughly into well defined groups and a borderline one, more or less composite Some recent surgical methods developed in the treatment of conditions formerly regarded as entirely medical were referred to and the work of the Mayo and Lahey Clinics and of a surgical group in Michigan Dr Fitz believes that at no time has the medical profession been more alive and forward looking than at present

After a standing vote of thanks to Dr Fitz the meeting adjourned and a buffet supper was served

ANDREW PETERS, M D, *Reporter*

#### CLOVER HILL HOSPITAL

Lawrence, Mass

The next medical meeting of the Clover Hill Hospital will be held in the reception room of the hospital at 161 Berkeley Street, Lawrence, on Thursday afternoon, November 21, 1935, at 4 30 P M

Speaker George R Minot, M D, Professor of Medicine at Harvard University

Subject "The Etiology, Diagnosis and Treatment of Nutritional Deficiency Anemias"

The lecture will be illustrated with lantern slides Discussion will follow A clinical exhibition arranged by Lawrence physicians may be seen following the lecture All physicians of Lawrence and vicinity are cordially invited to attend

EDWARD MACK SMITH, M D, *Chairman*

# THE BOSTON HEALTH LEAGUE AND THE MASSACHUSETTS CENTRAL HEALTH COUNCIL

A Luncheon Meeting of the Boston Health League and the Massachusetts Central Health Council will be held at The Parker House Boston on Thursday November 21 1935 at 12 30 P.M.

Dr Carl Buck Field Director of the American Public Health Association will speak on 'New Horizons in Public Health Work'

## NEW ENGLAND PHYSICAL THERAPY SOCIETY

The New England Physical Therapy Society will meet at 8 P.M. on Wednesday November 20 at the Hotel Kenmore 490 Commonwealth Avenue, Boston.

### PROGRAM

Treatment of Prostate Pathology George C Prather M.D., Boston George E. Percy M.D. Salem

Opening comments by DeWitt G. Wilcox M.D., Newton, and William D. McFee M.D., Boston followed by general discussion

Special dinner arrangements have been made for a table in the Empire Room of the Kenmore at 6 30 P.M. Members and guests are urged to take advantage of this social hour

The council will meet at 6 P.M.

All members of the medical profession are cordially invited to attend

WILLIAM D. McFEE, M.D., Secretary

41 Bay State Road  
Boston Mass

## NEW ENGLAND HEART ASSOCIATION

Boston City Hospital

Amphitheatre of the Mallory Institute of Pathology (Entrance at 784 Massachusetts Avenue)

Monday November 25 at 8 15 P.M.

### PROGRAM

- 1 Demonstration of Pathological Specimens
- 2 Amyloid Heart. Dr G. Kenneth Mallory
- 3 The Mechanism and Treatment of Postural Hypertension. Dr L. B. Ellis and Dr Florence Haynes
- 4 The Significance of Precordial Leads in Cardiac Infarction — Clinical Pathological Correlation. Dr James M. Faulkner
- 5 Recent Observations on the Functional Properties of the Vascular System and on the Hemodynamics in Arterial Hypertension. Dr Soma Weiss
- 6 The Nature of the Peripheral Resistance in Arterial Hypertension with Special Reference to the Vasomotor System. Dr Myron Prinzmetal and Dr Clifford Wilson.
- 7 The Electrocardiogram in Bacterial Endocarditis as Contrasted with Rheumatic Carditis. Dr Maurice S. Segal.
8. The Significance of Differential Venous Pressure Measurements. Dr Eugene B. Ferris, Jr. Presented by Dr Robert W. Wilkins

- 9 Malignant Hypertension of the Pulmonary Circuit (?) Dr Frederic Parker Jr., and Dr Soma Weiss

## HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held in the Peter Bent Brigham Hospital Amphitheatre (Shattuck Street Entrance) Tuesday evening November 26 at 8 15 P.M.

### PROGRAM

Presentation of Cases.

The Mechanism and Effects of Abdominal Compression in the Treatment of Pulmonary Tuberculosis By Dr Burgess Gordon, Associate Professor of Medicine Jefferson Medical College

Medical students and physicians are cordially invited to attend.

MARSHALL N. FULTON M.D., Secretary

## CARNEY HOSPITAL

### CLINICAL MEETING

A Clinical Meeting of the Carney Hospital will be held at 8 30 P.M. on Monday November 18

### PROGRAM

Blood Transfusion By Dr Lewis S. Pilcher (Lantern Slides)

The Routine Management of Diabetic Patients By Dr C. W. Finnerty

Physicians and medical students are invited.

## SOCIETY MEETINGS CONGRESSES AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY NOVEMBER 18, 1935

Monday November 18—

- 9 10 A.M. Boston Dispensary, 25 Bennett Street, Boston. Blood Clinic. Dr William Dameshek
- 8 P.M. Medical Historical Pageant. Boston Medical Library 6 Fenway
- 8 30 P.M. Carney Hospital Clinical Meeting

Tuesday November 19—

- 9 10 A.M. Boston Dispensary 25 Bennett Street, Boston. Back Strain—Sciatica. Dr F. R. Ober
- 13 Noon South End Medical Club office of the Boston Tuberculosis Association 554 Columbus Avenue Boston
- 2 30 P.M. Pediatric Ward Visit. Massachusetts Eye and Ear Infirmary
- 7 45 P.M. Gardner Auditorium State House, Boston. "The Child and the Modern World." Lawson G. Lowrey M.D.

Wednesday November 20—

- 9 10 A.M. Boston Dispensary 25 Bennett Street, Boston. Ward Cases. Dr B. J. Thannhauser
- 11 2 A.M. Clinico-Pathological Conference. Children's Hospital
- 1 P.M. Massachusetts Society for Mental Hygiene Twentieth Century Club Boston
- 8 P.M. New England Physical Therapy Society Hotel Kenmore, Boston

Thursday November 21—

- 8 30 9 30 A.M. Clinic Surgical Staff of the Peter Bent Brigham Hospital, at the Peter Bent Brigham Hospital
- 9 10 A.M. Boston Dispensary, 25 Bennett Street, Boston. "Interviewing a Patient." Professor Elton Mayo.

12 30 P M The Boston Health League and the Massachusetts Central Health Council. The Parker House, Boston.

\*3 30 P M. Medical Clinic at the Peter Bent Brigham Hospital

5 P M. Lecture on "The Care of the Patient," Harvard Medical School, Amphitheatre C

Friday, November 22—

\*9-10 A.M. Boston Dispensary, 25 Bennet Street, Boston Ward Cases Dr S J Thannhauser

12 M Clinical Meeting of the Children's Medical Staff. Ether Dome, Massachusetts General Hospital

5 P M. The Edward K. Dunham Lectures Harvard Medical School Amphitheatre, Building C

Saturday, November 23—

\*9-10 A.M. Boston Dispensary, 25 Bennet Street, Boston. Liver Disease (Continued.) Dr S J Thannhauser

\*10-12 Staff rounds at the Peter Bent Brigham Hospital.

\*Open to the medical profession

†Open to Fellows of the Massachusetts Medical Society

November 14—Harvard Medical School Lecture on "The Care of the Patient," Dr Arthur R. Crandell Amphitheatre C at 5 P M

November 15—New England Roentgen Ray Society will meet at the Massachusetts Eye and Ear Infirmary, 243 Charles Street, Boston, at 8 15 P M

November 15—Boston Floating Hospital Staff Meeting will be held at 12 noon.

November 15—Boston University School of Medicine Surgical Clinic at the Boston City Hospital See page 1000

November 18—Medical Historical Pageant. See page 993

November 18—Carney Hospital, Clinical Meeting See page 1003

November 19—Lawrence Cancer Clinic, Lawrence General Hospital One Garden Street, 10 A M

November 19—The South End Medical Club will meet at the office of the Boston Tuberculosis Association 554 Columbus Avenue, Boston, at 12 noon

November 20—Massachusetts Society for Mental Hygiene will meet at the Twentieth Century Club Boston, at 1 o'clock.

November 20—New England Physical Therapy Society See page 1003

November 21—Harvard Medical School Lecture on "The Care of the Patient." Dr David D Scannell Amphitheatre C at 5 P M

November 21—Medical Clinic at the Peter Bent Brigham Hospital See page 1000

November 21—The Boston Health League and the Massachusetts Central Health Council See page 1003

November 21—Clover Hill Hospital See page 1002

November 22, 25, and 27—The Edward K. Dunham Lectures Harvard Medical School See page 1000

November 25—New England Heart Association See page 1003

November 26—Harvard Medical Society See page 1002

December 5-7—National Society for the Prevention of Blindness See page 940, issue of November 7

December 13—William Harvey Society Beth Israel Hospital 8 P M

## DISTRICT MEDICAL SOCIETIES

### FRANKLIN DISTRICT MEDICAL SOCIETY

Meetings are held on the second Tuesday of January, March and May at the Weldon Hotel, Greenfield, at 11 A.M.

CHARLES MOLINE, M.D., Secretary

### NORFOLK DISTRICT MEDICAL SOCIETY

November 26—Norwood Hospital at 8 P M Papers by the staff

January 28, 1936—Hotel Kenmore at 8 P M Dr Benedict F Boland—Cauterization of the Cervix Uteri Using Various Electrical Methods Illustrated with lantern slides

February 25, 1936—Massachusetts Memorial Hospitals at 8 P M. Papers by the staff.

March 31, 1936—Hotel Kenmore, at 8 P M (Subject to be announced)

May, 1936—Annual Meeting (Place, date and subject to be announced)

The censors meet for the examination of candidates May 7, 1936, November 5 1936

FRANK S CRUICKSHANK, M.D.  
1236 Beacon Street, Brookline, Massachusetts

### PLYMOUTH DISTRICT MEDICAL SOCIETY

November 21—State Farm

January 16—Goddard Hospital Subject and speakers to be announced later.

March 19—Plymouth County Sanatorium, South Hanson

April 16—Brockton Hospital

May 21—Lakeville State Sanatorium

G A. MOORE, M.D., Secretary

### SUFFOLK DISTRICT MEDICAL SOCIETY

December 11—Joint Meeting with the New England Heart Association at the Boston Medical Library "Constrictive Disease of the Pericardium" Dr Charles Sidney Burwell Discussion Dr Edward D Churchill and Dr Paul D White

January 29, 1936—Joint Meeting with the Boston Medical Library at 8 Fenway "Observations Around the World," Dr Walter B Cannon

March 18, 1936—Meeting at the Boston Medical Library "The Laboratory and Clinical Story of Fatigue," Dr Arlie V Bock and Dr David B Dill Discussion Dr Donald J MacPherson and Dr Augustus Thorndike, Jr

April 29, 1936—Annual Meeting at the Boston Medical Library "The Treatment of Septicaemia," Dr Champ Lyons "The Pleurality of Scarlatinal Streptococcus Toxin," Dr Sanford B Hooker Discussion Dr Hans Zinsser

The medical profession is cordially invited to attend all of these meetings

ROBERT L DeNORMANDIE M.D., President,  
CHARLES C LUND M.D., Secretary,  
FRANCIS T HUNTER, M.D.,  
Boston Medical Library

### WORCESTER DISTRICT MEDICAL SOCIETY

November 20—Special meeting See page 949, issue of November 7

December 11—Wednesday evening St Vincent Hospital Worcester, Mass Dinner and scientific program Subjects of program to be announced later

January 8, 1936—Wednesday evening Worcester City Hospital, Worcester, Mass Dinner and scientific program Subjects of program to be announced later

February 12, 1936—Wednesday evening Worcester State Hospital Worcester, Mass Dinner and scientific program Subjects of program to be announced later

March 11, 1936—Wednesday evening Memorial Hospital, Worcester, Mass Dinner and scientific program. Subjects of program to be announced later

April 8, 1936—Wednesday evening Hahnemann Hospital Worcester, Mass Dinner and scientific program Subjects of program to be announced later

May 13, 1936—Wednesday afternoon and evening Annual Meeting of Society Time, place and details of program to be announced in an April issue of the Journal

ERWIN C MILLER, M.D., Secretary

## BOOK REVIEW

New and Supplementary Facts and Figures About Tuberculosis Jessamine S Whitney 46 pp New York National Tuberculosis Association \$50

This pamphlet, published in June, 1935, by the National Tuberculosis Association, is complementary to an earlier compilation of facts and figures about tuberculosis issued in 1931. It consists of forty nine elaborate tables including a group of tables of great importance on tuberculous infection.

To those who are investigating and writing on the mortality and morbidity of tuberculosis and who need statistical information of any kind whatsoever on this subject, this booklet will prove a veritable mine of useful, accurate and up to-date information

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## NEW ENGLAND BRANCH AMERICAN UROLOGICAL ASSOCIATION

### TORSION OF THE APPENDIX TESTIS\* (HYDATID OF MORGAGNI)

#### Report of Two Cases

BY JOHN S. RHODES, M.D.†

**T**ORSION of the appendix testis is so rare that the condition is seldom thought of in the differential diagnosis of lesions of the scrotum. No description of the condition can be found in textbooks on Urology with the exception of Hinman's recently published book.<sup>1</sup> The signs and symptoms are very similar to those seen in other acute diseases of the scrotum.

The first case report of torsion of the appendix testis was recorded by Colt<sup>2</sup> who in 1922 described a case seen in the Royal Infirmary at Aberdeen, Scotland in August 1921. Albert Mouchet<sup>3</sup>, a Frenchman, is credited with the first detailed pathological description of this condition and in 1928 he reported three personal cases. Dix<sup>4</sup> in a review of the literature in 1931, collected forty seven cases. To date only two cases have been recorded in the North American literature, both from the Boston Children's Hospital by Foshee<sup>5</sup> in 1932. Since September 1934 two cases have been seen at the Massachusetts General Hospital.

The appendix testis is a remnant of the cephalic end of the Mullerian duct. It is a pea sized structure, usually sessile but occasionally pedunculated, located near the upper pole of the testicle and is present in the majority of individuals. Normally, it is cystic, containing transparent liquid and is lined with cylindrical epithelium.<sup>6</sup>

#### REPORT OF CASES

**CASE 1.** O. Z., a thirty nine year old Greek poultry raiser, came to the hospital September 17, 1934 with the story that four weeks before entry he had been "kicked in the scrotum by a pet rooster." He immediately had severe pain in the left side of the scrotum accompanied by dizziness and nausea and found it necessary to lie on the ground for a few min-

utes. Throbbing pain in the left testicle kept him awake that night but was less severe on the following day. At this time the patient noticed swelling of the left part of the scrotum. His doctor advised rest in bed and ice packs to the scrotum. The pain gradually subsided but the swelling persisted and the patient was referred to the hospital. There were no urinary symptoms.

On examination the left side of the scrotum was enlarged four to five times its normal size. It was tense smooth and did not transmit light. The testicle and epididymis could not be distinguished. There was very slight tenderness. The urine was negative and the temperature was normal.

Hematocele was thought to be the most likely diagnosis. Operation was done under spinal anesthesia. The scrotum was incised and the tunica vaginalis was freed and delivered. When opened three to four ounces of dark blood and blood clot escaped. A round mass the size of an English walnut and thought to be a necrotic testicle was exposed. An orchidectomy was done by amputating the cord at the external inguinal ring. The scrotum was closed except for a small rubber drain.

Further examination revealed that the structure taken to be testicle was really the appendix testis. The tunica albuginea was thickened and covered with fibrin but the testicle and epididymis were normal.

**CASE 2.** I. G., a Jewish boy of eleven years, entered the hospital April 6, 1935 complaining of severe pain in the left lower quadrant and left side of the scrotum of forty-eight hours duration. There was no history of trauma. There had been no nausea or vomiting and no change in bowel habits. The temperature was 100 and the white blood count 11,200.

On examination the left side of the scrotum was found to be enlarged twice its normal size and the overlying skin was reddened. The cord was not thickened. The child would not tolerate examination of the testicle because of tenderness.

A diagnosis of torsion of the testicle was made and operation was performed immediately under ether anesthesia. The tunica vaginalis was exposed and opened. About one ounce of clear yellowish fluid was expelled. The testicle and epididymis were grossly normal. Near the upper pole of the testicle there was found a pedunculated bluish, oblong mass about the size of an almond (Fig. 1). The twisted pedicle was clamped, ligated and divided and the mass removed. The scrotum was closed without drainage. Convalescence was uneventful and the child was discharged after five days.

From the Urological Service of the Massachusetts General Hospital.

Read at the meeting of the New England Branch of the American Urological Association, Boston, April 28, 1935.

†Rhodes, John S.—Resident Urologist, Massachusetts General Hospital. For record and address of author see "This Week's Issue," page 1018.

## ETIOLOGY

The etiology of torsion of the appendix testis is obscure. The lesion occurs in individuals in whom this structure is pedunculated. Foshee<sup>6</sup> has suggested that a sudden and violent ere-

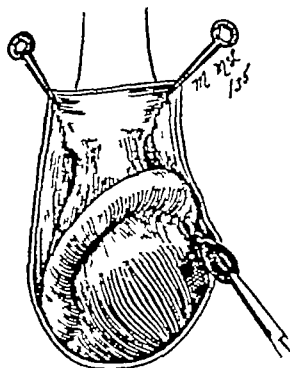


FIG 1 The gangrenous appendix testis is held in the forceps

masteric reflex is the probable cause of torsion of the pedicle. The history of trauma may be lacking.

## INCIDENCE

The age incidence in sixty-one cases, of which fifty-nine have been collected from the literature, has varied between eleven months and sixty-six years. Only three cases have been more than sixteen years of age.

## PATHOLOGY

Torsion of the pedicle results in necrosis due to the loss of blood supply. Foshee has described edema of the testicle and epididymis. In the two cases observed by the author there was no gross evidence of any change in the testicle or epididymis and in Case 1 these structures were microscopically normal. There is usually an accumulation of clear fluid within the tunica vaginalis. This fluid may be bloody as in Case 1. Culture of the fluid removed in Case 2 gave no growth. Necrosis was too advanced to permit histological study of the specimens from either of our cases. The gangrenous appendix testis may become detached from the testicle and be found floating free within the tunica vaginalis.<sup>8</sup>

## SIGNS AND SYMPTOMS

The common symptoms are the sudden onset of pain in the scrotum which may radiate into the groin. The pain may be accompanied by dizziness and nausea and is usually followed by swelling and retraction of the scrotum on the affected side. The overlying skin may become reddened. There is often slight rise in

the temperature and white blood count during the early acute stage. The symptoms are not always severe. Mouchet has described a case in which retraction of the affected side of the scrotum and syncope were the only signs.

## DIAGNOSIS

The diagnosis of torsion of the appendix testis is difficult and seldom made before operation. This condition may be confused with acute epididymitis, orchitis or torsion of the testicle. Careful palpation, when tolerated by the patient, may reveal a small, tender nodule located near the upper pole of the testicle and distinct from the epididymis and testicle. The signs of inflammation and the elevation of temperature are usually more marked in acute epididymitis and orchitis. Both orchitis and acute epididymitis commonly occur in the presence of infection elsewhere, either in the urinary tract or in other parts of the body. Torsion of the testicle is likely to result in greater thickening of the spermatic cord.

## TREATMENT

Granting that a diagnosis can be made without operation, the acute symptoms may be expected to subside gradually under palliative treatment. Early operation will confirm the diagnosis and hasten convalescence. The incision may be made in the inguinal region or over the scrotum as the operator chooses. In addition to the removal of the gangrenous appendix testis, excision of the redundant tunica vaginalis is desirable in the presence of a large amount of hydrocele fluid.

## CONCLUSIONS

1. Two additional cases of torsion of the appendix testis are described.
2. The diagnosis is difficult and should be considered in all acute lesions of the scrotum, especially through the age of adolescence.
3. Operative removal of the strangulated appendix testis is the treatment of choice.

## REFERENCES

1. Hinman, Frank. *The Principles and Practice of Urology*. Philadelphia, W. B. Saunders Company, P. 801, 1935.
2. Colt, G. H. Torsion of the hydatid of Morgagni. *Brit. J. Surg.* 9: 464 (Jan.) 1922.
3. Mouchet, A. Sur une variété d'orchite aiguë de l'enfance due à une torsion de l'hydatide de Morgagni. *Presse méd.* 31: 485 (May 30) 1922. Les formes frustes de la torsion de l'hydatide de Morgagni. *Presse méd.* 36: 1345 (Oct. 24) 1926.
4. Dix, V. W. On torsion of the appendages of the testis and epididymis. *Brit. J. Urol.* 3: 245 (Sept.) 1931.
5. Foshee, C. H. Torsion of the appendix testis. Report of two cases. *J. A. M. A.* 99: 289 (July 23) 1932.
6. Testut, Traité d'Anatomie Humaine 6: 468.
7. Contades, X.-J. et Méricot, L. A propos de deux cas d'hydrocèle secondaire à la torsion de l'hydatide de Morgagni. *Annals d'Anat. et Path.* 9: 785 (Nov. 30) 1932.
8. Glass, E. Ein selten grober freier Körper in einer Hydrocele testis. *Zentralbl. f. Chir.* 47: 267 (Mar. 20) 1920.

EXPERIMENTAL AND CLINICAL OBSERVATIONS  
ON URINARY CALCULI\*

BY C C HIGGINS, M.D.†

NUMEROUS clinical observations have been made which support the contention that a relationship exists between the formation of urinary calculi and a deficiency in the diet. The clinical observations of McCarrison<sup>1</sup> of India indicate that stone areas occur in parts of that country where a properly balanced diet is not followed. Similar observations have been made by Fujimaki<sup>2</sup> and other observers. In the United States, stone areas are said to exist in southern Florida and southern California, and in England, Joly<sup>3</sup> states that calculous disease is more prevalent in Westmoreland and Derbyshire. Joly also has stated that in countries where progress in the knowledge of diet and nutrition has occurred, we have been rewarded by a decrease in calculous disease in children, while in countries where the children do not have a well balanced diet calculous disease still is quite prevalent. Osborne and Mendel<sup>4</sup>, in the course of a series of investigations dealing with dietary problems, noted that calculi developed in a certain percentage of the experimental animals. This was true, however, only of the rats that have been on a diet deficient in vitamin A during some part of the experiment.

I should like to review briefly the experimental work that we have been doing for the past four years.

The effect of the withdrawal or of a deficiency in the various vitamins was studied to determine the exact relationship between the production of calculi and a deficiency in the specific vitamins. Likewise, the effect of inadequate amounts of fat, protein, carbohydrate and the various salts was studied. In experimental work with dietary problems, extreme care must be taken in the preparation of the foods or a misinterpretation in results will occur. It is essential that the necessary proteins, fats and carbohydrates and the various salts be included in the diet and the food must contain the required number of calories and it must also be palatable.

After the rats have been maintained on a diet deficient in vitamin A for twenty-nine days the first signs of vitamin A deficiency which are manifested are xerophthalmia, loss of weight and if small amounts of vitamin A are not restored to the diet at this time, the rats become cannibalistic, the stronger rats prey on the weaker and some die from intercurrent infection.

The incidence of urinary calculi that can be

formed in the white rat that is maintained on a diet deficient in vitamin A is shown in the following table

## EXPERIMENTAL PRODUCTION OF URINARY CALCULI

200 ALBINO RATS—25 CONTROLS			
Number of Rats	Duration of Experiment Days	Bladder Calculi	Per Cent
30	1-30	1	3
28	30-60	4	14
42	60-90	18	38
28	90-130	20	71
30	130-180	26	86
17	180-250	15	88

Twenty-five controls 1 showed sand in bladder

## EXPERIMENTAL PRODUCTION OF URINARY CALCULI

Number of Rats	Duration of Experiment Days	Kidney Calculi	Per Cent
30	1-30	0	0
28	30-60	0	0
42	60-90	6	14
28	90-130	8	28
30	130-180	9	30
17	180-250	7	41

Twenty-five controls No renal calculi

## EXPERIMENTAL PRODUCTION OF BILIARY CALCULI

Number of Rats	Duration of Experiment Days	Biliary Calculi	Per Cent
30	1-30	0	0
28	30-60	0	0
42	60-90	0	0
28	90-130	2	7
30	130-180	4	13
17	180-250	4	14

Twenty-five control rats No biliary calculi

It will be noted that bladder calculi form at an earlier period than do kidney calculi. Likewise, at the end of 250 days, small stones are found in the livers of these animals in from twelve to fourteen per cent of the cases.

The question also arises as to the possible relationship between infection and the formation of urinary calculi. In our experimental work it was found that the incidence of infection was practically equal to that of the calculus formation. The chemical analysis of stones showed that they were composed of calcium and magnesium phosphate with traces of carbonate. Neither uric acid nor oxalates were found to be present. There was also a small amount of mucoid substance.

When it had been demonstrated that stones could be produced by a diet deficient in vitamin

Read at the meeting of the New England Branch of the American Urological Association, Boston, April 25, 1938.  
Higgins, C. C.—Member of the Surgical Staff, Cleveland Clinic. For record and address of author see "This Week's Issue," page 1499.



A and that they could be prevented by the addition of vitamin A to the deficiency diet, the question arose regarding whether stones could be caused to undergo solution when vitamin A was restored to the diet. A group of rats, therefore, was maintained on a deficiency diet for a sufficient period of time to allow the stones to be demonstrated roentgenographically. These rats were then maintained on the same diet but cod liver oil was given daily by mouth by means of a medicine dropper. In every instance, if the rat survived for a sufficient period of time, the stones underwent complete solution and when autopsy was performed, no evidence of a calculus remained. The time required to cause a dissolution of the stone, however, seemed to depend directly upon the degree of infection present in the kidney and likewise upon the amount of kidney damage present which reduced the function of the individual kidney. In the absence of infection or any degree of renal damage, the stones underwent solution with considerable rapidity.

At this time, we decided to determine whether an alteration of the constituents of the diet would cause a change in the chemistry of the calculi which were produced. As I reported in previous communications<sup>5, 6</sup>, when the phosphorus was reduced to a minimum, in comparison with the calcium present in the diet, the chemistry of the stones which were produced was changed considerably. The stones produced after the phosphorus intake was reduced were composed chiefly of calcium carbonate with traces of calcium magnesium phosphates. Again no uric acid or oxalates were present. We then decided to attempt to produce calculi in other animals whose diet had been deficient in vitamin A and a group of dogs was therefore studied. I was fortunate in seeing with a veterinarian a dog which had had stones in the bladder at frequent intervals and had had two previous cystotomies with the removal of stones from the bladder. Upon analyzing the diet of this dog, it was found that his diet was definitely deficient in vitamin A. Stones removed from the bladder were composed chiefly of calcium and magnesium phosphate with only traces of carbonate. In our experimental work with other dogs, after they had been maintained on a deficiency diet for a period of seven and one-half months, a cystotomy was performed. In four of the seven dogs that have been operated upon up to the present time, multiple stones were found in the bladder in three instances. One stone was allowed to remain in the bladder which was then closed in the usual manner as was the abdominal wall. These dogs are now on a diet high in vitamin A in an attempt to determine whether the stones produced in the dogs also will undergo solution.

At the present time, the work of the production of uric acid stones is being studied. This

work is carried out on chickens and pure bred Dalmatian dogs, and a report of this will be published in a later communication.

From this experimental work, it seemed that we had sufficient data to permit us to apply our results in clinical cases. After considerable deliberation, we decided that the cases in the following groups might be suitable for medical treatment:

1 Cases in which the patient refused removal of the calculus by surgery.

2 Cases in which bilateral renal calculi were present but in which surgical intervention was not deemed advisable.

3 Cases in which calculi were present in one of the calices of the kidney but were not producing obstruction.

4 Cases in which small calculi were present in the renal pelvis but did not produce obstruction.

5 Cases in which calculi were passed at frequent intervals but could not be demonstrated roentgenographically.

6 Cases in which calculi were of sufficient size to require nephrectomy.

7 In orthopedic cases such as osteomyelitis or fractures where the recumbent position was required for a long period of time. It is known definitely that calculi may form under such conditions.

8 Cases in which prevention of the recurrence of lithiasis following operative removal of stones was desired.

The following routine has been adopted in cases where medical treatment is anticipated. The patients are hospitalized for a period of from three to seven days while the necessary examinations of the blood and urine and x-ray studies are made.

A plain roentgenogram and stereoscopic study is first made. These show whether stones are actually present, whether they are unilateral or bilateral, and whether coexisting stones are present in the ureter or the bladder. This is followed by a cystoscopic examination. After visualization of the bladder, catheters are passed to both kidney pelves. Specimens are taken in glucose brain broth for culture. Likewise, a specimen is collected in order that we may have a stained slide of the sediment. Two cubic centimeters more are collected for pH determination and the usual cytological examination. A fractional phenolsulphonphthalein function test is made.

In all cases, a catheterized specimen of urine is taken from each kidney for a pH determination. This is done in view of the fact that we have found in some instances (17 cases) a definite difference in the pH of the urine from a kidney containing a stone, especially if the stone is of the calcium-phosphate type. In

one instance, the pH of the urine from the kidney in which a stone was located was 8.4 and triple phosphate crystals were present, while in the normal kidney, the pH was 5.2 and no phosphate crystals were present. Therefore it can readily be seen that the pH of the bladder urine is not always a true interpretation of the acidity or alkalinity of the urine as it comes from the kidney.

The following day after the spasm of the ureters which results from the passage of the catheters has subsided, an intravenous urogram is done. This shows whether stones are producing an obstruction and also gives additional information regarding the function of the kidney. If it is obvious that a definite obstruction is present or that the patient is having sufficient discomfort and pain from the presence of a stone, surgical intervention is necessary. It certainly would be unwise to temporize with an obstructive lesion of the upper urinary tract and to sacrifice the renal parenchyma while the patient is on the dietary régime.

Certain blood examinations are quite important. Calcium, phosphorus, phosphatase, urea, uric acid, creatinin and sugar determinations are made routinely. If an elevation of the blood calcium is found and a lowered blood phosphorus, our attention is drawn to the possibility of the presence of parathyroid disease and the patient is studied more closely along this line. Likewise, if there is an elevation of the blood uric acid, naturally it is important that the purines and the various foods in the diet that tend to elevate the blood uric acid be minimized. If the patient has passed a calculus previously, this is analyzed in our chemical laboratories. A routine Jeans test is made in order to determine whether clinical evidence of vitamin A deficiency is present.

After all these data have been secured, we can tell whether the patient is suitable for conservative treatment and the high vitamin A acid ash diet is prescribed. Vitamin A is given in the form of two Carotene-in-oil capsules three times a day for a period of one month. After this time, one capsule is taken each morning and night.

Patients must follow the diet for a considerable period of time. Because it is so essential that the patient should understand the principles of the diet, the dietitian visits him daily while he is in the hospital to discuss with him why certain foods are allowed and others restricted. She also explains in detail the sample menus which the patient is given to follow when he leaves the hospital. It is impressed upon the patient that if satisfactory results are to be secured, the diet must be followed as closely as a diabetic patient adheres to his diabetic régime.

No specific diet can be used in all cases but the diet must be prescribed in each individual case depending upon the pH determinations of

the urine and the blood chemistry. As a general rule, we start with an excess of acid or alkaline ash of approximately 17.3 cc. depending upon the pH of the urine from the kidney harboring the calculus. However, in the presence of a proteus infection or of poor renal function, it frequently is necessary to change this to twenty or thirty cc. during the first few days of hospitalization. Likewise, in some instances, it is necessary to administer ammonium chloride in enteric coated tablets to reduce the pH of the urine to a point from 4.9 to 5.2. Since acetone, diacetic acid or beta-oxibutyric acid are not present in the urine, the patient can be maintained on this diet for a considerable period of time.

The patient also is taught to make his own pH determinations which are done one half hour before lunch in order to avoid the effect of the alkaline tide. A simple and inexpensive apparatus\* may be purchased which gives a result of sufficient accuracy that it can be used to follow the patient's progress and to determine whether his diet must be altered or the medication must be increased to maintain the desired pH.

If the pH of the urine remains at the desired level for a period from five to six days, the patient is discharged from the hospital and told to report the daily pH determination to the family physician every two weeks.

I now have six patients in whom I was unable to reduce the pH of the urine below 6.8 or 7.0. In all six of these patients, large bilateral stones, very poor kidney function and a proteus infection were present. In spite of an excess acid ash of twenty-eight to thirty cc. and forty grams of ammonium chloride daily by mouth I was unable to reduce the pH to the desired level during the patient's stay in the hospital. In four instances however between three and five weeks after the patient was discharged, the pH gradually was reduced to approximately 5.2. All these patients had been treated elsewhere previously with the ketogenic diet by excellent men and the pH had not been reduced to the acid side in any of them.

The following cases are a few in which satisfactory results have been secured by the use of the high vitamin A acid ash diet.

CASE 1. The patient was a woman fifty-two years of age, who had large bilateral renal calculi. In spite of marked kidney damage she was able to carry on her daily duties and the blood urea was forty-five mg. per hundred cubic centimeters. When I first saw this patient, seven and one-half months ago a stone had never been passed. Since that time, she has followed the diet and more than 273 small calculi have been passed. It is interesting to note that these patients have very little discomfort when the calculi which resemble a jelly like mass are passed. If however this mass is allowed to stand on filter paper and dehydration occurs a small accumulation of sand and stone is found. When this patient was last seen a roentgenogram revealed a marked decrease in the size of the calculi.

\*This may be purchased from the LaFolte Chemical Products Company, Baltimore, Md.

**CASE 2** The patient was a man fifty two years of age whose condition had been diagnosed as arthritis before he entered the Clinic

A plain roentgenogram showed that a large stone filled the entire right kidney. Operation was advised but the patient refused. The high vitamin A acid-ash was prescribed and five and one-half months later, more than 300 small calculi had been passed. While the stone was undergoing solution roentgen examination revealed the breaking up of the solid mass until it was decreased in size by at least fifty per cent. Unfortunately, at this time, the patient was killed in an automobile accident and we were unable to secure the kidney for examination.

**CASE 3** The patient was a young girl who had a small stone at the ureteropelvic junction. Inasmuch as she did not wish to discontinue her school work, nonoperative treatment was advised. I was able to dislodge the stone with a ureteral catheter causing it to fall back into the kidney pelvis.

The high vitamin A acid ash diet was followed and in a period of five and one-half months, the stone disappeared entirely.

**CASE 4** The patient was a physician who had two recurrent stones in the right kidney. One stone produced a definite obstruction and operation was advised. However, two previous operations had been performed on this kidney and any further surgical procedure was refused.

The high vitamin A acid ash diet was prescribed and three and one-half months later, the large stone in the lower calyx of the kidney had entirely disappeared, and the stone in the pelvis of the kidney was definitely smaller.

**CASE 5** This patient was a physician also.

A plain roentgenogram revealed nine stones in the left kidney. The high vitamin A acid ash diet was followed for seven and one-half months and the stones disappeared entirely.

#### CONCLUSIONS

The following results have been secured by the use of the high vitamin A acid-ash diet in the treatment of urinary calculi.

1 We now have collected a series of twenty-three cases in which stones which were too large to pass spontaneously from the kidney have undergone complete solution as indicated by radiographic studies and by pyelography.

2 We have a group of seventeen patients who passed calculi at frequent intervals. After the high vitamin A acid-ash diet had been followed, all have been entirely free from symptoms for more than two years.

3 During the past two and one-half years, we have had only one instance of recurrent stone formation following operative removal of stones from the upper urinary tract. In this case, the patient did not follow the routine that was outlined for him. I do not wish to infer that postoperatively we only use the high vitamin A acid-ash diet. This is prescribed in addition to the other therapeutic measures that we always have used such as eradication of infection and elimination of stasis. Since this régime has been used the incidence of recurrent stone formation has been reduced from 16.4 to 4.7 per cent in our cases.

4 We also have a series of cases in which

the stones have diminished in size, but insufficient time has elapsed to warrant their complete solution.

5 In other cases, we have been unable as yet to note any decrease in the size of the calculi although the patients have followed the diet for a period of from four to five months. It is impossible to determine whether a noticeable decrease in the size of stones will occur after the diet has been followed for longer periods of time. We do believe, however, that if the stone is not producing definite renal damage, and is not disabling the patient from pain, conservative treatment should be attempted.

6 We are quite certain that, if in addition to the other therapeutic measures which have been used previously, a carefully planned diet is prescribed to which vitamin A is added postoperatively, the recurrent formation of stones can be reduced to a minimum.

#### REFERENCES

- 1 McCarrison R. The experimental prevention of stone in the bladder in rats. *Brit M J* 2: 159 (July 30) 1927.
- 2 Fujimaki Y. Formation of urinary and bile duct calculi in animals fed on experimental rations. note on treatment. *Japan M World* 6: 29 (Feb) 1926.
- 3 Joly J. Swift. Stone and Calculous Disease of the Urinary Organs. St. Louis C V Mosby Co. 1931.
- 4 Osborne T B and Mendel L B. The incidence of phosphate urinary calculi in rats fed on experimental rations. *J A M A* 69: 32 (July 7) 1917.
- 5 Higgins C C. Experimental production of urinary calculi. *J Urol* 29: 157 (Feb) 1933.
- 6 Higgins C C. Experimental production of urinary calculi in rats. *Urol & Cutan Rev* 38: 33 (Jan) 1934.

#### DISCUSSION

**DR. FLETCHER H. COLBY** I want to congratulate Dr. Higgins very highly on his presentation and his subject which shows, whether you believe it or not, that a great deal of hard and progressive work has been done. There are certain questions that are not clear to me. First, we find stone formation in this part of the country and it is very difficult for us to believe that the average patient is deficient in vitamins of any sort. That, I believe, applies to the average ward patient that we have in our hospitals. Certainly, it would seem to apply to the private patients that we have. If there is no vitamin deficiency, it is difficult to see how feeding vitamin A is going to affect the stones.

Another point is this: in the cases of stones that have resulted from parathyroid disease, we have found at the Massachusetts General Hospital, all these patients have been carefully observed following the removal of the parathyroid tumor to see if there would be any effect on the stone, if the stone would get smaller or possibly dissolve in the spectacular manner that some of these cases we have seen tonight have. In the few instances in which that was done, where the patients were observed, no change, so far as I know, was present or could be determined in the structure of the stone itself. Here is an instance where the etiological factor has been removed, definitely metabolic in character, and I think it would be fair to assume that there might be some change in these patients' stones.

I have enjoyed Dr. Higgins' paper very much and want to thank him a great deal for coming, on and talking to us.

**DR. E. GRANVILLE CRABTREE** I have a patient who has a series of mishaps, the first of which was an overdose of radium affecting the bladder and rectum, as a result of which I implanted the ureters. One of these resulted in a nephrectomy because it

had to be planted in an unusual place as I could not approach the sigmoid because of extensive adhesions from previous operations. She has lived with one kidney which has functioned perfectly well for nine years. Beginning six months ago there was a change in this patient. She began to have loss of weight, pain and an intravenous pyelogram showed a great degree of dilatation of the ureter far down to its insertion into the sigmoid. In addition to that it showed stones in the kidney pelvis. The kidney pelvis was opened and a mass of soft stones the analysis of which has not yet been completed, was removed. The kidney was placed on nephrotomy drainage as a temporary measure after demonstrating that the junction between the ureter and the sigmoid was perfectly normal and would admit a large sized bougie. Our difficulty however has been the question of persistent alkaline urine on that side as tested by the urinary flow from the catheter drain in her kidney. The infection is a protus and I was hoping to get some help from Dr. Higgins about acidifying this urine as we have been unable to do it by any measures so far employed.

DR. ALFRED SHOHL. I came here to listen and to learn. By no stretch of the imagination can I be considered a urologist. Dr. Deming tried to teach me some things about urology once but I am afraid it didn't take. I was associated with him once in an attempt to modify the acidity of the urine in various ways. Perhaps he will tell you about the methods you can employ best in changing the acidity of the urine and what results to expect.

Speaking as a chemist, there is no question that uric acid is soluble to alkalies. As far as the cystine oxalates are concerned the most acid urine one can obtain would be approximately the condition for the precipitation of cystine.

I am naturally very much interested in the question of vitamin A deficiency in relation to stone formation and very often I have seen these calculi in rats. I have no doubt that the acidity of urine can be influenced by the diet but I am still in doubt, however as to how much importance one must lay to the acidity factor and how much to the vitamin A. As far as I know vitamin A deficiency in human beings is not widespread at least in this country but where vitamin A deficiency occurs it is not invariably associated with calculi.

On the question of measurement of the acidity of the urine by the colorimeter I agree with Dr. Higgins. With hundreds of determinations so far as I know no practical difference has been made out in any type of urine between the electrometric and the colorimetric measures. It is true that there is a definite salt effect on the indicators but I do not think that is ordinarily of sufficient magnitude to vitiate any result that may be determined by colorimetric determinations of the urine. I think Dr. Albright's ideas with regard to phosphate are well taken and any attempt to acidify the urine by phosphates is perhaps a step in the wrong direction.

I would like to ask Dr. Higgins the diets with which he produced pure calcium carbonate stones in rats.

DR. E. L. PRINSON. I would like to know what happens to stones in rats if they are put on an acid diet without vitamin A at all.

DR. ROBERT R. BALDWIN. I would like to ask Dr. Higgins whether the dissolving of stones in cases where infection was present had any effect on the infection whether the infection persisted or not.

DR. THOMAS N. HETURN. I have known of Dr. Higgins' excellent work by his published papers and I came up from Hartford to hear it personally presented because I thought it of such value. Also I wished to see his pictures of dissolving kidney stones certainly a most dramatic presentation. I have been equally charmed by the convincing work the group in Boston has done at the Massachusetts General Hospital on disturbed metabolism as a result of hyperparathyroidism.

For a number of years I have removed stones from the kidneys and I am astonished at my good fortune that so many of them have not recurred. I recall twenty five or thirty years ago when dietary treatment for the prevention of stones was a prevalent medical concept. I remember the uncertainty which many of us felt who were conscious of our ignorance of the metabolic processes involved. I remember how we were told some stones would form with acid urine and some with alkaline urine. Naturally there was a revolt by my generation against accepting such poorly proved theories.

Now shall we accept as proved these more recent theories? We must keep in mind that a large proportion of stones are unilateral and that without resorting to any complicated metabolic diet or parathyroidectomy at least sixty per cent of our stones do not recur. Is concentrating the attention of the poor human stone victim on the fact that he may reform stones good treatment when sixty per cent go along rather happily without recurrence? I have felt and feel now my gross ignorance on this subject, my incapacity to judge except in a relatively small group which stones are metabolic and which stones are the result of dietary deficiency. I hope that as a result of this work, urologists will better understand the etiology and treatment of kidney stones resulting from dietary or glandular errors. I also hope that the minds of urologists will not be so centered on the complex phases of this lesser group that they will make all their patients too stone-conscious unless they are quite sure to which group of stone makers they belong.

One thing has not been mentioned to which attention should be paid and that is the value of good drainage of the kidneys at the time of operation and to the value of forcing fluids where you are uncertain as to what the etiology of the stone is. Those of us who are not fortunate enough to have metabolic laboratories at our command and are afflicted with a stubborn skepticism will do well if we keep the urine very dilute with forced fluids and be sure at the time of the operation that there is not some obstruction even of a mild character. Adequate kidney drainage is still probably the best corrective for renal infection. Remember that the majority of these patients will not reform stones and they should not have to carry in their minds always the feeling that they are handicapped by having to stick to special diets and probably only a very small group should be trained to examine their urine frequently as diabetics do and so become always conscious of their disability.

I do not wish to convey the impression that I am not properly grateful and appreciative of the very splendid work that is being done by our metabolic chemists and by our food experts. I speak only for the encouragement of urologists who are not clear in their minds regarding this complicated process and for the benefit of the morale of the majority of those human beings who have had or will suffer from a kidney stone.

DR. CLYDE L. DEMING. I would like to ask Dr. Higgins two questions. It is considered that vitamin A is having somewhat the opposite effect from vitamin A, that is cod liver oil and I wonder if Dr. Higgins has seen any stone formations in orthopedic

cases that have had viosterol. In using his acid-ash diet, does he follow pretty closely the diet as outlined by Dr Keezer?

DR C C HIGGINS. Of course, the discussion of the etiologic factors involved in the formation of urinary calculi could be prolonged indefinitely. Probably no single factor is instrumental in the production of all stones, however, by our experimental work in vitamin A deficiency, conditions are produced which explain satisfactorily the mechanism of calculous formation. There is likewise no doubt but that hyperparathyroidism is associated with the formation of calculi in some instances.

In the series of cases of urinary calculi that I have studied, I have not noted a single case associated with hyperparathyroidism and the blood calcium and phosphorus determinations always have been within normal limits. We have operated upon three parathyroid tumors, however, which were associated with hyperparathyroidism and in which there were no evidences of calculi.

In a communication with Dr Max Ballin of Detroit, he told me that in the cases which he reported, in no instance were urinary calculi found. If cystoscopic examination is performed on a female dog every three or four days, and the region just in front of the trigone is traumatized with a wire, an ulceration is produced. If the urine of the dog then is rendered strongly alkaline, you will notice a deposition of phosphates on the ulcerated surface which becomes further united by the fibrin which exudes from the raw surface. If this deposit then drops into the base of the bladder and the alkalinity of the urine is continued, the gradual development of a calculus can be followed.

The question has been asked as to whether vitamin A deficiency is a common clinical finding. It is a very simple matter to make a diagnosis of extreme avitaminosis. However, in many cases, it is difficult to determine whether a mild degree of deficiency is present. After all, you cannot overlook the statistics of Jeans which were published in the *Journal of the American Medical Association* a short time ago. He found that approximately twenty per cent of the children who entered the dispensary of Iowa State University for diagnosis and treatment were deficient in vitamin A. Obviously, if a marked degree of avitaminosis is present, the condition is recognized and treatment is instituted. Therefore, for the production of urinary calculi, both in patients and in experimental animals, only a very mild degree of deficiency must exist over a long period of time.

The question is asked, how much vitamin A do we secure in our food? The usual food sources of vitamin A are milk, butter, eggs and green vegetables. The vitamin A value of animal foodstuffs varies considerably with the diet of the animal. This is especially true of dairy products such as milk, cream, butter and eggs. The Ohio State Experimental Station has found that when cows are on winter feeding, some milk contains less than half as much vitamin A as when the cows are on summer feeding in pasture. Thus the variation in vitamin A content of dairy products is markedly affected. Likewise, eggs toward the end of the laying season frequently contain only half the vitamin A content that they do in the earlier part of the year. Of course, carrots contain a large amount of vitamin A, but unfortunately, people are not especially fond of them.

With regard to the action of viosterol. About two years ago, we started working on the effect of viosterol in rats to ascertain whether calculi could be produced. In ten of fifty experimental animals, calcification was found in the renal paren-

chyma, however, no calculi were evident. In view of other experimental work that has been done, I do not feel that preparations which contain viosterol should be utilized over a long period of time. As stated previously, the stones which first formed experimentally in the white rat were composed of calcium magnesium phosphate with traces of carbonates. No oxalates or uric acid were present. We found later that by decreasing the phosphorus in the diet in relation to the calcium, a reversal in the chemistry of the stones occurred. Now they were composed chiefly of calcium carbonate with only traces of phosphates.

Is the alkalinity of the urine the chief factor in the production of stones? When the white rats are maintained on a diet deficient in vitamin A, the urine becomes alkaline. If, however, small amounts of ammonium chloride are given and the urine remains approximately neutral, calculi can be produced but it requires a longer period of time. After the stones have been formed experimentally, acidifying the urine alone does not cause a solution of the stone. Likewise you cannot prevent the recurrence of calculous formation due to the fact that the lesions in the mucosa of the genito-urinary tract are still present. We know that vitamin A has a specific effect on the epithelium and is a most useful medication to promote its healing.

In the work reported on calculi associated with hyperparathyroidism, the point that has interested me is that the calculi were phosphatic in type and were produced in an alkaline urine. I am waiting anxiously to see such a patient to determine whether by the use of the high vitamin A acid ash diet alone, a solution of the stone can be accomplished before operation is performed on the parathyroid glands, or whether a positive Jeans' test is present. The clinical findings in these cases, that is, the phosphatic stones and the alkaline urine, are similar to those which we made in our dietary work. It may be true that the LaMotte apparatus does not give an absolutely accurate determination of the pH of the urine, however, it is sufficiently accurate to warrant its adoption to follow the progress of these patients. As we follow the progress of a patient with diabetes by a blood sugar examination, likewise we follow the progress of patients on the high vitamin A acid ash diet by a pH determination of the urine.

The effect of diet on infection. A short time ago in St. Louis at the meeting of the Southwestern Branch of the American Urological Association, I was asked if I had noticed that in many instances the renal infection had subsided after the patient had been on the high vitamin A acid ash diet for a period of time. I noticed that in a few cases, but did not pay a great deal of attention to it. It has been stated that the bactericidal effect of the urine on a patient who is following the ketogenic diet is due to the beta oxybutyric acid. This, of course, is not present in the urine of the patient on the high vitamin A acid ash diet. If the urine has bactericidal properties, therefore, it must be due to the fact that the pH of the urine is at a level which is not favorable for the growth of bacteria and is maintained at this level for a considerable period of time.

I will not go into detail about the discussion of the cystine stones. They are rather unusual. However, I feel certain that a cystine calculus can be formed experimentally just as easily as a phosphatic stone if we can produce a constant cystinuria for a long period of time and maintain the experimental animal on a vitamin A deficiency diet. Likewise, I believe an oxalate stone can be produced experimentally if we can produce an oxaluria in an experimental animal for a considerable period of time and maintain it on a diet deficient in vitamin A.

## MASSACHUSETTS MEDICO LEGAL SOCIETY

A REVIEW OF THE VARIETY OF POISONS WHICH HAVE  
CAUSED DEATH IN THE MASSACHUSETTS STATE  
HOSPITALS FOR MENTAL DISEASE\*

BY ANNA M. ALLEN, M.D.†

**D**URING the twenty years, from 1914 to 1934 which this review covers, the number of deaths caused by poisoning (exclusive of alcohol) in the State Hospital of Massachusetts for mental diseases reaches the surprisingly low figure of forty one, in twenty two of these cases the poison was ingested before admission. The hospitals' population is between 22 000 and 24 000 patients. In this period there were approximately 2,600 cases which came under the jurisdiction of the Medical Examiner thus giving us a figure of somewhat over 15 per cent for the incidence of poisoning in the sudden or unexpected deaths in the forty-one cases.

As can be seen from the accompanying table, the poisons fall into a great variety of categories

Corrosive poisons	Lye	4 cases
Non-metallic poisons	Iodine	3
	Phosphorus	1
	Fluorine	1
Metallic poisons	Arsenic	7
	Mercury	4
	Lead	2
	Antimony	1
Gaseous poisons	Carbon Monoxide	4
Alkaloidal poisons	Morphine	2
	Nicotine	1
Non-alkaloidal organic poisons	Cresols	4
	Phenols	3
	Phenobarbital	3
	Cyanide	1
	Tri-ortho-cresyl phosphate	1

Of the corrosive poisons lye is easily accessible used as it is, so frequently in kitchen work. All of the four deaths caused by this substance were suicidal. The most rapid of these deaths occurred thirteen hours after ingestion of the lye and postmortem examination showed an intense hemorrhagic necrosis of the gastrointestinal tract, including the mucosa of the mouth, esophagus, stomach and extending a few feet into the small intestine. There were several perforations in the esophagus and stomach. It was not possible to determine the exact amount taken by this patient, but in the case of another patient who died in thirty

nine days, it was estimated that one ounce of lye was consumed.

Tincture of Iodine caused death in two individuals. A seventy year old woman drank approximately three and one half ounces, became very cyanosed, and died in one hour. Autopsy showed edema of the glottis and necrosis of the gastric mucosa.

Phosphorus in the form of a tube of Bisnit Rat poison was spread on chocolate and consumed by a twenty four year old male who felt guilty over an illicit love affair. He suffered from nausea and epigastric pain, and died in thirty one hours. Autopsy showed pulmonary edema and congestion, necrosis of the epithelium of the esophagus and a characteristic odor from the abdominal cavity.

An accidental death occurred in one hospital when roach powder a mixture of sodium fluoride and sodium silicofluoride was mistaken for powdered sugar and used in making hard sauce to go with the noontime dessert. The patient who was mixing the sauce tasted it on several occasions, and then complained of weakness and nausea. He vomited copiously and lapsed into a state of mild shock which responded well to treatment though generalized weakness and muscular cramps continued. Some five hours later he complained of dyspnea, and expired almost immediately. Autopsy showed subpleural and epicardial hemorrhages, as well as extravasations of blood into the lung tissue and intense hyperemia of the kidneys. The blood was liquid throughout and when examined for calcium by Mr. E. H. Stotz, Dept. of Biochemistry, Harvard Medical School it contained only 5.8 mg./100 cc., instead of the normal 10 mg./100 cc.—the tetany level is approximately 7 mg./100 cc. Dr. William F. Boos, toxicologist, found fluorides present in all the organs, as well as in the heart's blood. In this case death was presumably due to an artificial tetany brought about by the fluoride combining with the blood calcium to form a calcium fluoride which is of extremely low solubility. Since this fatality, all the roach powder used in the Massachusetts State Hospitals for Mental Disease is colored so that a similar mistake will not recur.

Of the Metallic Poisons arsenic caused the most deaths—seven fatalities. In this group, however, are listed four cases who died while undergoing treatment for syphilis, two of these were caused by the administration of un-

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neutralized arsphenamine, and two died shortly after an injection of sulpharsphenamine, presumably because of an idiosyncrasy for this substance. The other three deaths were suicidal and the arsenic was taken before admission to the mental hospital. It was ingested in the form of Paris green (copper acetoarsenite). A sixty-eight year old man took six tablespoonfuls of Paris green, mixed it with milk, and drank it. He lapsed into a state of shock, later became cyanotic, and died five hours and twenty minutes after taking the poison. At autopsy there were numerous particles of bright green material in the stomach. The mucosa of the stomach was swollen and hemorrhagic. Subpleural and subepicardial hemorrhages were common.

Mercury, in the form of bichloride tablets, caused death in three cases. A depressed male patient, whose wife had taken him on visit from the hospital against advice, took six tablets. He lived eight days with almost complete suppression of urine. Another patient smuggled in some tablets of bichloride of mercury, after returning from a visit to her home. She ate several and died three and one-half days later. Autopsy showed hemorrhages into the mucosa of the stomach, ileum and colon, as well as an acute toxic nephritis. A forty-two year old patient suffering from the effects of chronic alcoholism drank approximately three ounces of a 5 per cent solution of mercurochrome. He died forty days later. Autopsy showed pulmonary tuberculosis, also an acute nephritis. The skin of the body was pinkish-white and definite pink staining was noted in the lungs, liver and bladder.

Two cases of occupational lead poisoning developed psychoses, and died in State Mental Hospitals with the usual syndrome of generalized intoxication.

Antimony Trichloride was used as a means of suicide in the case of a thirty-five year old cabinet worker. He drank about 40 cc of paint remover containing butter of antimony and suffered from severe pain in the throat and epigastrium. He died in twenty hours. Autopsy permission was refused but a quantity of spinal fluid was removed at the suggestion of Dr. Myrtelle M. Canavan, and this when tested by Dr. William F. Boos, toxicologist, was found to contain antimony, the first time antimony has been recovered from the spinal fluid.

Deaths from gaseous poisons numbered four, all of which were suicidal attempts before admission and in which death was caused by carbon monoxide. Illuminating gas was the method employed in three cases, and the gas from the exhaust of an automobile engine in the fourth case. This latter mode was used by a twenty-four year old male, who died in fifteen hours. No autopsy was performed on any of these cases.

Of the deaths from alkaloidal poisons, it was questionable whether morphine was the prime

agent in the two listed as such. It was known that both of these patients had used this drug for some time before admission, but the manner of death and the signs before death were not conclusive. There was a probability of poisonous alcohol being a factor in the death of one of these, and organic heart disease was definitely diagnosed in the other.

Nicotine caused death within fifteen minutes in the case of a forty year old man who drank an unknown quantity of an insecticide containing this alkaloid. He developed convulsions, frothed at the mouth, became rapidly cyanosed, and died. Autopsy showed the blood, fluid throughout, and the stomach contained a green liquid with a heavy precipitate and characteristic odor.

Under the non-alkaloidal organic poisons are listed four cases of suicide due to cresols, creolin 2, lysol 1 and sulphonaphthol 1. A thirty-eight year old woman drank approximately seven ounces of creolin. She died in two days. The other creolin poisoning case consumed an unknown quantity and lived six days, showing at autopsy acute gastritis, nephritis and bronchopneumonia. A twenty-three year old syphilitic woman drank the contents of a three-ounce bottle labelled Lysol. She was unconscious within a few minutes, showed signs of pulmonary edema, and died within one hour. The sixty-one year old widow who drank sulphonaphthol had also cut her left wrist, and throat from ear to ear. She lived for four days.

Phenol was taken in the form of carbolic acid by a forty-eight year old man, who died fifteen minutes after it was discovered that he had taken the poison. Six to eight ounces of an insecticide containing phenol and kerosene was drunk by a 50 year old woman. She became cyanosed and comatose, dying within six hours of drinking the fluid. Indelible ink which contained phenol was taken by an insane woman, who died one hour and forty minutes later.

Phenobarbital or Luminal caused three deaths. In two of these approximately seventy-two grains were administered in mistake for magnesium sulphate. Deep coma resulted and a rise in temperature, as high as 105°F. Pulse and respirations were also markedly increased in rate, and there was evidence of pulmonary edema. One man died in fifty-four hours, the other in sixty-four hours. The other death from luminal was suicidal. It occurred in an epileptic girl who took an unknown quantity and was found unconscious. She received drastic treatment but remained inert until her death some sixty hours after taking the drug. Autopsy showed little of note, except pulmonary edema, an enlarged liver (2175 grams) congested kidneys and slight subarachnoid oozing of blood.

Sodium Cyanide, the amount unknown, ingested with suicidal intent, caused death in a twenty-five year old chemical engineer, who had

voluntarily come to a State Hospital after his mother committed suicide. He died within ten minutes after taking this poison. Sodium cyanide crystals were found in his clothes. Autopsy, confined to the stomach only, showed the mucous membrane of this organ to be bright red and velvety.

Tri-ortho-cresyl phosphate or so-called Jamaica ginger was presumably partly responsible for the death of a seventy-two year old male who also suffered from chronic alcoholism. He had an advanced polyneuritis on admission to the Mental Hospital, but he did not die until one and one-half years later. At autopsy the spinal cord showed atrophy of the grey matter and anterior horn gliosis.

Of these forty-one deaths caused by poisoning, twelve were accidental and twenty-nine suicidal. The accidental deaths may be listed as follows:

Antisyphilitic treatment	4
Lead Poisoning	3
Luminal	1
Morphine	1
Sodium Fluoride (roach powder)	1
Jamaica Ginger (Tri-ortho-cresyl phosphate)	1

It is difficult to see how the majority of these can be completely prevented. Those that occurred before admission (lead poisoning morphine and Jamaica ginger) are outside our influence. Of the remainder, the luminal deaths were caused by an error which is unlikely to recur, for the reason that the bottles which contain the magnesium sulphate and luminal have no longer any similarity and cannot be mistaken for each other. The roach powder is tinted so that there is now a distinct difference between it and powdered sugar. Two of the fatalities in giving the treatment for syphilis, those due to the administration of unneutralized arsphenamine, are guarded against recurrence by the fact that it has been replaced by sulpharsphenamine and neoarsphenamine. The other two deaths, which occurred after the injection of sulpharsphenamine, were unavoidable in that there was no obvious contraindication for the use of this therapeutic agent.

The suicides were all caused by poisons which are easily accessible and for the most part may be bought at any drug store. Insecticides, antiseptics or disinfectants being employed by many people require no ingenuity in obtaining them outside of the hospital. Within the hospital many ruses were employed by the depressed patients to obtain these poisons. Occasionally they were smuggled in after the patient returned from visit. Tincture of iodine was stolen from the surgery by a patient polishing the floor at the same time as a nurse was in the room attending to another patient. With regard to the indelible ink, it was not known beforehand that this contained phenol, and the

bottle was not marked poison. In the case of two of the suicides, luminal and sodium cyanide, even after careful investigation it was not possible to determine just how the patients obtained them. The insecticide containing nicotine was taken from the greenhouse, while the florist was absent for a few minutes, by a patient who had been mowing the grass outside. The majority of these patients had shown no suicidal intent previously and several appeared well enough to be allowed parole of the grounds.

When classified according to the mental state, we get the following result:

Undiagnosed	13
Alcoholic	6
Manic Depressive-Depressed	5
Dementia Praecox	4
Toxic Psychosis	4
Psychosis with Psychopathic Personality	2
General Paralysis of the Insane	2
Psychosis with Mental Deficiency	2
Traumatic Psychosis	1
Psychosis with Syphilis	1
Psychosis with Epilepsy	1
Total	41

The thirteen cases that were undiagnosed had taken the poison before admission to the hospital and died before an accurate diagnosis could be made. The alcoholic group is surprisingly high, but may be accounted for by the depressive effects which frequently follow alcoholism. The manic depressive figure, when compared with that of dementia praecox is high, considering that the latter form a much higher percentage of the State Hospital population than the former.

A brief analysis of the age at death shows that twenty-eight of the forty-one were under forty years of age at death. The youngest to commit suicide was twenty-one years of age and the oldest was aged eighty-four years. With regard to sex, seventeen were female and twenty-four male.

#### CONCLUSIONS

- 1) Massachusetts has cared for 22 000 24 000 mental patients yearly, for twenty years.
- 2) Approximately 2600 cases have come under medical examiners' attention at their death in that time.
- 3) Only forty-one or slightly over 1.5 per cent of this number have come to their death by poisons.
- 4) Twelve of the forty-one, were accidental, twenty-nine suicidal.
- 5) Twenty-two of the forty-one had imbibed the poison before coming to the hospital, nineteen after coming to it.
- 6) The poisons were various: corrosive non-metallic, metallic, gaseous, alkaloidal and non-alkaloidal organic poisons, metallic poisons were in greatest number.



- 7) The mental diagnoses ranged from "undiagnosed" (13) to psychosis with epilepsy (1)
- 8) The ages were twenty-one to eighty-four
- 9) Males twenty-four, females seventeen in number
- 10) Steps have been taken to minimize these deaths

### DISCUSSION

DR WINTRED OVERHOLSER I am sorry that I did not hear the whole of this presentation, I know something of it, naturally. We are very much interested in the office of the Department in the sudden deaths that occur in our hospitals, particularly by suicidal intent.

One thought that occurs to me in looking over the summary on the board is that it is quite obvious, I think, that even under close supervision, such as patients have in mental hospitals, it is not possible to guarantee that there will not be suicidal deaths.

One thing that impresses me, too, in the outside cases, and I am sure it impressed the others here because you are all called in cases of this sort, is the great danger, in cases of depression, that there will be an attempted suicide, which, all too frequently, is successful.

The seriousness, too, of depressions occurring in patients who are in their homes is not sufficiently recognized. We know that. Of course, it is common knowledge from reading the papers, and it is also common knowledge to all of you gentlemen who are called to view the bodies.

The type of poisoning that particularly attracted our attention, recently, is that by sodium fluoride, which I imagine Dr Allen took up in some detail, the ingestion of roach powder. As a result of this affair being called to our attention, we changed the formula by adding a small amount of lampblack, so that the cockroach powder used now, with this formula, is off the white color and is, therefore, sufficiently different in appearance from the powdered sugar so that at least we hope this mistake will not be made again.

Dr Barrett, the Assistant Commissioner, is present, Dr Gay, and it may be that he has something that will be of interest to the group.

DR BARRETT *Dr Gay, and Members*—The thing that is especially interesting to me in discussion of suicide in the State Hospitals reverts to a consideration of administration. It, oftentimes, is an administrative problem that is very difficult to cope with. We do have accidental deaths from poisoning in institutions, and some in which the patients are very strongly implicated. There are others, some of which Dr Allen has reported here, where the patient was not active in the process at all, especially the luminal deaths, in which there was another personality factor involved.

We take very special precautions in the allocation of medicines on the wards, which is absolutely necessary. We must have medications available for immediate use on various types of hospital wards. That is an improvement, I think, over the old hospital system where all medications were disbursed from a pharmacy, by doses. Under those conditions, oftentimes the patient got medications that had been ordered for them, and oftentimes they didn't, and when they did get them, they were maybe

two or three hours late and they didn't get the required dosage.

Under the State Hospital system of Massachusetts, I would like to say that we more or less pride ourselves that we are actually conducting hospitals and not asylums. We are trying to make treatment for patients available at all times so that it is necessary to have medications in certain quantities on the wards. We have taken precautions to see that these storage places are under at least a double lock, and that they are available only to persons who are authorized to administer these medications on order of physician. But, it seems that sometimes there is an error on the part of the administering person. Sometimes there will be that personal factor of becoming somewhat careless and leaving things out. Whether that can ever be entirely corrected, I don't know. I seriously doubt it.

The case of sodium fluoride poisoning, I think, is one of special interest in that the way this was administered is something exceptional and new to me. I had never even suspected that this mixture might be stored in close proximity to powdered sugar. But, that is another personal equation, I imagine, and the Department is especially concerned in seeing that a minimum of those cases occur. I thank you.

PRESIDENT GAY Thank you very much, Dr Barrett. Is there any further discussion?

DR MAGRATH I wish to congratulate Dr Allen on the presenting of such an enlightening and complete analytical study of causes of death from poisoning among institutional workers. It has been very enlightening to know what your experience has been in the State institutions.

My own experience is with people who are, for the most part, in the open, and, as we see, they take matters into their own hands, when this happens, they take almost any of the things listed on the board here.

As I look them over, the substances enumerated include only one, nicotine, with which I have not had experience. I congratulate the chemist on getting nicotine. It is a difficult thing to do.

It is a wonder that more accidental deaths do not occur incident to the compounding of prescriptions. Accidents do occur, of course, but in proportion to the number of prescriptions filled, they are quite rare.

One comes to my mind where a North End drug gist or his clerk, who is not a registered pharmacist, by the way, dispensed on a prescription something which the purchaser of the medicine took home and then ingested, and she very speedily went into convulsions and died. What the physician had written for was stypticin. She suffered from menorrhagia, and the druggist's clerk read it as "strychnine." He reached up on the shelf and took down a bottle of strychnine sulphate from among the poisons, and put up the prescription in terms of a strychnine instead of stypticin.

It isn't to be wondered at that the poor lady died and died promptly.

In another instance of what we might call the pharmacy accidental type came the demise of a woman who bought, or thought she bought, citrate of magnesium, effervescent citrate of magnesium, of which she took an appropriate amount and thereafter became unconscious and vomited, and very speedily died. That was a case of poisoning and it was difficult to trace the source of the error, but probably it was outside of the pharmacy, because the pharmacist showed me the package from which he had taken the materials in order to prepare this.

bottle of medicine. It evidently took place in the factory or at any rate on the premises where the cartons were put up. It was a mislabeled package instead of containing citrate of magnesia, it contained tartar emetic so that there was a mistake

not on the part of the pharmacist, but on the part of the wholesaler who manufactured it.

This paper of Dr. Allen was very enlightening and I am very grateful to have had the opportunity to hear it.

## A CLINICAL LECTURE ON MIGRAINE\*

BY A. H. GORDON, M.D.†

THE object of my talk this evening is to present the salient features of *Migraine* from the standpoint of the clinician, and to emphasize the width of the many gaps in our knowledge of this mysterious ailment rather than the few small fragments of what we think we know.

Having once about ten years ago been emboldened to write on the subject of migraine I referred to that article when called upon on this occasion, and find I can give wholehearted consent to at least one paragraph which says: "For the purpose of this discussion by migrainous headache we mean a headache protruding in intensity, paroxysmal in onset and periodical in recurrence, which can turn a strong man into a worm and make the affections of a woman dark as Erebus, which may pass a legacy from generation to generation and which attacks a girl as she approaches womanhood and is said to leave her at the menopause but frequently doesn't."

At the outset one must ask the very reasonable question: Is there such a disease as migraine? And immediately I hear twelve good men and true in this room answer, "Yes for I have it." But again I may ask, Is the migraine that afflicts any one of you twelve the same as that which afflicts the other eleven? These two questions cannot be answered with certainty for we are still compelled to identify the disease by the clinical features which it possesses, rather than by the morbid anatomy which it does not possess, and our attitude toward it must for the present be one of rational empiricism.

There is much evidence that this symptom complex of migraine was recognized by the physician of the early days of the Christian era and in particular its tendency to attack one side of the head is remembered in the early name *hemikrania*, which in French became *migraine* and which later in English was corrupted to *megrims* and thus again was applied somewhat disdainfully to any sickness which could be brought on at will to avoid a worse alternative.

Before we touch upon what we are to do for migraine, a word should be said about what migraine does to us, I mean to us as clinicians. For it becomes a mirror into which the doctor may look and see what manner of man he is.

We have heard much these late years of the forgotten man and here we find the forgotten disease, for how often on the eruption of its headache or its vomiting into our peace of mind is the isolated event regarded as an "acute indigestion" (whatever that is) or as a "toxic manifestation" (whatever that is) or as a "neuralgia" (whatever that is) without the effort to integrate the symptoms into a clinical whole by relating them with forgotten or misunderstood episodes in the past.

If we are of the school to which focal infection explains everything, our eyes stray, not unerringly but automatically, to the teeth or the tonsils until Moloch is appeased, or if we are true materialists, a suspicious tenderness is eventually found over the gall bladder or appendix and that's that, and if, perchance we are gifted with an imagination, and no good clinician is without it, the symptom complex of migraine leaps quickly to our minds, and by painting the history here and pruning it there, a good case for the neurological picture of true migraine can be made from a chronic nephritis, a cholecystitis or a pyloric obstruction.

Just here we should pull ourselves together and decide what we mean to include within the limits of the term migraine. In a disease without a morbid anatomy one man has almost as much right to include in the picture any sort of recurring nausea or dizziness or what not, unassociated with a typical attack as another has to exclude recurring headaches which are associated with well defined local paralyses, but until we know more about the classical disease than we do now, it is wiser not to call anything migraine that does not measure up to the orthodox description of a periodical headache chiefly one-sided, which is preceded by certain types of aura and followed by nausea or vomiting, the whole attack being succeeded by a return to normal health.

The approach to a nebulous subject like migraine is buttressed somewhat by figures and these figures help to keep us from losing ourselves in speculations. To make these figures less deceiving I have averaged several groups of statistics and it is fair to say from these that three fourths of the cases of migraine commence before twenty-five years of age and that one half show the presence of another case in the same or in the previous generation, and that in addition the cases descend with greater frequency through the maternal side of the family.

Cases occur more frequently in females some

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would say two and a half times as frequently as in males, but others feel that this disparity is more apparent than real

City people seem to be more affected than country people

The clinically important features of migraine may be set down as

- 1 Periodicity
- 2 Return to normal between attacks
- 3 Headache which, in its character of one-sidedness, has given the disease its name of hemicrania or migraine. Always severe, the attacks of headache are often prostrating. Some patients will say that if the house burnt down they could not move, so great is the pain.

4 Nausea and vomiting. These unpleasant symptoms occur in three-quarters of the cases and give to the attack its name of sick headache, but vomiting as a rule does not end the attack. To be classed with nausea and vomiting is a group of other symptoms involving the vegetative nervous system, coldness, giddiness, collapse, pallor, sweating, polyuria and diarrhea, which are of a general character, and unilateral sweating and flushing, and fullness and throbbing of one temporal vessel which point toward a sympathetic involvement on one side.

5 Prodromata are not invariable but are frequent. Languor and malaise followed by giddiness and coldness often precede the headache.

6 Ocular manifestations such as zigzags, spectra and scotomata were found by Elliott in 44 per cent of cases and in the form of hemianopia in 18 per cent. This is a proportion far above that which one sees in ordinary medical consultations. I am inclined to think that from their dramatic character, the ocular symptoms are kept in the foreground and that 10 to 15 per cent would cover the number we ordinarily see.

7 Time of onset. It is quite striking in how many instances the attack commences in the morning on rising. Another feature difficult to explain is that if the attack continues into the second day the sufferer's sleep may be undisturbed in the intervening night. Ordinarily however when sleep occurs the storm blows over.

8 Undoubtedly a feature of true migraine but approaching the border line of diagnostic error is the group of unilateral sensory and sometimes motor symptoms that may develop. These may be numbness of the face, arm or leg, slight weakness and slight aphasia and certainly hemianopia. Ryle reports a group of such cases and in addition one with vestibular symptoms.

Their transient character, their appearance in only the more severe attacks and their absolute disappearance between attacks hold these phenomena within the concept of the disease, but keep us on the "qui vive" lest something may be lurking behind the migraine syndrome. One

may take still stronger ground in what is called the ophthalmoplegic type of migraine. In a fairly wide experience with the ailment I have never met with a case. It is described as a migrainous attack in which periodic paralysis of one or more branches of the third nerve may occur and in a few autopsies some organic disease has been found to account for the paralysis.

These features are the ones which commonly make up the clinical picture of migraine but the presence of the ailment in a patient's parent or brother or sister adds as greatly to one's assurance of a correct diagnosis as does its absence inject a feeling of uncertainty.

Having set down what appear to be reasonable clinical criteria for what we shall regard as migraine it is of interest to mention certain cases which for the time may be regarded as inhabiting the border land of this disease. One such is what might be called, whether justly or not time will tell, abdominal migraine. Only one case of this nature has come under my care.

A twelve year old boy had suffered from periodical attacks of abdominal pain with projectile vomiting. These attacks had commenced at four years of age and had continued at intervals of from a few days to one month. They were preceded by lassitude and distaste for food, and came on with severe abdominal pain which continued until a projectile vomiting of large amounts occurred, which gave relief to the pain. The attacks had no relation to food and after they passed off he felt quite well again. He had been operated upon for appendicitis four years before without relief, and when I saw him I suspected a partial obstruction of the small bowel. His x-ray examination and all features of his physical examination were negative and there was no fever, but as he was incapacitated from school and from play an exploratory operation was suggested, which showed absolutely no pathological condition to be present. He recovered rapidly from the operation but was neither better nor worse after it.

The subject of abdominal migraine is a dangerous one to venture upon, dangerous for the physician, but still more so for the surgeon, but I think that there is little doubt that such a condition does exist. An attack of epigastric pain and vomiting without fever, with or without diarrhea, periodical in its appearance, either replacing a cephalic migrainous attack, or appearing in a person who has such attacks, should be carefully weighed and measured before its victim is submitted to abdominal section. I would be the first to admit that a gall bladder or an appendix or a pancreas or a gastric ulcer might be at the bottom of such a symptom complex, but in the light of the case to which I have referred I would be more chary the next time in advising operation.

Another of the borderland types is that associated with psychical symptoms. Neilson reports an instance in a physician of thirty-seven who had periodic attacks of loss of memory and loss of orientation with defects in his visual

field lasting two or three hours and preceded by fortification spectra. One might ask if these attacks were migrainous or epileptiform or whether they were a type of periodic psychosis involving the personality of one who suffered from migraine.

The question has already been raised as to whether the occurrence of definite paralyses of the ocular muscles with attacks of hemianopia could be properly classed as migraine and the same can be said of the facial pareses which have also been reported. The presence in some autopsies of local organic lesions in cases of this type further tends to throw doubt upon their truly migrainous character. W. J. Adie of London reports seven cases of migraine which developed permanent hemianopia and in one of which a subarachnoid hemorrhage developed. He puts forward the observation that in migraine in which a recurrent and temporary cerebral circulatory disturbance occurs, this disturbance at times may be severe enough to lead to cerebral infarction or to subarachnoid hemorrhage. As I have already said, we cannot yet readily include within the concept of migraine instances in which permanent structural damage occurs, but such cases are of use in offering sidelights upon a very obscure problem.

In this connection I have been struck and I have no doubt many of you have been struck by the frequency with which hypertensive vascular disease appears in those who have been in earlier life the subjects of migraine. The association of migraine with the idiopathic convulsive state has also raised a good deal of discussion. Dr. Stanley Cobb has collected a group of 1086 patients with idiopathic convulsive disorders and found in 9139 relatives of these people that forty-three per 10,000 had migraine. In 250 control cases without convulsive attacks their 1896 relatives showed only fifteen per 1000 with migraine. Ely found that in people with convulsive disorders a greater number had ancestors with migraine than had ancestors with the convulsive state. Buchanan's figures give the same result, and he comes to the conclusion that migraine and essential epilepsy are transmitted from generation to generation as the expression of the same underlying factor in the germ plasma. I do not deny the correctness of the figures but no such close affinity between the two diseases has appeared in my own experience.

What are the views at present of the nature of this mysterious malady? Many observers have argued that it is a toxemia but to put the matter shortly no group of cases has yet given evidence of significant alteration in the blood or urinary chemistry though an interesting observation was made by van Leeuwen and Zeider of a substance found in the alcoholic solution of the blood of asthmatic and migrainous patients which stimulated the smooth muscle of the gut of a cat upon which the blood of con-

trols showed no effect. Diamond, in 1927 in a small group of cases found an increase in the van den Bergh reaction and urobilinogen in cases of migraine but no such findings have appeared in cases under my care.

Others have believed that it is an allergic disease. Vaughan and Balyeat upon investigating patients with migraine have found responses to various foods by intracutaneous injection, and on that basis have treated these patients by removing the offending food. Vaughan has found 70 per cent of cases of paroxysmal headaches to be associated with allergy and has reported relief in 61 per cent of thirty-seven cases, and Balyeat reported 52 per cent relieved of symptoms in fifty-five cases. We all have seen occasional instances in which certain foods as wheat bread, chocolate, etc., would bring on attacks but few have been so fortunate as the authors mentioned in affording relief. To most of us the evidence that allergens are the cause of migraine has still a long way to go to be convincing.

Certain endocrinologists claim that migraine may be due to dysfunction of the pituitary gland. As yet no one can deny this, but the type of evidence put forth to support the argument is somewhat bewildering to the ordinary mind. The ophthalmologists lead us to believe that migraine is often due to eyestrain. I wish it were, and I wish that the type of oculist could be raised up who would correct the offending error of refraction. So far he has eluded me. Or it may be it is associated with disturbance of the genital glands. Its appearance at puberty, its exacerbations about the menstrual period and frequent disappearance at the menopause, and its similarly frequent disappearance during pregnancy are very suggestive. Just what one would do about male patients on this basis raises a difficulty. The statement that migraine is due to some disturbance of the vegetative nervous system is a sort of revelation of the obvious. The almost constant association of sympathetic phenomena with all cases and their predominance in some is well known.

The headache and vomiting remind one of a temporary cerebral tumor and the occasional hemianopia and other visual aberrations suggest a local swelling of the occipital cortex and regions more anterior. All of these symptoms would indicate some process causing temporary swelling of regions of the cortex, but whether of vascular or lymphatic origin no one may yet say. In this connection a verbal communication of Dr. Wilder Penfield's is of interest. He would postulate as a cause of migraine a stimulus arising from some so far unknown cause in the substance of the brain, and transmitted along the sympathetic fibres now known to accompany the cerebral vessels to the cerebrospinal nerves supplying the head and neck, in the same manner as the pain due to coronary disease is trans-

*Systolic Gallop Sounds* There is little agreement in the literature as to the type of patient in whom one is likely to encounter systolic gallop rhythm, doubtless because of the small number of patients upon which each author based his report. Four of the six cases of Cuffer and Barbillon<sup>1</sup> had typhoid fever, one tuberculosis of the lungs, peritoneum and genital organs, and the sixth kyphosis due to Pott's disease. None of their patients had either heart or renal disease such as are frequently exhibited in diastolic gallop rhythm. Potain<sup>2</sup> found systolic gallop associated with arteriosclerosis of the aorta with atheromata, in typhoid fever and in grippe of the typhoid form. Wiedemann's<sup>4</sup> case had pulmonary tuberculosis. Giroux<sup>6</sup> described systolic gallop rhythm in hypertension with left ventricular hypertrophy. The patients of Amblard<sup>7</sup> had weakened hearts and low blood pressure as part of the general debility of such diseases as typhoid and diphtheria. One of White's<sup>8</sup> four cases was diagnosed as irritable heart. The other three had enlarged hearts, one with auricular fibrillation and another with auricular fibrillation and intraventricular heart block. Wolferth and Margolies<sup>9</sup> found this form of gallop rhythm in two patients, a girl of fourteen years extremely ill with miliary tuberculosis and a fifty-year-old woman with hypertension, coronary arteriosclerosis and heart failure. Thus it appears from the literature that systolic gallop rhythm is encountered in the following three conditions: in the normal heart weakened by a severe general infection, in arterial hypertension and in the presence of atheromatous change in the aorta. No mention was made as to its benignity or its occurrence in otherwise healthy individuals.

*Autopsied Cases* Autopsies are reported in the literature in but four instances. The heart of one of the cases of Cuffer and Barbillon<sup>1</sup> was contracted and normal, the patient having died of typhoid fever with intestinal hemorrhage. Another presented a dilated and flaccid heart that was otherwise normal, this patient having died of tuberculosis. Both of Obrastzow's<sup>5</sup> patients had atheromatous change in the ascending portion of the aorta, one with dilatation. The heart itself was not otherwise mentioned. From the meagre autopsy data we know only that systolic gallop rhythm may occur without objective organic disease of the heart. Gallavardin<sup>9</sup> reported autopsies on three patients with metallic clicking sounds occurring in systole. All three had strands of pleuropericardial adhesions to which Gallavardin attributed the sounds. Lukewise, Luan and Deparis<sup>10</sup> reported fifty cases with clicking sounds during systole and referred to the possible association of this finding with pleuropericardial adhesions, although no postmortem studies were made.

*Mechanism of Production* As to the mecha-

nism by which systolic gallop rhythm is produced, the literature offers only reasoning by inference. Cuffer and Barbillon<sup>1</sup> thought that the first sound and the gallop sound were produced by the two parts of a double systolic effort made by a ventricular myocardium so weakened that a single effort was incapable of raising intraventricular pressure to a degree sufficient to open the semilunar valves. They felt that one would be likely, then, to encounter the gallop sound in all states in which the heart gives way in consequence of myocardial weakness of any cause, whether such weakness be primary or the result of a general affection of the body. They believed the double systolic elevation of the precordium and the plateau observed in the upstroke of the apex cardiogram to be in keeping with this idea.

Potain<sup>2</sup> gave origin to the concept of arterial production of the extra sound. According to him, an aorta diseased by atheromatous change or by general weakening of its wall in such diseases as typhoid may produce a sound when stretched to the limit of its distensibility by the inflow of blood from the left ventricle. Under normal conditions, he felt, the aorta is never stretched to its limits and a sound is not produced. Wiedemann<sup>4</sup> adopted the arterial production theory by the exclusion of other factors and on the basis of evidence of sclerosis of the radial arteries.

Obrastzow<sup>5</sup> reasoned that there was an increase in the period of isometric contraction of the ventricle, the first sound being produced by the closure of the auriculoventricular valves and the extra sound by the opening of the semilunar valves and the commencement of ejection of blood from the ventricle, these two elements being fused into one sound in the normal heart. Thus the condition of the myocardium and the presence of arterial hypertension must play no unimportant rôle. Bard<sup>11</sup> later concurred in this idea. Giroux<sup>6</sup>, whose patients had hypertension and left ventricular hypertrophy, agreed to the theory of a lengthened presphygmie period and to the dissociation of the muscular and valvular elements of the first sound, but thought that the extra sound would not appear unless the valves were sclerosed.

Amblard<sup>7</sup> studied the blood pressure in his patients with typhoid or diphtheria and systolic gallop rhythm or a tendency to it. He found that on slight exercise the systolic and diastolic blood pressures rose from their previously abnormally low levels to approximately normal levels, at which time the gallop sound appeared. If exercise were carried still farther, the pressure, particularly the systolic, fell markedly, whereupon the sound disappeared. He concluded that after slight exercise his patients were suffering from a relative hypertension which produced the sound in the presence



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Case No	Age Years	Sex	Chief Complaint	
1	28	F	Told she had heart	
2	19	F	Irregular rhythm h	later
3	21	M	Murmurs had been	
			pitatation when nerv	
4	71	M	Pain on exertion 8	
			attack 1 month ago	
5	43	M	Tired Losing weight	
6	11	F	Murmur had been	No murmur,
			joint pains	
7	37	F	Nausea	ns
8	42	M	Nervous since see	itation
			Pains in left chest.	/
9	46	F	Weak	
10	61	M	Tired Occasional	
			heart	
11	64	M	Dyspnea Precordi	
12	38	M	Tired Ache about	
13	28	F	Tired	
14	40	M	Wanted examination	
15	32	M	Tired Sighing res	
16	50	M	Constriction lower	ng position.
			ertion	
17	22	F	Sternal pain F	
			Heart consciousness	
18	23	F	Palpitation and pain	
			told she had a mur	
19	35	F	Nervous Exhauste	
20	59	F	Cough following pre	ears later loud-
				ons in 7 years
21	44	M	Slight palpitation	
22	31	F	Tired Pain about	
23	34	M	Nausea Wanted h	
24	18	M	Something queer h	
			in heart	
25	43	M	"Staggering" sensat	
			chest to neck	
26	25	F	Aerophagia. Belch	
27	28	F	Tired Mild joint	
			dial pain once	
28	44	M	Epigastric pain afte	
			thing queer found	
29	57	M	Severe precordial	minations next
			ago	
30	37	M	Ache about apex	
31	65	F	Slight pain at ape	
32	56	F	Nervous Palpitati	
33	49	M	Sternal pain	Loud whole
				ed in sitting
34	25	F	Ache over apex	
			tion	
35	60	M	Tired Slight pain	

of a weakened myocardium White<sup>12</sup> has stated that the cause is unknown, but that it may possibly be deformity of valves, chordae tendineae, pericardium or pleura.

Opinion as to mechanism is, then, roughly divided into two basic ideas, that of a lengthened period of isometric contraction of the ventricle with resultant dissociation of the elements of the normal first sound and that of production by a diseased or weakened aortic wall.

**Prognostic Significance of Systolic Gallop Rhythm.** There is no intimation in the literature that systolic gallop rhythm bears the ominous prognostic significance so well known in diastolic gallop rhythm. The cases are too few, however, to be of any statistical value. Several of the reported cases died of frankly non cardiac causes. It is possible that this form of gallop rhythm in the presence of general infection implies a severe general debility but whether such debility is more severe than in those patients who do not exhibit systolic gallop sounds we do not know. Likewise, in those patients with organic heart disease or arterial hypertension we cannot say that the prognosis is worse with than without systolic gallop rhythm. Several cases of recovery from infections with disappearance of the sound, are reported. Some authors, notably White<sup>12</sup>, Wolfert<sup>13</sup> and Margolis<sup>14</sup>, and Macleod, Wilson and Barker<sup>15</sup> have regarded it as without significance.

#### THE PRESENT SERIES

We have observed the gallop sound placed in the systolic phase of the heart cycle in thirty-five patients over a period of eleven years (See table 1.) The relative frequency of this type of gallop rhythm is reflected by the fact that during the same period 186 patients with diastolic gallop rhythm were observed. Approximately 16 per cent, then, of patients showing gallop sounds that have come under our observation have exhibited the systolic variety.

**Quality of the Sound.** In all of this group the extra sound was separated from the normal first and second sounds by an interval sufficiently long so that we clearly felt we were dealing with an additional rather than a split sound. In general the extra sound resembled in quality the normal first sound. Variations in quality were encountered, at times the accessory sound having somewhat more of a valvular quality resembling the second sound. It is possible that some of these may be similar to the metallic clicking sounds supposedly due to plentropicardial adhesions.

**Intensity of the Sound.** The intensity of the extra sound was variable from patient to patient and in the same patient on different examinations. In twelve cases we have made clear notes in this connection. In two it was of slight intensity, that is just loud enough to be positively identified as a distinct extra sound,

in four it was of moderate intensity and in six it was as loud as or louder than the other heart sounds. In the majority of our series it was heard only at the apex of the heart or with maximum intensity at the apex. In but a single case was it heard only at the base.

**Effect of Position.** The position assumed by the patient during the examination had considerable influence on the intensity or even the presence of the sound. Our notes specifically mention this relationship in twelve instances. In three cases the sound was heard only while the patient was recumbent, disappearing when the sitting posture was assumed. In four cases it was heard in both positions, the intensity being greater in the recumbent in three and in the sitting position in one. In four cases it manifested an equal intensity in both positions. In another it was of marked intensity while the patient was supine and practically absent when he sat up. Three years later this relationship was reversed.

**Effect of Rate.** In this series of cases gallop rhythm was heard with varying rates of the heart beat. There were ten instances in which it was present while the rate was under 80 and five when it was under 70. In the others the rate was higher, occasionally reaching levels over 120. This is unlike the relationship between heart rate and diastolic gallops for it is very rare to find these gallops present when the heart rate is slow, especially under 70.

**Constancy of the Sound.** The constancy with which the sound was observed in a patient who had once exhibited it was also variable. In three cases it was noted after its absence on a previous examination. One of these had a mild rheumatic infection and a systolic murmur, thirteen months later the murmur had disappeared and systolic gallop rhythm was present. In one case the sound had practically disappeared when the patient was examined one year later. In one the sound was observed on twelve of thirteen examinations over a period of seven years, while another exhibited it on four of seven examinations over eight years. One had the sound when seen one week after an acute coronary closure. He made a good recovery and it was not heard again on the five examinations during the next two years. Adequate follow up data on this group over a long period are not available since the patients were largely seen in consultation and remained under the immediate care of their own physicians.

**Clinical Features of the Group.** By and large the patients in this series made up a rather miscellaneous group. There were some with mild and others with severe cardiovascular disease. There were still others who had organic disease not involving the cardiovascular system and finally a group which had no organic disease whatever, merely manifesting



minor functional disturbances. There were no patients in the group who had severe acute infections such as typhoid fever or diphtheria similar to those reported in the literature. This is perhaps due to the fact that such acute infections are rarely encountered in the practice from which these cases are drawn. Only two patients in the group had known infections of any sort, both having mild rheumatic fever. Eighteen patients or half the group had no demonstrable organic disease whatsoever and twenty-three or two-thirds had no detectable cardiovascular disease.

The presenting complaints of most of these patients were strikingly either mild or bizarre. Seven were sent by their own physicians because something queer had been heard on auscultation. Two came voluntarily because they wanted their hearts examined. Only one of these nine patients had a notable symptom, a woman whose palpitation and pain about the heart had been annoying since she was told that she had a heart murmur. Eleven complained of being tired or lacking vitality. One man stated that he was nervous since witnessing a death. Sixteen patients complained of pain about the apex of the heart, but only five were regarded as having coronary artery disease. In the others the pain was mild, vague and precipitated by nervousness and not by exertion. Belching of gas, nervousness, palpitation and peculiar sensations in various parts of the body were common complaints. Actual physical incapacitation was entirely absent except to a slight degree in the five patients who had coronary artery disease. The striking thing about the group was that the majority were "nervous" people who were concerned about the possible existence of heart disease.

Of the twelve patients who did have cardiovascular disease, five had disease of the coronary arteries, in three of whom occlusion had occurred. Two of these five and six others had arterial hypertension. The degree of hypertension was not marked, however, as only three had systolic tensions of over 160 mm and only two had diastolic tensions of over 100 mm. The other patient in the group with cardiovascular disease was a man of sixty years who had left bundle branch block without other evidence of heart disease. There were none with valve defects. It is notable that in the entire series there were only two patients whose hearts were clinically enlarged. Equally notable is the fact that in not a single instance was there subjective or objective evidence of congestive heart failure.

Electrocardiograms were obtained in thirty of the group. Significant abnormalities, without consideration of left axis deviation or occasional premature contractions, occurred in only five patients. Four of these had coronary

disease and one had bundle branch block. Atrioventricular nodal rhythm occurred in one of the group without heart disease, but this we have not considered a significant abnormality.

*Age* There is a fairly sharp division of the groups with and without cardiovascular disease according to age. Among those with cardiovascular disease there was but one less than forty-four years old, a man of twenty-one with slight arterial hypertension, while in the group without cardiovascular disease there was but one who was more than forty-four years of age. Thus almost without exception the older patients in our series had cardiovascular disease while the younger ones did not. The extremes of age in the entire series were eleven and seventy-one years.

*Sex* The sexes were represented by nineteen males and sixteen females. Among those with cardiovascular disease, however, there were twice as many males as females while the sexes were equally represented in the group without cardiovascular disease.

*Prognosis* The prognostic significance of systolic gallop rhythm is suggested by the fact that none of the group are dead, and most are in a good or excellent state of health. This is in striking contrast to the fact that 46 per cent of the cases with diastolic gallop observed during the same period of time are known to be dead, the remainder being unheard from or known to be in poor condition. The dead who showed a diastolic gallop rhythm lived an average of ten months and twenty days after the detection of the gallop, the living have so far survived an average of about fifteen months. The patients with systolic gallop rhythm have already lived an average of more than five years and for the most part are well.

The absence of symptoms of myocardial insufficiency of any appreciable extent in those with heart disease, the slight degree of arterial hypertension in those who exhibited it, the rarity of cardiac enlargement and the complete absence of all signs of congestive failure make it appear that this variety of gallop rhythm has no unfavorable influence upon the subsequent course of the patient's life.

The importance of systolic gallop rhythm lies in the fact that it may be confused with diastolic gallop and an incorrect prognosis given as a result of this error. In a few cases we have experienced difficulty in timing the extra sound. The following procedure, however, has been useful in deciding that the abnormal sound occurred between the first and second sounds rather than between the second and first. During auscultation the stethoscope is first placed at the apex and then rhythmically moved with each heart beat to points nearer and nearer to the aortic area. It will generally be found that the sound that gradually disappears is the

middle one of the three and the examiner is therefore left with the normal two heart sounds on reaching the base of the heart. We are fully aware that indisputable evidence that the gallop sound was truly systolic could only have been obtained with sound tracings photographed simultaneously with other events of the cardiac cycle such as those recorded in the electrocardiogram. The sharp clinical distinction and subsequent course of the cases included in this study as contrasted to those with diastolic gallops are fairly satisfactory proof that the bedside findings and terminology were valid.

**Mechanism of Production** As to the mechanism by which systolic gallop rhythm is produced we have nothing to offer from our series except in so far as the previously mentioned theories may be applied here. We cannot speak of atheromatous plaques in the ascending portion of the aorta without autopsy material. It does not appear, however, that such degenerative changes could be an important factor in our cases with such a preponderance in the younger age group. It is true that many of our patients were asthenic individuals. This would be consistent with Potain's theory of production of the sound by distention of an aortic wall the tone of which is diminished. Certainly the physical state of our patients, however, is not comparable to that which obtains in typhoid fever. This can scarcely explain all instances. The other theories also seem inadequate, although pericardial or pleuropericardial adhesions may possibly account for some of these cases.

#### SUMMARY

Thirty-five patients with systolic gallop rhythm observed over a period of eleven years are reported. This number represents 16 per cent of all patients with gallop rhythm encountered during this period.

The extra sound in systolic gallop rhythm is placed in systole between the normal first and second sounds. In most cases it has a quality resembling the normal first sound. Its maximum intensity is usually in the region of the apex of the heart. Its intensity is variable in different patients and occasionally in the same patient from time to time. It may alter its intensity or even disappear with change in the position assumed by the patient, although generally it is loudest in the recumbent position. It may also appear or disappear without apparent cause.

Two-thirds of the group had no cardiovascular disease. Most of them had no complaints having been seen in consultation because of suspected heart disease or they presented bizarre complaints of a minor or functional nature. Most of them were "nervous" people. The remainder of the group, twelve in number, had demonstrable cardiovascular disease. Five of

them had coronary artery disease, two of these and six others had arterial hypertension, usually mild in degree, and one had bundle branch block without other evidence of cardiovascular disease. Valve defects, congestive failure or congestive signs of any sort were not found. Only two patients had cardiac enlargement. Significant electrocardiographic abnormalities were absent except in four of those with coronary disease and the one with bundle branch block. No real incapacity was present except in those with coronary artery disease.

Extremes of age were eleven and seventy-one years. With one exception in each group, those below forty-four years of age had no cardiovascular disease, those above forty-four had such disease. Males were predominant in the group with cardiovascular disease while there was no difference in the number of males and females in those without it.

None of the group are dead at the time of this report, while 46 per cent of the group with diastolic gallop observed over the same period are dead. The rarity of cardiac enlargement and physical incapacity, the slight degree of arterial hypertension in those who had it and the complete absence of congestive signs all point to the benignity of systolic gallop rhythm.

It appears that none of the proposed theories as to causation of the extra sound can satisfactorily account for all cases.

#### CONCLUSIONS

1 Systolic gallop rhythm is more frequent than is commonly supposed.

2 It occurred in this series predominantly in "nervous" people. Heart disease is more often absent than present in patients with systolic gallop rhythm although serious heart disease may be present.

3 It has no unfavorable influence on prognosis.

#### REFERENCES

- 1 Cuffer et Barbillon: Nouvelles recherches sur le bruit de galop cardiaque. Arch. gén. de méd. 19: 1 et 301, 1857.
- 2 Potain: Les bruits de galop. Semaine méd. 20: 175 1899.
- 3 Wolferth C. C. and Margulies A.: Gallop rhythm. Int. J. Nat. Clin. 11: 15 (March) 1922.
- 4 Wiedemann G.: Zu Frage des mesosystolischen Galloprhythmus. Ztschr. f. d. ges. exper. Med. 8: 77 1913 14.
- 5 Obratow W. P.: Ueber die verdonnellte u. und akzentuierten Herztöne bei umschriebener Auskultation des Herzens. Ztschr. f. klin. Med. 57: 70 1895.
- 6 Gioux R.: Le Bruit de Galop. Thèse Faculté de Médecine de Paris. Paris. A. Maloine et Fils, pp. 95 1913.
- 7 Amiard A.: Tension artérielle et bruit de galop. Presse Méd. 25: 65 (May 13) 1916.
- 8 White P. D.: Clinical significance of gallop rhythm. Arch. Int. Med. 61: 1 (Jan.) 1923.
- 9 Gallavardin L.: Pseudo-dédoublement du deuxième bruit du cœur simulant le dédoublement mitral par bruit extra-cardiaque rétrostomatique surajouté. Lyon méd. 121: 403 (Sept. 14) 1913.
- 10 Lian C. et Deparis M.: Le claquement méso-systolique pleuro-péricardique. Bull. et mémo. Soc. méd. d. hôp. de Paris 49: 496 (April 17) 1922.
- 11 Bard, H.: Du bruit de galop de l'hypertrophie du cœur gauche son mécanisme et sa signification clinique. Semaine méd. 20: 29 (May 18) 1904.
- 12 White, P. D.: Heart Disease. New York The Macmillan Co. N. Y. 1923.
- 13 Macleod, A. G., Wilson, F. W., and Barker P. S.: Observations on heart sounds with particular reference to gallop rhythm and sound of auricular origin. Proc. Soc. Exper. Biol. & Med. 29: 1069 (N. Y.) 1932.

## THEELIN THERAPY IN VULVOVAGINITIS

BY RICHARD BETTS PHILLIPS, M D †

SINCE the introduction by Lewis<sup>1</sup> of theelin, the estrogenic hormone, in the treatment of vulvovaginitis in 1933, there have been a number of papers published on this particular aspect of hormone therapy. J. Brown<sup>2</sup>, Huberman and Israeloff<sup>3</sup>, Miller<sup>4</sup>, and in England, Nabarro and Signy<sup>5</sup>. Other very interesting work has been published recently on the chemistry of this hormone, its apparent relationship to carcinogenic tar derivatives, and its effect on the male and female organism, Leo Loeb<sup>6</sup>, Cook, Dodds, and Hewett<sup>7</sup>, Burrows and Kennaway<sup>8</sup>, and A. Lacassagne<sup>9</sup> (Vide infra).

Theelin\* is the name given to the estrogenic substance by Parke Davis. Schering prepares it as Progynon. G. W. Carnrick has named its preparation Thelestrin, Squibb calls it Amniotin, and still other names by which this hormone is known are Menformon, Estrin, and Folliculin. Theelin has been found to have the formula  $C_{18}H_{22}O_2$ . It is lipoidal in type, with absence of nitrogen, and possesses a structural picture very similar to the male sex hormone, the corpus luteum hormone, and cholesterol, all of which are phenolic compounds.

The hormone theelin may be administered either intramuscularly or orally. The oral preparation is called Theelol by Parke Davis, and the oral dosage is approximately five times greater than the intramuscular. Dosage is estimated in rat units or in international units. The rat unit is approximately 3.3 times stronger than the international unit. The international unit is defined as the activity of one ten-thousandth of a milligram of a standard international crystalline powder identical with the theelin first described by Dr. Doisy. There are about 3,000 rat units per milligram of theelin. One Doisy or rat unit is equivalent to 3.3 international units. A Doisy rat unit is the smallest amount of estrogenic hormone which will induce estrus in mature but ovariectomized rats, as judged by cornification of epithelial cells in vaginal smears. The hormone must be the smallest amount which will cause this effect when administered in three divided doses, four hours apart. Twenty rats must be used in each test, and 75 per cent of these animals must show a typical response. One rat unit is equivalent to five mouse units. Wide variations in dosage have been described, from 25 rat units as administered by Raglan Miller<sup>4</sup> intramuscularly in patients in whom a theelin reaction has been established, to 50,000 international units administered orally and intramuscularly in one dose by Nabarro and Signy<sup>5</sup> of London.

\*One-half of the Theelin used was kindly presented to us by Parke Davis & Company.

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Edgar Allen<sup>10</sup> in 1928 showed that in the *Macaca rhesus* monkey a proliferation and thickening of the vaginal epithelium follow shortly after the administration of the ovarian hormone. Herein lies the rationale of this treatment as applied to vulvovaginitis. That is to say, one hopes that, by creating a temporary transformation of the immature vaginal epithelium as seen in young girls into one which is thickened and adult in type, a cure may be established. The upper layers of the vaginal epithelium become cornified, and increase in thickness from five to thirty layers or more. There is pronounced sloughing of this outer or functionalis layer (see figures 1 and 2). Fur-

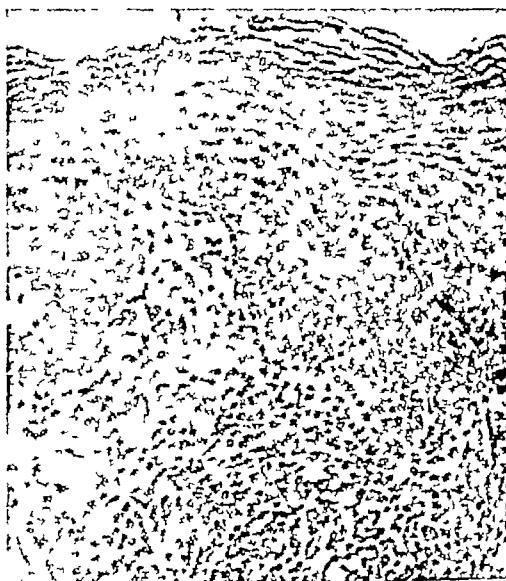


FIG 1. S. B. aged 8. Vaginal epithelium removed November 15, 1934. Treatment begun October 11. Total number of rat units of Theelin to November 15, 1450. The epithelium shows cornification, desquamation and marked hypertrophy. It is of a thickness of approximately thirty layers. The basal cells are undergoing active proliferation. The uppermost layer of the functionalis or outer layer can be seen to be desquamating.

thermore, there is a tremendous activity demonstrable in the basal cell layer, with mitotic figures in the cell nuclei and a heaping up of what might be called swollen cells in the intra-epithelial layer or the zone midway between the functionalis and basalis layers (see figure 2). It is thought that the sloughing of the epithelial cells (see figure 3) takes with them gonococci which are embedded in the uppermost layers of the epithelium. Furthermore, by keeping up the reaction over a moderate length of time (several months), one hopes to create a more resistant vaginal wall and thereby to prevent reinfection or relapse.

In our series of thirteen cases, treated in the Out-Patient Gynecological Department of the Boston City Hospital, we found eleven of the

children to have positive smears at the beginning of treatment. The other two had suspicious smears, and all had from +++ to ++++ discharges. The smears were loaded with pus

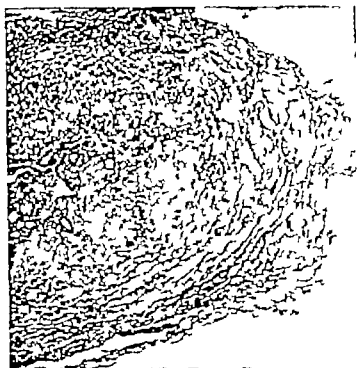


FIG. 2. M. J. aged 6.

Biopsy November 15 1931 four weeks after treatment had been instituted with Theelin. The patient had received 2100 rat units of Theelin at this time. The smears were not all although a number had been positive in the preceding month. Notice the cornification, desquamation and thickening of the epithelium. The basal cell membrane is hyperplastic. The arterioles are distended and the intra-epithelial layer has what might be called swollen or bulbous cells, while the functional layer is seen to be shedding flattened squamous epithelium.



FIG. 3. M. P. aged 6.

Smear taken with platinum loop on November 15 1931 same day as biopsy (see figure 2) shows large numbers of desquamated epithelial cells which are cornified. There are still a few pus cells present, but there were no gonococci evident. Both this patient and her sister aged three and a half, had positive smears in October.

cells and gram negative diplococci, both intracellular and extracellular in large numbers. Six patients had marked inflammatory reddening of the vulva, one with excoriation. Urethritis was present in two. Two children had marked

lower abdominal pain with slight temperature. In one of these patients (M. J.), a little colored girl, aged six, typical gram negative intracellular diplococci were found on performing direct peritoneal aspiration (Dr J. Tartakoff). This latter case was our only patient who was hospitalized. She had been admitted with a diagnosis of acute appendicitis.

Our plan of treatment was as follows. Each patient received approximately from 700 to 900 rat units administered in three divided doses weekly. The smallest amount of theelin received by any patient was 2100 rat units, and the largest was 4460 rat units. Figures 1 and 2 show the effect of the estrogenic hormone on the vaginal epithelium following the administration of 1450 rat units in the one case, and 3300 in the other. It would appear that the theelin reaction is established when the patient has received in the neighborhood of 2,000 units. We used the theelin in oil preparation exclusively, not the aqueous solution. The former preparation is supposed to permit of slower and more uniform absorption of the hormone.

Weekly smears were taken throughout the entire period of treatment. The smears were taken by means of introducing a platinum loop into the vagina under reflected light, and scrapings of the vaginal walls obtained. After the first one or two examinations, we found that practically all the patients stood the examination with the greatest of ease. We performed vaginal biopsies once on each patient (see figures 1 and 2). On our charts we recorded the character of the theelin reaction as evidenced by the comparative number of cornified epithelial cells in the microscopic field, a diminishing amount of pus cells, and, of course the presence of the gonococcus. It was remarkable to note the rapidity with which the smears became loaded with epithelial cells in a short space of time, where previously there had been practically none of these cells. In every case one can notice a marked grayish tumescence of the hymen, visible to the naked eye. This is especially noticeable in colored girls. Raglan Miller describes what he calls the "glassy" appearance of the vaginal smear when it consists almost entirely of epithelial cells, as contrasted with the "opaque" appearance when the smear is taken at the beginning of treatment and consists mostly of pus. We found the knee-chest position to be the best for securing vaginal wall scrapings. Figure 3 shows the large number of epithelial cells of adult type which nearly fill the microscopic field after the reaction is well established. Notice the contrast in these cells and the thin oval immature cell found before treatment.

The average age in our group was six and one half, the youngest three, and the oldest ten.

The average number of rat units of theelin administered was 3,160

At the end of ten weeks' treatment, when all patients were regarded as evidencing negative smears and no discharge in ten, and very slight discharge in three, all treatment was discontinued for six weeks. At the end of this time,



FIG 4  
Vaginal epithelium of infant two and three-quarter months old. Autopsy specimen. In general but little change in thickness of layers is noted up to about ten years of age. Courtesy of Robert M. Lewis, M.D., Yale University School of Medicine, New Haven, Connecticut.

all were examined again and it was found that 70 per cent (nine out of thirteen) had relapsed. We do not believe that reinfection from extraneous source occurred in any of them. All mothers and fathers had been carefully checked up. Of the nine who were thought to have relapsed, three had positive smears, and six had suspicious smears. All nine had a return of their discharge, but not of such severity as before treatment with theelin. The four who were presumably cured were all subacute cases, and they have remained apparently cured to this date April 1 1935.

The economic and social features of vulvovaginitis are serious and far reaching. Oppenheimer and Everett<sup>11</sup> have published an interesting article on this aspect of the disease, and describe forty-three children who were kept out of schools in Washington, D. C., for from one to four years. We ourselves had one patient (A. de C.), aged eight, who was kept out of school for a year and a half and whom we finally were able to have taken back to school only after repeated effort. Oppenheimer and Everett<sup>11</sup> further emphasize the great loss, both economic and sociologic, which this disease may be responsible for.

Theelin is a most potent hormone, and its use is still attended with a certain unknown danger as to what the end result on the patient may be. By its exhibition menstruation can be caused experimentally in ovariectomized women and monkeys, and endometrium which has been atrophic can be proved to show hyperplasia (Werner and Collier<sup>12</sup>). Lacassagne<sup>9</sup> has demonstrated the fact that the male may be influenced by theelin. He showed that following injection of estrogenic substance into male mice, the posterior lobe showed marked hypertrophy. He also showed that it was pos-

sible to increase the mammary cancer rate in mice by increasing the estrogenic substance. Burrows and Kennaway<sup>8</sup> have produced estrus with enlargement of the horns of the uterus in mice and complicated with pyometra and peritonitis merely by applying this hormone to the non-epilated skin of the back. C. Clauberg<sup>13</sup> showed that it is possible to stimulate even the smallest adult human uterus by means of large doses of follicular hormone and proved this by salpingography. Leo Loeb<sup>6</sup> and Lathrop and Loeb<sup>14</sup> demonstrated that with mice in whom early oophorectomy had been performed, there occurred a very marked diminution in the cancer ratio both in mice possessing a cancer susceptibility and in those that did not. Leo Loeb<sup>6</sup> has further emphasized the apparent close relationship between estrogenic hormones and certain carcinogenic derivatives of tar. Cook, Dodds, and Hewett<sup>7</sup> in 1933 have produced estrus successfully in mice by the use of a synthetic compound which is chemically closely allied to tar. Doisy, Veler, and Thayer<sup>15</sup> showed that one milligram of the crystalline estrogenic hormone is equivalent to 3,000 rat units in potency. On the other hand, Robert T. Frank<sup>16</sup> demonstrated that no estrogenic hormone could be detected one-half hour after injecting 2000 mouse units into a rabbit and that none could be found in the urine or tissues in the succeeding twenty-four hours. However, since it is well known that estrogenic substance will produce active epithelial cell proliferation (see figures 1 and 2), the question which naturally arises is, Will there be any harmful change in these young girls in either the near or the remote future? From a review of the results obtained to date in several clinics, and the experimental work on animals, one can feel moderately certain that the possible damage to any individual is minimal. J. Raglan Miller<sup>4</sup> reported one case recently in which he had the opportunity of performing a biopsy on an ovary of a child who had received 1100 rat units of theelin, and the organ proved to be quite normal. Novak<sup>17</sup> states in a very recent article that estrogenic substance is not a stimulant to ovarian activity, and adds "The fear that pelvic hyperemia produced by estrogenic substance may predispose to uterine and tubal extension of the vaginal infection is probably more apparent than real." This is in conformity with the progress of one of our cases, M. J. (Vide supra). Nabarro and Signy<sup>5</sup> in London reported breast hypertrophy in one case which regressed upon cessation of treatment. They report no untoward results in any of their twenty cases, although they gave as much as 10,000 to 50,000 units intramuscularly in one dose, sometimes repeated, and in several cases 1,000 units per day for approximately three months. In three children receiving 3,000 rat units daily, the average length of treatment was cut down to twenty-eight days, and the last

positive smear was found sixteen days after beginning of treatment. Relapse occurred in four teen out of twenty after having been home an average of two months. These writers advocate large dosage treatment, 4,000 units by mouth at a time. Raglan Miller<sup>4</sup> believes that in new cases treatment should be continued from four to six weeks with smaller doses in the neighborhood of 100 rat units daily and once the theelin response has been established then vigorous squamous cell reaction should be maintained for several months. This can be accomplished with a greatly decreased number of rat units, administered weekly. Miller further believes that estrogenic hormone is of value, no matter what organism may be responsible for the vulvovaginitis.

In June 1935 J. Thornwell Witherspoon<sup>18</sup> of Tulane has reported an unsuccessful series of vulvovaginitis cases<sup>10</sup> treated with estrogenic hormone, none of whom were cured. They all showed temporary improvement, however during the middle of his two to three months period of treatment. His results therefore have been slightly worse than mine. His dosages were somewhat similar.

#### CONCLUSIONS

1. Thirteen girls were treated in the Out Patient Department of the Boston City Hospital with theelin only for a period of from four to six months.

2. The patients received approximately the same amount of theelin the average number of rat units being 3,160. The average age was six and one-half.

3. The discharges cleared up rapidly in all cases to a greater or less degree, and smears became negative in every case within four to six weeks of treatment. Six weeks after cessation of all treatment 70 per cent of the patients (nine out of thirteen) "relapsed." Two of the remaining four patients continued to have slight discharge which was negative and which cleared up after several more weeks of treatment. Two of the nine were cured after more treatment with theelin. Thus, seven appeared to be in statu quo in the final analysis.

4. No harmful results were noticed in any of our patients. Larger doses than we gave should not be administered since the epithelial response may be obtained with the doses outlined above. Larger doses may cause scar tissue formation in the ovaries, and it is possible that the menarche in these girls may be delayed or otherwise interfered with. These possibilities will be questioned until a report is published later, dealing with the onset of the catamenia in girls who have been treated with theelin.

5. Theelin (or other estrogenic hormone) may be used in the treatment of vulvovaginitis in conjunction with our other and standard methods of treatment. The cost has recently decreased considerably.

6. The criteria in following the treatment are

- 1 The presence of Gonococci
  - (a) Intracellular,
  - (b) Extracellular,
  - (c) Absent,
- 2 Presence of Pus
  - 1 plus
  - 2 plus
  - 3 plus
  - 4 plus
- 3 Epithelial Cells
  - (a) Amount
  - (b) Type, immature oval, adult cornified,
  - (c) Appearance of slide, "glassy", or "opaque",
  - (d) Biopsy of vaginal epithelium
- 4 Hymen
 

Grayish and edematous when the estrogenic hormone reaction is established

The Vaginal Epithelium Blocks were made by the Tufts Pathology Laboratory

#### REFERENCES

1. Lewis, Robert M.: A study of the effects of theelin on gonorrheal vaginitis in children. *Am. J. Obst. & Gynec.* 25: 522 (Oct.) 1932
2. Brown, J.: Treatment of gonorrheal vaginitis in immature girls. *J. A. M. A.* 104: 191 (3) 1934
3. Huberman, J., and Janss, H. H.: Therapeutic value and effects of amphotin in gonorrheal vaginitis in children. *J. A. M. A.* 103: 18 (July 7) 1934
4. Miller, J. Raglan: Two years experience with theelin treatment of gonorrheal vaginitis. *Am. J. Obst. & Gynec.* 20: 553 (April) 1935
5. Nabarro, David, and Biny, A. G.: Treatment of vulvovaginitis with oestrin. *Lancet* 1: 804 (March 16) 1935
6. Loeb, Leo: Estrogenic hormones and carcinogenesis. *J. A. M. A.* 104: 1897 (May 4) 1935
7. Cook, J. W., Doodie, B. C., and Hewett, C. L.: Synthesis of oestrin-acting compound. *Nature* 131: 56 (Jan. 14) 1933
8. Burrows, Harold, and Kennaway, N. M.: On some effects produced by applying oestrin to the skin of mice. *Am. J. Cancer* 20: 1 (Jan.) 1933
9. Lacaze, A.: Métaplasie épidermoïde de la prostate provoquée chez la souris par des injections répétées de fortes doses de folliculine. *Compt. rend. Soc. de biol.* 115: 180 1932
10. Ibid.: Apparition de cancers de la mamelle chez la souris mâle soumise à des injections de folliculine. *Compt. rend. Acad. de sc.* 1931 630 (Oct. 10) 1932
11. Allen, Edgar: Reactions of immature monkeys (*Macaca rhesus*) to injections of ovarian hormone. *Am. J. Physiol.* 46: 478 1933
12. Allen, Edgar, and Dole, Edward A.: The induction of a sexually mature condition in immature females by injection of the ovarian follicular hormone. *Am. J. Physiol.* 69: 577 (Aug.) 1934
13. Oppenheimer, E., and Everett, H. H.: School excisions for gonorrheal infections in Washington, D. C. *J. Social Hyg.* 20: 129 (March) 1931
14. Warner, August A., and Collier, W. D.: The effect of theelin injections on the castrated woman. *J. A. M. A.* 100: 633 (March) 1932
15. Claiborn, C.: Studien an infanctilen und insuflentenen menschlichen Uteri (Zum problem der ovarialinsuffizienz). *Zuchr. f. Geburtsh. u. Gynäk.* 107: 221 1934
16. Lathrop, A. H., and Loeb, Leo: On the part played by internal secretion in the spontaneous development of tumors. *J. Cancer Research* 11: 1 (Jan.) 1936
17. Ibid.: Further investigations on the origin of tumors in mice. The tumor incidence in later generation of strains with observed tumor rate. *J. Cancer Research* 11: 127 (April) 1936
18. Dole, Edward A., and Clement, D., and Thayer, Sidney: The presence of theelin in the urine of pregnant women. *J. Biol. Chem.* 81: 159 1930
19. Frank, Robert T.: Sex-endocrine factors in blood and urine in health and disease. *J. A. M. A.* 104: 1891 (June) 1935
20. Norak, Emil: The therapeutic use of estrogenic substances. *J. A. M. A.* 104: 1815 (May 13) 1935
21. Witherspoon, J. Thornwell: Treatment of gonorrheal vulvovaginitis of childhood with the ovarian follicular hormone. *Am. J. Obst. & Gynec.* 29: 957 (June) 1935

# CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C CABOT, M.D

TRACY B MALLORY, M.D., *Editor*

CASE 21471

## PRESENTATION OF CASE

*First Admission* A thirty-five year old white American janitor was admitted complaining of swelling of the legs

Two weeks prior to entry the patient developed a sore throat associated with nasal discharge and mild headache. These symptoms continued for about three days and then subsided. At this time he noticed swelling of his ankles and, in the absence of other symptoms, continued with his work. The swelling gradually extended up his legs and he began to fatigue readily. A slight non-productive cough developed. He had a nocturia of one or two times since the onset of his edema but there were no other symptoms noted. Because of the increasing fatigue, after ten days he consulted a physician and was immediately hospitalized.

He had never had any previous illness of significance.

His family history is irrelevant.

Physical examination showed a well-developed and nourished young man appearing quite comfortable. There was marked pitting edema of the lower extremities, penis, scrotum, sacrum and lumbar region, and puffiness of the eyelids and to a less degree of the face. The tonsils appeared to be normal. The lower teeth were quite carious and discolored, the upper teeth had been removed. The fundi were negative except for slight tortuosity of the arterioles and a physiological cupping. The heart was not enlarged and no murmurs were audible. Gallop rhythm was heard. The blood pressure was 150/110. There were scattered rare medium coarse râles over the posterior chest bilaterally. The abdomen was slightly distended and tympanic and there was slight edema of the abdominal wall. Intraperitoneal fluid was not demonstrated clinically.

The temperature was 100.3°, the pulse 100. The respirations were 20.

The urine showed a large trace of albumin and a specific gravity of 1.032. The sediment contained 8 red blood cells, an occasional white blood cell and a few hyaline casts. Examination

of the blood showed a red cell count of 4,900,000, with a hemoglobin of 80 per cent. The white cell count was 4,900, 75 per cent polymorphonuclears. A stool examination was negative. The nonprotein nitrogen of the blood was 28 milligrams per 100 cubic centimeters. The serum protein was 2.8 grams per cent. A Hinton test was negative.

He was given a diet containing a low salt content with a protein component of 80 to 100 grams per day. Although the charted intake and output exhibited moderate fluid retention the patient's edema gradually subsided. His temperature dropped to normal twenty-four hours after examination and except for transient rises to 101° to 103° following intravenous injections of typhoid vaccine (25,000,000 to 100,000,000) at scattered intervals it remained at the normal level. At the end of the first week he became nauseated and vomited each morning. This subsided after six days. During this time his white blood cell count rose to 14,000, with 84 per cent polymorphonuclears. The serum protein was now 3.97 grams per cent, the chlorides 631 milligrams per cent and the nonprotein nitrogen 38 milligrams per cent. The urine continued to show a large trace of albumin and had a specific gravity varying from 1.002 to 1.032. The sediment remained similar to that of the admission specimen. During the third week a booming quality of the second aortic sound became evident. By this time the edema had almost entirely disappeared and the patient felt much improved. At the end of one month he again began to vomit and the edema returned. The blood pressure was 135/95 and a systolic murmur was now audible over the precordium. He was given a transfusion of 500 cubic centimeters of blood with no evident change in his condition. His hair was observed to be graying quite rapidly. Ascites appeared. He was given 3 grains of thyroid daily for five days without any clinical change. His vomiting ceased within a week. During the sixth week the edema diminished slightly but examination of the fundi revealed some haziness of the discs and fullness of the veins. Diuresis was not established, nor had his edema subsided completely, but he was sent home at this time for convalescent care.

*Second Admission*, five weeks later.

He felt quite well for two weeks and then there was a rapid return of edema and repeated vomiting of food directly after ingestion. Two weeks before entry he began to have slight blurring of vision and twelve days later developed diarrhea.

Physical examination showed generalized anasarca. The skin was dry and coarse. The fundi showed choked discs, small patches of exudate and rare hemorrhages. There was a slight systolic murmur audible over the precordium and a moderately accentuated aortic second sound. The blood pressure was 200/145. A few me-

drum coarse râles were audible at the angles of the scapula. The abdomen was tense and distended. The serotum was swollen to the size of a large grapefruit. There was marked clubbing of the fingers and toes, a finding which had not been recorded at his previous admission.

The temperature was 98°, the pulse 100. The respirations were 20.

The urine showed a specific gravity varying from 1.008 to 1.023. There was a slight to large trace of albumin. The sediment was similar to that reported upon his initial admission. The blood showed a red cell count of 4,500,000, with a hemoglobin of 75 per cent. The non-protein nitrogen of the blood was 24 milligrams, the chlorides equivalent to 106 cubic centimeters N/10 chloride per 100 cubic centimeters. The serum protein was 3.5 per cent, the cholesterol 555 milligrams per cent.

The urinary output continued slightly below the fluid intake except for a slight spontaneous diuresis directly following admission and a brief induced diuresis two weeks later following the injection of salyrgan. Vomiting ceased promptly after admission. On the third day intravenous injection of typhoid vaccine (100,000,000) produced a febrile rise to 102°. During the third and fourth weeks he received three grains of thyroid daily with a subsequent gradual rise of pulse to 120. The temperature remained normal. On the twenty-eighth day he complained of diminution of hearing and left earache. A reddened drum was noted and was treated expectantly. The temperature rose to 99° but subsided promptly. Three days later he developed right earache. The right drum likewise became injected. The temperature rose to 100°. The pain and fever subsided gradually but the patient remained partially deaf. During the fifth week he again began to vomit small amounts at irregular intervals after meals. This continued for the remainder of his hospital stay. On the thirty-fourth day the blood pressure was 160/120. The eye grounds were unchanged. The edema was still marked. He was drowsy at times but for the most part was quite cheerful. The white blood cell count was 20,000. The specific gravity of the urine now remained between 1.007 and 1.015 with a single specimen showing a specific gravity of 1.020. The non-protein nitrogen was 31. He was discharged on the forty-ninth day with little evident improvement.

*Final Admission*, a month and a half later.

There had been no change in his condition until two weeks before entry. At this time his physician did an abdominal paracentesis. A few days later he developed a sharp pain in the right loin which radiated to the kidney region. This usually occurred after meals and was relieved by a sedative.

The patient had a pasty yellow face. The

abdomen was huge and there was massive generalized edema. Examination of the fundi showed slight haziness of the discs medially. There were some small hemorrhages and many whitish yellow exudates. The vessels were not remarkable. The tongue was dry. There was flatness over the lower half of both lungs posteriorly with absent tactile fremitus. Some bronchial breathing was audible in the area of dullness and was more marked on the left where egophony was also present. The heart was not enlarged and there was a rough to and fro friction sound heard best over the mitral area. The heart sounds were distant. The blood pressure was 125/105. A fluid wave was demonstrated in the abdomen.

Examination of the urine showed no change from the specimen previously examined. The blood showed a red cell count of 3,290,000, with a hemoglobin of 60 per cent. The white cell count was 12,300, 74 per cent polymorphonuclear. A second abdominal paracentesis was done in which 7,500 cubic centimeters of fluid was removed. The specific gravity was 1.006, the total cell count 57 per cubic millimeter, red blood cells 29 per cent, lymphocytes 47 per cent.

Because of nausea and a capricious appetite the patient was permitted to eat and drink whatever he chose. There was no change in his general condition. During the third week an other abdominal tap was done. The specific gravity was 1.002. Chlorides were equivalent to 90 cubic centimeters of N/10 sodium chloride per 100 cubic centimeters. The total protein was 8 per cent, the cholesterol was 36 milligrams per 100 cubic centimeters. There was little change in the cell content. During the fourth week the plasma proteins were 4.2 grams per cent. The non-protein nitrogen was 49 milligrams. The chlorides were equivalent to 84 cubic centimeters N/10 chloride. Because of restlessness he was given morphin. During the fifth week his respirations were between 6 and 10 per minute. He became progressively more drowsy and at the end of the sixth week, eight months after the onset of his symptoms, went into coma and died.

#### DIFFERENTIAL DIAGNOSIS

DR. MYLES P. BAKER. To single out a few of the more significant findings here, if we are dealing as I suspect, with a case of Bright's disease,—chronic glomerulonephritis—the appearance of the edema three days after the patient had had sore throat with nasal discharge is interesting and important, although the exact nature of the association remains decidedly in doubt. As a rule the appearance of edema as early as two or three days after the upper respiratory tract infection is more indicative of an exacerbation of glomerulonephritis than an



initial attack, in which the period between onset of tonsillitis or sinusitis, and the like, and the appearance of symptoms of nephritis is more often as long as a week or two weeks, ten days perhaps is the average

The statement of slight non-productive cough is interesting. It may be only an impression on my part but it seems to me that most of the few such cases that I have seen beginning with stubborn edema, presenting edema as the main complaint, have this irritative cough, perhaps definite moist râles at the bases, evidences of an ill-resisted bronchial infection

The nocturia of one or two times since the onset of the edema I hesitate to comment on, as no further mention is made of it. It seems hardly likely that this is the beginning of a compensatory polyuria with renal insufficiency because we have no other proof of that at the moment

Slight tortuosity of the arterioles in the fundi is an equivocal finding, but does bear out our impression that this man has had an insidiously developing renal lesion, for some time antedating the appearance of his symptoms. I think that, too, is borne out by the finding of the low level of serum protein, 2.8 grams per cent. It seems hardly likely that this level would be reached in such a short period of time as his symptoms would indicate. Presumably he had a marked proteinuria for some time largely albumin, and that had led to this depletion of serum protein

The urinary findings mentioned at this point are important here because they are the only specific mention we have of examination of the urine sediment. He has microscopic hematuria, a few white cells, which one would expect in this type of Bright's disease, and only a few hyaline casts. One generally finds in association with such marked proteinuria as this man has fatty granular casts with, frequently, doubly refractile lipid bodies in the urine sediment. The white blood cell count is such as you would see particularly after an upper respiratory tract infection, 75 per cent polymorphonuclears are consistent with secondary infection,—bronchitis, tracheitis and so on

This episode lasting a week, of nausea and vomiting, with leucocytosis, is unexplained. One wonders if there has been a recrudescence of upper respiratory infection, but we do not know. One wonders in such a case whether there is active poorly resisted pneumococcus infection in an ethmoid sinus, for instance

We have evidence of retained ability to concentrate the urine, and a suggestion that such gallop rhythm as was observed on admission was the result of some cardiac dilatation such as occurs with an acute phase of glomerular nephritis, and the booming quality of the aortic second sound indicates a more satisfactory cardiac function

No attempt was made to treat his tonsils by

radiation or surgery, nor have we any evidence that throat cultures were done. As a rule figures bear out the clinical impression that this type of nephritic does not respond well to tonsillectomy. One would hesitate not to treat pus under pressure in the sinuses, or tonsils around which there had been a peritonsillar abscess on their own merit. But a hunt for some focus of infection and eradication on vague indications does not help this type of unemittingly edematous individual. There appears to be a mediocre immune reaction, unimproved by, let us say, tonsillectomy

One wonders on the second admission how close this patient came to some cerebral episode such as has been described under the general heading of hypertensive encephalopathy with this marked rise in blood pressure and evidence of hypertensive neuroretinopathy

"He was given three grains of thyroid daily for five days without any clinical change." The pulse rate later increased. That is rather unusual. Usually most of these patients tolerate large doses of thyroid without any apparent tachycardia

DR WYMAN RICHARDSON: I do not think that was right. He got up to twelve or fourteen grains a day

DR BAKER: This second admission was punctuated after he had been in the hospital for four weeks by mild otitis media. He continues to have high blood pressure and the leucocytosis often seen in these cases. He is beginning to show difficulty in concentrating his urine, indicating fewer and fewer functioning glomerulotubular units

The physical findings on the third admission are interesting. They are consistent with fluid at both bases. The signs on the left make one wonder whether the man has a pericardial effusion, to which in some degree he is entitled with his general anasarca. To-and-fro friction sounds heard over the mitral area may be the first evidence of a fibrinous pericarditis with fluid in both pleural cavities. It may be a pleuropericardial rub. The distant heart sounds, the lowered pulse pressure and the lowered systolic pressure speak for fluid in the pericardial sac, or cardiac dilatation

Examination of the urine showed no change from the specimens previously examined

There is a high chloride content in the ascitic fluid, I believe a rather characteristic finding in these cases. The total protein is a little high for such a so-called "nephrotic" fluid

This man has been through most of the trials and tribulations of the essentially edematous nephritic, as Dr O'Hare chooses to call such a case. As far as differential diagnosis is concerned it seems to me highly unlikely that we are dealing with any other disease than progressive glomerulonephritis. One wonders about the possibility of amyloid disease but

amyloid disease in the presence of such definite hypertension and hypertensive neuroretinopathy as this man has must be a very rare finding. Amyloid disease does occur without any obvious focus for sepsis, but I think we can exclude it here as a most unlikely possibility. This man has had on physical examination definite signs of arterial damage and I take it that it is probable that his kidneys will show not only marked evidence of glomerulitis and tubular degeneration but also arteriolar sclerosis which may have contributed to the rather rapid tempo of his disease. I think it is quite likely that his kidneys will be fairly normal in size, perhaps the slightly swollen, large, pale kidney of essential ly edematous nephritis.

DR. TRACY B. MALLORY Dr. Richardson you saw this patient on the ward. Have you anything to add?

DR. RICHARDSON In the first place I am not sure he had clubbed fingers. I think they were very likely the hereditary type. When I first saw him he had fingernails that curved in both directions.

From the point of view of treatment one of the most difficult symptoms were the attacks of severe pain in the right epigastrium not in the right loin, coming on after eating at the time when he had marked ascites. It was very severe pain requiring a large dose of morphia for relief. I do not know now what the cause of this pain was, unless, associated with edema in the gastrointestinal tract, it was possibly some temporary obstruction.

In regard to the treatment, there is probably some question why typhoid vaccine was used in this patient. It was, I thought a brilliant idea of mine on the basis of previous patients I had seen, one in particular who developed an acute appendix when he was edematous with this disease. The appendix ruptured, operation being impossible, and he developed an appendix abscess and had a high swinging temperature whereupon he had the most tremendous diuresis I have ever seen. When the nephrosis cleared temporarily, the surgeons went in and drained the abscess and he was well for a number of years. So when we discovered that this patient could not take a high protein diet—I did not feel very brave about the acacia intravenously that we hear about it does not seem to me that the reports are very encouraging—and since we could not transfuse him frequently we did try the typhoid and if you look at the chart with hopeful eyes you will see an increase in output of 50 to 100 per cent, temporary improvement that was not lasting.

I did not see him during the last month of his illness, but up to the time I left I did not think he had any pericarditis or pericardial fluid. I agree with the diagnosis that Dr. Baker has made, although in the beginning I was inclined to think it was subacute. I agree that it

was long standing glomerulonephritis with acute exacerbation at the end.

About the tonsils, I again could not get very enthusiastic about fooling around in the throat although the tonsils did look infected.

DR. J. H. MEANS I was interested in the last note, the statement that the tongue was dry when he was water logged. I think that is an interesting relationship and one we see not infrequently. He was dehydrated and water logged at the same time. I remember a patient a year ago with a somewhat similar picture of dropsy and cerebral symptoms that could have been uremic or something else but the tongue was very dry indeed. He was given intravenous fluid in spite of his edema with marked improvement and marked diuresis.

I think the therapeutics are more interesting than the diagnosis, which does not interest me very much. The therapeutics are extremely complicated and we are very much in the dark about what to do with people of this sort. There is nothing in this history to tell what was done about fluid. It speaks of fluid balance but it does not say whether fluids were given freely or withheld except in the last paragraph where it says he was permitted to drink what he chose. I often think that letting the patient drink what he chooses is the best thing to do because nature knows more about what the body needs in the way of fluids than the doctor.

DR. RICHARDSON In regard to fluids by mouth, we could not get much into him. For long periods we gave large amounts of glucose by vein with a low salt diet. At the time of the first entry he had a high blood chloride.

DR. MEANS When you gave him intravenous fluids what happened to the fluid output? Did it give him a diuresis?

DR. RICHARDSON I do not think it did. It improved his general condition but the charted output did not show much change.

DR. MEANS What did the thyroid do in the way of producing diuresis?

DR. RICHARDSON Nothing. I think he got up to fourteen grains a day.

DR. MEANS That is a colossal dose if it is USP thyroid.

#### CLINICAL DIAGNOSIS

Chronic nephritis with edema

DR. MYLES P. BAKER'S DIAGNOSIS

Early chronic glomerulonephritis, with edema

#### ANATOMICAL DIAGNOSES

Subacute glomerulonephritis.

Multiple septic infarcts of the lungs

Hydrothorax bilateral

Ascites

Sterile peritonitis

## PATHOLOGIC DISCUSSION

DR MALLORY The kidneys here were essentially normal in size, weighing 270 grams, perhaps small for a man, but he was a small individual and all the other organs were proportionate. Grossly they were smooth and pale, consistent with a subacute nephritis or nephrosis. Microscopically there is a quite typical intercapillary glomerulonephritis. The tubules show comparatively little degeneration. The average case of Bright's disease with marked edema will show generally a pretty marked fatty degeneration of the tubules, but one can see the entire syndrome of nephrosis with absolutely negative tubules and changes apparently limited to the glomeruli.

The other point which Dr Baker raised in the differential diagnosis, as to how long this process had been going on, is not possible to settle exactly. It is a very common experience that the first symptom noted by a patient with Bright's disease comes at the very terminal stage, a few weeks or months before death, in an illness that later pathologic examination assures has been in existence for years, and it is almost always safe to bet that a case of nephritis is considerably more chronic than the clinical history might indicate. However, in this case I do not think that was true. The kidneys had not shrunk to a significant degree. There were very few completely sclerosed glomeruli and few changes in the blood vessels.

The heart was somewhat small in size, certainly no hypertrophy at all. There was no evidence of pericarditis.

The terminal pulmonary signs turned out to be emboli rather than bronchopneumonia. There was one rather large area of infarction and there were two quite small septic foci in the upper lobes with beginning abscess formation which I feel were septic infarcts.

A PHYSICIAN Was there anything in the gastrointestinal tract?

DR MALLORY Absolutely nothing.

DR BAKER Was the intestine edematous?

DR MALLORY Not noticeably so.

DR BAKER Do you think that diarrhea could be caused by edematous intestine?

DR MALLORY Diarrhea in the terminal stage of nephritis is usually associated with typical uremic colitis, but he did not have it.

A PHYSICIAN Did you find a focus for the emboli?

DR MALLORY No.

I neglected to mention that the peritoneal fluid at the time of autopsy was slightly hemorrhagic and somewhat turbid. It impressed us as a sterile peritonitis following hemorrhage at the last tap rather than an acute infectious peritonitis.

DR BAKER I would like to report that the patient whose history Dr Richardson cited has

been coming back to the Outpatient Department from time to time and now, four years after his serious illness, has no signs of even a latent glomerulonephritis. The sediment is entirely normal as far as we know, without doing Addis counts. There is no active renal lesion. After he left the surgical wards the first time he had to return two months later for treatment of a subdiaphragmatic abscess, and he was very sick for two or three months, but he has never had any return of edema.

A PHYSICIAN I should like to ask about the sediment of the urine in today's case.

DR BAKER It tallied with Dr Mallory's findings,—less evidence of tubular damage than one would expect in such an individual.

## CASE 21472

## PRESENTATION OF CASE

A sixty-four year old white native farmer was admitted complaining of abdominal pain, loss of weight and malaise.

One year before entry the patient had an attack of frequent loose watery bowel movements which continued for ten days. At this time he observed that his weight, which had been 200 pounds four years previously, had decreased to 174. This had followed no dietary restrictions or other known etiological factor. Following the cessation of the attack of diarrhea the patient continued to feel run-down and after three months consulted his physician who prescribed a diet and a tonic. He was told to avoid fatty foods. There was no improvement in his condition and he developed "chafing" pains in his right upper quadrant which caused him to lift his clothes from the involved area for relief. This recurred irregularly, often seven to eight times daily and then not at all for several days. These pains continued with little change up to his admission. For a year he had also suffered from cramplike pains in the lower abdomen which usually began one and a half hours after his noonday meal and often aroused him from his afternoon nap. The distress was promptly relieved by a teaspoonful of milk of magnesia but recurred at almost daily intervals. Two months before admission the patient made several visits to a clinic where x-ray studies of the gall bladder and gastrointestinal tract were negative except for the presence of diverticula along the sigmoid. He was also told that he had high blood pressure. At no time was there nausea, anorexia, vomiting or noticeable melena. His bowels moved regularly daily after his initial attack of diarrhea. He had developed a nocturia of three times during his illness. His weight had decreased to 151 pounds.

His father died at the age of sixty-eight of pneumonia, his mother at eighty-four of shock.

Several members of his father's family had had tuberculosis.

He had had typhoid fever but no other illnesses of significance.

Physical examination showed a well-developed and nourished elderly man who appeared to be comfortable. His thyroid was enlarged and firm. The heart was enlarged to the left and a systolic murmur was audible. A was greater than P<sub>2</sub>. The blood pressure was 220/110. The remainder of the physical examination was reported as being negative.

The temperature was 99.6°, the pulse 70. The respirations were 20.

Examination of the urine was negative. The blood showed a red cell count of 3,300,000 with a hemoglobin of 55 per cent. The white cell count was 18,500, 72 per cent polymorphonuclears, 13 lymphocytes, 13 monocytes, 2 eosinophils. The platelets were reported as being normal. The stools repeatedly gave a strongly positive reaction to the guaiac test but were otherwise negative. A Hinton test was negative. The nonprotein nitrogen of the blood was 30 milligrams. The basal metabolic rate was +18 per cent. Analysis of the gastric content showed a free hydrochloric acid of 0 to 9 and a total acid of 3 to 15. The reaction to the guaiac test was negative. An electrocardiogram showed left bundle branch block.

A barium enema passed through the ileocecal valve without delay. There were a few small diverticula in the sigmoid. There was no evidence of spasm and the bowel emptied moderately well with defecation. A gastrointestinal series showed a small hernia of the stomach through the esophageal hiatus. The first part of the duodenum was long and the second part short. Some of the loops of the small intestine appeared to be slightly dilated but there was no evidence of any intraluminal disease.

Proctoscopy was done shortly after admission but no pathologic process was found up to a point 14 centimeters from the anus. The stools continued to react positively for microscopic blood and occasionally showed fairly large amounts of macroscopic blood. He remained in the hospital for one week and then returned to his home. Four days later he was readmitted stating that although his bowels had moved once daily they had been tarry in appearance and on that day they had been quite copious and fluid in character. He became weak and had frequent dizzy spells. Transfusion was given on the following day and two days later a laparotomy was done.

#### DIFFERENTIAL DIAGNOSIS

DR. LELAND S. MCKITTRICK. This man of sixty-four had apparently been sick for about one year and his initial symptom as near as one can tell, was an attack of frequent, loose, watery bowel movements lasting ten days. As-

sociated with this he first noticed loss of weight of twenty-six pounds, but he had not been weighed for the previous four years. There is nothing about the first attack of loose watery bowel movements which gives me any lead as to just why he had it. Presumably there was no gross blood. He did not have a complete recovery following cessation of diarrhea and that, presumably, can be taken as the beginning of this present illness. He had with that this "chafing pain" in the right upper quadrant. He has had cramp like pain in the lower abdomen and the striking thing about this pain is that it comes pretty regularly an hour and a half after the noonday meal and is relieved by milk of magnesia. It is my impression that not infrequently a patient, particularly beyond middle age, may refer the pain of a posterior wall ulcer to the lower abdomen or elsewhere. That is, he may not be definite about the location. The constant regularity with which it recurs and the fact that it is relieved by milk of magnesia may be of some significance. Later the x-rays were negative. That makes duodenal ulcer unlikely but does not exclude it particularly if it were a posterior wall one.

He had no more vomiting or diarrhea but he continued to lose weight, having lost a total of forty-nine pounds. There is nothing in the history up to this time that makes it possible for me to draw any definite conclusions as to what is the matter with him. His family history is negative. I do not believe the past history of typhoid means a great deal. He has an enlarged firm thyroid which I think is not significant. He does have, apparently cardiovascular disease. He has an enlarged heart, a hypertension of 220/110. He is essentially afebrile. He has a perfectly good pulse. On the laboratory side he has a pretty marked secondary anemia, also a leucocytosis, both actual and relative that is a polymorphonuclear increase. His blood is apparently normal from the point of view of platelets and there is nothing to enable them to say he was bleeding because of any blood disease. He has a persistently positive guaiac in the stools and at times he has gross macroscopic blood. In his vomitus where the hydrochloric acid is low he has a persistently negative guaiac. Therefore, it would seem to me that we can discount his stomach as having anything to do with the hemorrhage. More than that, it would seem at present that large quantities of macroscopic blood point pretty definitely to the fact that the blood must be lower down than the small bowel. I think it is possible for active hemorrhage from the upper bowel to come out of the rectum as macroscopic blood but it does not occur very often and I never had seen it. Therefore it seems to me that it must be coming from the large bowel.

A barium enema was negative except for a few diverticula of the sigmoid. We cannot accept these as having anything to do with the hemorrhage.

The diaphragmatic hernia I think can be passed by. There are occasional cases of secondary anemia associated with diaphragmatic hernia but I think in this instance that that cannot be a factor because of the negative guaiac in the stomach contents and positive guaiac and the gross blood by rectum.

The proctoscopy was negative for a distance of fourteen centimeters. It does not say why it was not passed higher or whether there was any blood in the rectum at that time. I do not think the statement of a negative proctoscopy is particularly helpful to a person who is trying to interpret it, but I might assume from the negative proctoscopy that they saw nothing in the mucous membrane or any evidence of blood, either localized or coming down from above.

DR RICHARD H SWEET That is correct.

DR MCKITTRICK The association of bloody diarrhea and abdominal cramps of course brings several things to mind immediately. At least one of them is ulcerative colitis. I believe a negative x-ray and negative proctoscopy exclude ulcerative colitis. Carcinoma of the large bowel has not been excluded. It is perfectly possible and surely not at all unlikely to have a carcinoma of the large bowel in the absence of a positive x-ray. Carcinoma of the hepatic flexure particularly may not show by x-ray. On the other hand, about eighty per cent of lesions in this location have a palpable mass and a negative x-ray plus absence of a palpable mass make this unlikely. The proctoscope did not get high enough to exclude another blind area 18 centimeters up, which is the common site for polyp and cancer and difficult to visualize by x-ray. In other words, I am not able at this time to make what to myself is a satisfactory diagnosis in this instance, but I cannot exclude a lesion of the rectosigmoid.

He has cardiovascular disease. I do not believe that a mesenteric thrombosis can very satisfactorily give this picture.

Therefore, I am forced to leave this today without a definite diagnosis except to say that I believe his bleeding is from the large bowel. I do not think he has a carcinoma. I do not believe he has a diffuse polyposis and I feel very sure that he does not have an ulcerative colitis.

#### X-RAY INTERPRETATION

DR AUBREY O HAMPTON This is the chest film. It is practically normal except for enlargement of the heart and calcification in the midlung field. There is no enlargement of the glands and nothing to suggest malignancy. I did not fluoroscope this patient but these films

of the stomach show nothing abnormal except for this small hiatus hernia through the diaphragm. I think the variation in the length of the duodenum was probably due to pressure from the colon upon the stomach displacing it upward. This hernia of the stomach is the commonest type of hernia and is surprisingly common in old people. It is probably normal. The barium enema filled the colon perfectly satisfactorily. It is a little bit dilated in the proximal portion. The evacuation is not quite so complete as usual but certainly the dilatation did not persist. You cannot say he had an obstruction. In this film you get the impression that the spleen is enlarged. Here is the mucosal relief of the sigmoid just proximal to the rectosigmoid and it is perfectly normal except for this diverticulum-like pouch.

#### CLINICAL DISCUSSION

DR TRACY B MALLORY Dr McKittrick has left the case wide open.

A PHYSICIAN How about bleeding from Meckel's diverticulum? Would that be possible?

DR ARTHUR W ALLEN Would he not have had that earlier in life?

DR DANIEL F JONES Several things might clarify it a little. In the first place he had pain one and a half hours after meals which is about the time for pain in large intestine obstruction. He had blood in the stools constantly. He had irregular bowel movements, mostly diarrhea. The textbooks talk about constipation in carcinoma of the rectum. The surgeon rarely sees patients with constipation in cases of carcinoma of the rectum. It is much more often with frequent loose movements. I think that if many physicians could get that into their minds they would not go astray on so many cases. By the time patients get to the surgeon they have diarrhea, which is a very improper term to use. The patients themselves rarely admit that they have diarrhea. They do have anywhere from five to twenty-five episodes a day when they have to go to stool to get rid of a little gas, mucus or blood and frequently very little stool, so that the word diarrhea is a very improper term to use to the patient. You have to talk the language of the patient in order to find out what he means. Now that puts it very definitely, it seems to me, in the large intestine. That might be a polyp or malignancy. Polyps would frequently cause diarrhea or frequent movements without any great amount of obstruction but you must account for some obstruction here by the frequency with which he has pain. It is true that you occasionally get pain in the lower abdomen from an ulcer but that is much more frequently due to a gastroduodenal ulcer than an ordinary gastric ulcer or ordinary duodenal ulcer.

As to proctoscopy, I should like to say that

in a man with a loss of weight and diarrhea and pain I do not think it is fair to say that the proctoscopic examination is negative when you go only 14 centimeters, because 18 centimeters as Dr McKittrick said, is the most frequent site for a polyp and if you are going to use a proctoscope you should at least go up to the rectosigmoid junction because that is the difficult place to see a growth by x ray and it is a little difficult to get by also with a proctoscope. If he cannot get by this region the surgeon should know why.

As to diverticulitis and bleeding I think that it is a very important question. I think you should not consider that diverticulitis causes bleeding. It does have a little blood occasionally. I am not sure of the figures but the only records that I have seen state that there is a little blood in five or six per cent, so that you cannot go much on that and you ought not to in this man because he has lost so much weight, from two hundred pounds down to one hundred and seventy four.

I do not know about arterial disease but I think that it very rarely gives pain regularly after each meal. Therefore, I do not think it can be due to arterial disease. Occasionally these people lose weight. It would not be likely that a patient would lose as much as this man so that I think that it is much more likely that this is a carcinoma or malignant disease of the colon or a polyp.

Dr. SWEET: There are two or three facts in the history that Dr McKittrick should have had. As it is he certainly made an admirable job of his discussion. The man was sent in with the diagnosis of probable undulant fever because the outstanding symptom was recurrent attacks of chills and fever. He had been to several other doctors. One had treated him with emetin. Every few weeks he had a spell of fever with chills, the last persisting attack of fever and chills was about three weeks before he came in here. We could not make a diagnosis. Incidentally, he had had no bleeding from the rectum until after he came into the hospital and then he had a massive hemorrhage on the day following proctoscopic examination. It is not fair to say that the proctoscopy was negative. The reason I could not get beyond fourteen centimeters was that there was something which seemed to be outside of the bowel which made it impossible to turn the corner of the sigmoid. The x ray had shown us that he had diverticula and I thought he might have an inflammatory mass resulting from that which made it impossible to get around it. There was no sign of polyp or tumor and no blood was seen.

One other interesting point which Dr Schatzka brought out was that he had several dilated coils of intestine in the x ray. Another point in the history was that he had had two definite attacks suggesting bowel obstruction during the preceding year with vomiting and acute illness, one attack lasting four days.

At operation we found a tumor of the sigmoid which I thought of course was carcinoma. This had perforated and caused a local abscess in the pelvis, not a large abscess, however. It also perforated into the ileum and he had a fistula between his ileum, about eight or ten inches above the ileocecal valve, and the sigmoid. I wonder if the fact that he passed tarry stools was not due to bleeding from the ileal side of the fistula so that the blood went around the colon and thus to the rectum rather than directly down the rectum, in which case the blood should have been bright red.

#### PREOPERATIVE DIAGNOSIS

Intestinal hemorrhage.

Dr. LELAND S. MCKITTRICK'S DIAGNOSIS

Hemorrhage from colon—cause undetermined

#### PATHOLOGIC DIAGNOSIS

Lymphoblastoma, sarcomatous type

#### PATHOLOGIC DISCUSSION

Dr. MALLORY: The examination of this tumor showed that it was not carcinoma but a lymphosarcoma. The great majority of the tumor lies in the outer layers of the wall of both the sigmoid and the ileum, the mucosa being relatively free in each instance. I do not find it possible to say with certainty from the specimens in which of the two structures it originated, although there was more tumor present in the sigmoid than the small intestine. The patient recovered from the operation and is still under observation.

Dr. SWEET: He now has a palpable spleen and a very abnormal blood picture which Dr Hunter thinks is rather suggestive of early lymphatic leukemia. His polymorphonuclear count is down to twenty and he has a lot of abnormal lymphocytic series cells in his blood.

Dr. JONES: May I say that it is not fair to say that the proctoscopic examination was negative. I want to call it to your attention that errors are made with a proctoscope very often because the examiner does not feel with the end of the proctoscope. It is a perfectly legitimate thing to do.

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## CLINICAL APPLICATIONS OF HETEROPHILE ANTIGENS AND ANTIBODIES

UNTIL quite recently, the terms, heterophile antigen and antibody, were used by only the most erudite of immunologists. The latter term was applied to the nonspecific antibody produced by the injection of certain bloods or organ and tissue extracts into certain animals, a phenomenon originally described by Forssman in 1911, who demonstrated the presence of anti-sheep hemolysins in the sera of rabbits that had been injected with guinea pig organ extracts. The antigens capable of producing such antibodies are contained in the organ and tissue extracts of guinea pigs, horses, mice and pigeons and in the bloods of sheep and goats. They are absent in another group of animals, including rabbits, cattle, pigs and rats, and in these animals heterophile antibodies can be produced by the injection of the antigen. Man is peculiar, as the antibodies are present or can be developed even though the antigen has been demonstrated in red blood cells of groups A and AB. More recent work has shown that the antigen is present in cer-

tain bacteria, such as members of the typhoid-paratyphoid-dysentery group and pneumococci.

Heterophile antibodies can usually be demonstrated in the sera of normal human beings, but, when present, are in very low concentrations. In certain diseases, notably infectious mononucleosis and certain blood dyscrasias, it has recently been shown that such antibodies are markedly increased. So much so, in fact, that the demonstration of anti-sheep hemolysins in high dilutions of freshly obtained serum from a suspected case of infectious mononucleosis practically confirms the diagnosis.

The practicing physician is now confronted with a prophylactic and a therapeutic procedure, both of which have been developed on the assumption that the presence of such antibodies, either produced actively by the administration of the antigen or injected passively, is of the utmost significance.

The first is an oral vaccine which has been recommended<sup>1, 2</sup> as a prophylactic agent against the common cold. The active constituents of this vaccine consist of the dried bodies of an avirulent, non type specific pneumococcus, containing heterophile antigen, and a hemolytic mouse virulent streptococcus. In the clinical report, 462 vaccinated individuals showed a decrease of 57 per cent in the number of colds for the school year as compared with the average number per year for the preceding three years, whereas the 527 controls showed a decrease of only 12 per cent. Among 30 carefully studied cases, the development of appreciable heterophile antibody titer was associated with almost complete immunity. In spite of such excellent results, one must be extremely cautious in adopting such a procedure until more confirmatory evidence has been presented. One should not forget that the probable etiologic agent of the common cold is a virus, that parenteral injection of most vaccines is more efficient than oral administration and that even the parenteral injection of vaccines for the common cold is of distinctly questionable benefit.

The second is the addition of heterophile antibody to antipneumococcal serum<sup>3</sup>. On the basis of the stated, but not necessarily proved, facts that horse serum and pneumococci contain heterophile antigen, that union of these antigens with the protective heterophile antibodies in the patient diminishes the efficacy of such antibodies and may produce untoward reactions and that such sera have been proved to be more effective (in rabbits), it is claimed that the preliminary treatment of antipneumococcal horse sera with heterophile antibodies and their addition to such treated sera result in a product which gives fewer reactions and may be used against all infecting types. Finland, Rueggsegger and Felton<sup>4</sup> have justly criticized these theoretical claims, after having failed to show that heterophile antibody has any relationship to

the course or outcome in human cases of pneumococcal pneumonia? They question the contention that this serum is less toxic. They call attention to the fact that advances in the serum therapy of pneumococcal pneumonia can be attributed to the results obtained in cases treated with adequate amounts of homologous serum. If the claims made for the serum containing heterophile antibody are accepted, they believe that a certain number of patients will fail to receive sufficient amounts of homologous antibody, because of the absence of "typing" and others will be exposed, unnecessarily, to the hazards of administration and the expense of a serum of questionable potency. They acknowledge that their opinions are not based on direct observation of the use of fortified sera and rightly conclude that such observations, in the last analysis, furnish the final criteria on which the use or discard of this product should depend.

## REFERENCES

1. Rockwell, G. E.; Van Kirk, H. C. and Powell, H. M. Oral immunization to colds. *J. Immunol.* 25: 4 (J. W.) 1925.
2. Rockwell, G. E., and Van Kirk, H. C. The relation of heterophile immunity to the incidence of colds. *J. Immunol.* 25: 455 (June) 1925.
3. Bailey, G. H., and Shorth, M. S.: Immunological relation of pneumococci and other heterophile antigens and biological significance in pneumococcal infections. *Am. J. Hyg.* 17: 255 1932. Powell, H. M., Jamieson, W. A., Bailey, G. H., and Hyde, R. H.: A comparative study of antipneumococcal serum containing heterophile antibody. *Am. J. Hyg.* 17: 192 1932.
4. Finland, M., Rueggeweg, J. M., and Felton, L. D. Should heterophile antibody be used in the treatment of pneumococcal pneumonia. *J. A. M. A.* 105: 1140 (Oct. 12) 1935.
5. Finland, M., Rueggeweg, J. M., and Felton, L. D. Heterophile antibodies in pneumonia. *J. Clin. Investigation* 14: 652 (Sept.) 1935.

## THE SOCIALIZATION OF MEDICINE

WHAT is this socialization of medicine of which so much is said, and of which so little is actually thought through? One does not get a very clear idea from the views expressed. Something is going on in medicine, some important change is taking place, and we are on our way, although we do not know whether the path will lead us. It is said also that physicians are backward, even blind, in failing to recognize this inevitable progress and adapt to it themselves and their practice.

Socialization of medicine means to make medicine conform to the principles of socialism. Since the socialists perhaps most of all, fail to agree as to the principles of socialism, how can others be expected to know what it is all about?

Socialism and individualism are permanent tendencies in human nature, as an ultimate philosophy either is inadequate and so misleading. In the division of labor it has been found expedient to have certain functions ultimately controlled by society at large, directly controlled by society organized politically, that is to say by the government. These functions are performed for the whole by the parts. Under com-

plete and perfect socialism, if such there be the government controls and directs every part. The question as to whether a function is or is not performed socialistically is settled by the answer to the questions: Who directly pays the bill? Who directly controls the group? Of course, in the long run society pays the bill in any case. It is to be remembered that a given socialistic scheme is not intrinsically better because it is socialistic, neither is it intrinsically worse. The outcome can be determined only by experiment. The method of science includes controlled experiment. It is true that history repeats itself, but never quite exactly.

Education is one of the socialistic enterprises to which we are committed. There are students of education however, who think that our very commitment to this socialistic enterprise has made more imperative than ever the need of our continuing to develop our private educational system.

The question at issue in medicine does not concern primarily the quality of medical service. That is to say, it is not that the science and art of medicine are so far behind what one has a right to expect. It is a fact that the science of medicine has progressed so far, and that the art of medicine has become so complicated and thus so expensive that the average citizen can not pay the cost for all medical services out of his own resources. The socialization of medicine means that the cost of medical care should be met by the government and not by the individual. Control goes to the person or organization responsible for the payment of the bill.

Again and again we have found that the governmental hand has had a paralyzing influence. Indeed so often has this been true that many persons look askance at the injection of the government into any undertaking. If mere quality of service, dollar for dollar is considered, is there anything the government does that would not be done better by private competitive enterprise?

Yet many times it has seemed wise, even necessary, to have the government interpose—to protect the weak against the strong, the poor against the rich, the ignorant against the knowing. Is there any justification besides protection?

What justification is there for the socialization of medicine? Against whom do the sick need to be protected? Is it against the medical profession?

If it has been expedient perhaps necessary, to socialize medicine in some fields, to protect the well against the sick, and the poor and the ignorant against themselves, is not this the best of reasons why medicine should not be wholly socialized, why more vigorous efforts than ever should be made to preserve part of it, at least, from the dry rot of governmental influence?



## THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

RHODES, JOHN S A B, M D Harvard University Medical School 1929 Resident Urologist, Massachusetts General Hospital His subject is "Torsion of the Appendix Testis" Page 1005 Address Massachusetts General Hospital, Boston

HIGGINS, C C A B, M D Washington University School of Medicine 1923 F A C S Member of the Surgical Staff, Cleveland Clinic His subject is "Experimental and Clinical Observations on Urinary Calculi" Page 1007 Address Cleveland Clinic, Cleveland, Ohio

ALLEN, ANNA M M D Royal College of Physicians and Surgeons Ireland 1925 Pathologist, Danvers State Hospital and Department of Mental Diseases Her subject is "A Review of the Variety of Poisons Which Have Caused Death in the Massachusetts State Hospitals for Mental Disease" Page 1013 Address 74 Fenwood Road, Boston

GORDON, A H M D Harvard University Medical School 1909 Physician, Peter Bent Brigham Hospital Associate Professor of Medicine, Harvard University Medical School His subject is "A Clinical Lecture on Migraine" Page 1017 Address 721 Huntington Avenue, Boston

THOMPSON, WILLIAM P B S, M D Harvard University Medical School 1931 Research Fellow in Medicine, Harvard University Medical School Voluntary Assistant in Medicine, Peter Bent Brigham Hospital Dalton Scholar in Cardiology, Massachusetts General Hospital Address 516 Park Drive, Boston Associated with him is

LEVINE, SAMUEL A A B, M D Harvard University Medical School 1914 Assistant Professor of Medicine, Harvard University Medical School Senior Associate Physician, Peter Bent Brigham Hospital Address 270 Commonwealth Avenue, Boston Their subject is "Systolic Gallop Rhythm A Clinical Study" Page 1021

PHILLIPS, RICHARD BETTS A B, M D University of Edinburgh Faculty of Medicine 1933 Junior Assistant Surgeon, Department of Gynecology, Boston Dispensary Assistant in Obstetrics and Gynecology, Boston City Hospital, Out-Patient Department His subject is "Theelin Therapy in the Treatment of Vulvovaginitis" Page 1026 Address 270 Commonwealth Avenue, Boston

## BOSTON MEDICAL LIBRARY

ROBERT HOOKE, 1635-1703

THE subject of this biographical sketch was one of the remarkable geniuses of the 17th Century, in a general way comparable in its diversity and imaginative foundation to the genius of Leonardo da Vinci. He lacked, however, that very essential quality of mind which enables a versatile individual to "follow through" in his strokes of genius. This may perhaps have been due to the multiplicity of ideas that were always crowding each other in his mind and demanding attention. To have originated, as he claims to have done, a hundred new inventions within an average lifetime, he might well be excused if some details were left incomplete. Besides the discoveries that may unquestionably be credited to him, he provided a clue to many another that was later recorded by some other observer. The intense mental activity that characterized his entire career should have had a more robust physical background than he seems to have possessed. In early youth, on account of his lack of physical stamina and the persistent headaches from which he suffered, he was regarded as poor material for the life of study that his quickness of wit seemed to entitle him to pursue. In view of the turn his mind took when left to itself, it would seem that science might have suffered more than the church would have benefited, had he been made to follow the course originally blocked out for him by his father, the Reverend John Hooke, who was minister to the parish of Freshwater on the Isle of Wight.

It was here that Robert Hooke was born on the 18th of July 1635. Interest in him from a medical viewpoint rests upon his activities in the Royal Society, that distinguished body of scientists whose approbation all research workers in whatever field of science sought. After his father's death in 1648, he took the 100£ left him by will and went up to London at the age of thirteen where for a short time he was a pupil of Sir Peter Lely. Later he entered Westminster School and lived in the house of Dr Busby. Here he manifested some of that intellectual precocity so frequently an accompaniment of genius. He acquired Latin, Greek and some Hebrew and other oriental languages, mastered six books of Euclid in one week, and of his own volition learned to play twenty lessons on the organ and "invented thirty several ways of flying."

In 1653, at the age of eighteen, he was enrolled at Christ Church, Oxford, as a chorister. He secured his M.A. Degree upon the recommendation of the Chancellor of the University in 1663. Because of his aptitude for mechanics he made the acquaintance of many prominent

men at Oxford and was enabled to pursue his studies in Astronomy and Chemistry. Proficiency in the latter resulted in his becoming, as associated with Robert Boyle whom he assisted to perfect his air pump. He worked with him until released to become the curator of experiments for the Royal Society as a recognition of a communication of his upon capillary attraction. He was elected a Fellow of the Royal Society in 1663 and later in the year became custodian of its collections, an office that later he was chosen to fill permanently, on a salary with quarters which he occupied during the remainder of his life. His income was supplemented by appointment to a lectureship in the Society, the subjects upon which he was to lecture to be determined by the Society. In 1665 he was appointed Professor of Geometry in Gresham College and as locum tenens for Dr. Pope he gave the lectures in Astronomy for two seasons.

He became greatly interested in respiration, combustion, the laws of falling bodies, specific weights, diving bells, land transportation, telegraphy and the relationship of barometrical readings to changes in the weather. In reference to many of these matters, his results were inconclusive but his interest in them indicates the activity of his mental processes.

He contributed to the methods of measuring time by inventing a machine to fashion the teeth of watch wheels and by measuring the variations of swinging pendulums. He published his *Micrographia* in 1665 in which were recorded numerous curious and interesting observations many of which were anticipatory of knowledge later to be more definitely established. Among them was a theory of light which he regarded as a "short vibrative motion." Heat, also, he conceived of as being a property of matter dependent upon the vibration of its composite particles. He anticipated Mayow's conception of the nature of combustion by eleven years.

In a paper on gravity, the force of which he showed could be measured by the oscillations of a pendulum and in a subsequent communication on curvilinear motion, offered a demonstration of the fact that the center of gravity of the earth and the moon is a point that describes an ellipse about the sun. He declared that the movements of planetary bodies are problems in mechanics.

He invented the first screw-divided quadrant and an anemometer of a form that, up to quite recently at least, was regarded as adapted for universal use. At about this same time, he devised a "weatherclock" and applied the principle of the circular pendulum to watches. He submitted himself to experimental study in an exhausted receiver and found time to give lectures on the nature of earthquakes. In 1667, he prepared a model to illustrate the rebuild-

ing of the city of London after the great fire but his plan was not accepted though it procured for him a lucrative position as city surveyor. Several thousand pounds, accumulated through his activities as a surveyor, were found in a chest after his death. He designed a number of public buildings. By some, he is regarded as the originator of the biological concept of the cell. At any rate, his *Micrographia* served to stimulate other observers in the Royal Society, notably Nehemiah Grew, to prosecute his important studies upon vegetable histology and physiology. In the field of Astronomy, Hooke made a number of original observations pertaining to the orbits and behavior of several of the planets but for the most part he lacked the mathematical knowledge that would have enabled him to follow the clues through to their conclusion. Particularly was this true in connection with his views upon gravitation about which he had a rather acrimonious controversy with Sir Isaac Newton, in which he claimed priority of discovery.

His jealous and peevish temper frequently brought him into conflict with workers in the fields of science. Some of these controversies only embittered his opponents, others either halted the announcement of valuable discoveries or postponed them for so long a time that others obtained the credit for their discovery. In the case of the application of the spiral spring to watches, there was no question of Hooke's priority of discovery but owing to a disagreement about the terms of a patent which Boyle volunteered to procure for him, credit for the invention passed on to Huyghens in 1675, seventeen years after its discovery by Hooke. For certain of his venomous criticisms of Oldenham, the secretary of the Royal Society, he was taken to task and forced to recant. After Oldenham's death, however, he was chosen his successor which position he filled from 1677-1682, editing seven numbers of the philosophical transactions of the Society. In his later years, he continued his investigations and there was scarcely a single invention of his period that he did not make or claim as his own. He did actually make about one-half of the discoveries of his age. He designed an autocouston, suggested a practical method of telegraphy, a universal joint, a sounding machine, the anchor escapement for clocks and many other mechanical devices. He also extended his interest into the fields of science, for he had ideas on the nature of fossil formation and the succession of living things upon the earth, which have been shown to be sound in the light of present day knowledge. His last invention, a marine barometer, was described for him, before the Royal Society by Halley. This was in 1700. He was created a Doctor of Physic at Doctors Commons in 1691.

Always of insignificant stature, stooped in his carriage, even in youth, this attitude became a deformity in later years. Intensely active, quick-moving and restless, he burned himself out at about sixty-four years of age and his remaining three years were for the most part unproductive. The last year he became wholly blind. Death claimed him on the third of March, 1703. He lived an essentially monastic life, lacking in all the social virtues that human associations cultivate, an unlovable character. Even his genius suffered because of his estrangements from his fellows and much that he might have had the credit for, ultimately went elsewhere. Appraisal of the significance of the life of such a man is difficult. If the "capacity for taking infinite pains" is essential to the make-up of a genius, then Robert Hooke was not in that class. Probably mere versatility falls short of true genius. Some, however, of the mechanical devices he either invented or paved the way to the discovery of, were the first steps in Watt's and Stephenson's steam engines in the mechanical field, and the perfection of the microscope, the telescope and various meteorological instruments of precision, in the purely scientific fields. For these it is fitting that the part he played in advancing civilization should not be forgotten on this his Tercentenary.

## The Massachusetts Medical Society

### SECTION OF OBSTETRICS AND GYNECOLOGY\*

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### GONORRHEAL INFECTION COMPLICATING PREGNANCY

Gonorrhea complicating pregnancy is not uncommon. Rapid invasion of the infection, before a developing pregnancy has blocked the uterine cavity, not infrequently results in termination of that pregnancy. Early miscarriage, therefore, in these cases is common. It very frequently happens that the etiological background is obscured by those symptoms referable to the miscarriage. Especially is this true of miscarriage followed by febrile reactions and acute pelvic symptoms. This latter represents, in a certain number of cases, the invasion of the pelvis by the gonococcus infection which

follows rapidly the emptying of the uterus. In all miscarriage cases, and especially those occurring with the first pregnancy shortly after marriage, one should make a careful inspection of the meatus for clinical evidences of gonorrheal infection, and if there is any question, repeated smears from the urethra and cervix.

In pregnancy complicated by a gonococcus infection, treatment of the latter should be vigorously carried out, using the same technique, as would be used if the patient were not pregnant. One should employ the douches, suppositories, and local treatment, customarily used in these cases. A warm sitz bath, a cleansing douche, followed by a vaginal suppository containing two per cent mercurochrome, or one-half grain of methylene blue, with, if necessary, local applications to cervix and urethra of mercurochrome, is a dependable treatment. The knee-chest position after insertion of the suppository is an important detail.

A mercurochrome tablet against the cervix, retained by a dry wool tampon, with a small piece of mercurochrome tablet in the urethra, retained by a cotton pledget, is excellent office treatment in these cases.

At the end of the eighth month of pregnancy, treatment should cease, this because of the assumed theory that vaginal procedures prior to delivery increase the danger of puerperal sepsis. It has been repeatedly demonstrated that this active treatment during the first eight months of pregnancy will not cause miscarriage or premature delivery. Repeated smears should be taken throughout this period as a check on the progress of the treatment, and intercourse, naturally, is absolutely interdicted.

The management of the delivery of the patient with an active gonococcus infection raises two important points. First, special prophylactic measures for the baby's eyes, and secondly, the possibility of the infection of the obstetrician's eyes by a spatter of vaginal discharge during delivery. For the latter, glasses are a valuable protection and if any question of contamination arises, the immediate adoption of prophylactic treatment is most important.

In regard to the baby's eyes the wise procedure in these cases is to institute active treatment, as if infection of the baby's eyes had actually occurred. It is wisest from all points of view, to delegate this care to an ophthalmologist. In the absence of the latter, the baby's eyes at birth should receive the usual prophylactic treatment and then at least twice daily for ten days, have the eyes washed out with boracic solution with the instillation of twenty-five per cent argyrol. The eyes should be carefully inspected twice daily and at the slightest suggestion of redness or discharge the ophthalmologist must be consulted. This active treatment in it-

\*A series of short selected articles by members of the Section is being published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the Section.

self not infrequently produces a mild inflammatory reaction. With a beginning gonorrheal ophthalmia, the first smears are very apt to be negative, and no obstetrician is justified in assuming responsibility for what a given case may or may not be.

Symptoms resembling puerperal sepsis follow usually late, delivery of the woman infected with gonorrhea are frequently encountered representing pelvic invasion following the removal of the obstructing pregnancy. The terminal manifestations of such an invasion are often abscess formation, primarily in a tube or tubes, but easily becoming the characteristic type of pelvic abscess. The ultimate pathology differs in this respect from the pus type in the non-puerperal state which very uncommonly develops into a typical pelvic abscess.

A not uncommon complication of gonorrheal infection is abscess in Bartholin's gland. The usual management of these should be followed. Those which are allowed to rupture spontaneously have a very much higher percentage of permanent cures than those that are excised. Warm borax sitz baths, repeated several times daily seem to hasten spontaneous rupture and to lessen the discomfort. Such an abscess may rupture during delivery. In cases observed there has been no noticeably increased post-delivery morbidity and lacerations have healed by first intention. The liberal use of antiseptics during the delivery of such a case is indicated.

Subsequent to the lying in period the patient should be carefully investigated to determine if there is a persisting gonococcus infection which, if discovered, necessitates a continuation of active treatment.

It should also be remembered that a very considerable number of infections in women are acquired shortly after their recovery from child birth. In these cases the irregular and excessively protracted flow is frequently attributed to delayed involution rather than to its real cause. Cases which describe too frequent "menstrual" periods within a few months post partum should be viewed with definite suspicion until the possibility of a recently acquired infection is ruled out. The characteristic symptom of the invasion period of the disease, discharge, under these circumstances is of course very easily assumed to result from the usual child birth injuries the excessive flow to delayed involution displacements, etc. The appearance of the urethra in these cases, is the most important single guide to a correct appraisal of the situation. A case with the above symptoms in the postpuerperal period, which has an inflammatory reaction in and about the meatus should be assumed to have a gonorrheal infection until the contrary is proved by innumerable smears.

### THIRD ANNUAL POSTGRADUATE MEDICAL EXTENSION COURSE

The following sessions have been arranged by the Committee for the week beginning November 24

#### Barnstable

Sunday November 24 at 4 00 P.M., at the Cape Cod Hospital, Hyannis Subject Kidney and Bladder Diseases A (Surgical) Hematuria Its Significance in Surgical Diseases of Kidney and Bladder Instructor S B Kelley J I B Vall, Chairman

#### Bristol South (Fall River Section)

Monday November 25 at 4 00 PM at the Stevens Clinic of the Union Hospital Fall River Subject Lung Collapse Therapy Instructor G L Stivers Eugene A. McCarthy Chairman.

#### Essex North

Friday November 29 at 4 00 P.M., at the Hotel Bartlett, 95 Main Street Haverhill Subject Accident Work in Cases Covered by Insurance Practical and Professional Considerations Instructors Mr Charles Horan and H. C Marble. Francis W Anthony Chairman

#### Essex South

Tuesday November 26 at 4 00 P.M., in the Nurses Home of the Salem Hospital Salem Subject Kidney and Bladder Diseases, A (Medical) Acute Nephritis—Etiology Diagnosis and Treatment. Nephrosis and Its Treatment. Instructor L H Hoyt. Walter G Phippen, Chairman.

#### Hampshire

Wednesday November 27 at 4 15 P.M. in the Nurses Home of the Cooley Dickinson Hospital, Northampton. Subject Pediatrics The Neonatal State and Its Diseases Medical and Surgical Aspects Instructors L W Hill and H. W Hudson Jr Robert B Brigham Chairman.

#### Middlesex South

Tuesday November 26 at 4 15 P.M., at the Cambridge Hospital Cambridge Subject Cancer of Stomach, Bowel and Genito-Urinary Tract. Modern Care of Inoperable and the Incumbent the Development of Improved Methods of Caring for These Cases with Less Pain and Discomfort with Minimum of Drug Therapy Instructors R. C Graves and Horatio Rogers Edmund H. Robbins Chairman.

#### Norfolk South

Monday November 25 at 8 30 PM at the Quincy City Hospital, Quincy Subject Arthritis (a) Medical Care of Patient in the Home. (b) Orthopedic Treatment in Hospital and Aids in Home Treatment. Instructors F R Ober and C S Keefer David L Belding Chairman.

**Plymouth**

Tuesday, November 26, at 4 00 P M, at the Brockton Hospital, Brockton Subject Kidney and Bladder Diseases, A (Medical) Acute Nephritis—Etiology, Diagnosis and Treatment Nephrosis and Its Treatment Instructor J M Flynn W H Pulsifer, Chairman

**Worcester North**

Friday, November 29, at 4 30 P M, at the Burbank Hospital, Fitchburg Subject Neurological Aids in the Diagnosis and Treatment of Disease from the Medical Viewpoint Problems of History and Examination with Special Reference to (a) Neurosyphilis, Multiple Sclerosis and Other Degenerative Conditions (b) Diseases with Acute Onset, such as Meningitis and Cerebral Accidents Instructor T J Putnam Edward A Adams, Chairman

**PHYSICAL THERAPY**

The Committee on Physical Therapy of the Massachusetts Medical Society is prepared to assist any city or county medical society with advice and, in so far as is possible, to provide speakers for programs of medical meetings during the coming winter

Talks, demonstrations, and motion pictures may be arranged in order to bring, to the general practitioner, practical suggestions as to the value and possibilities of physical therapy in the treatment of his patients Many simple procedures of physical therapy which have proved of value should be more generally employed These, as well as other methods, will be discussed It seems to the Committee that the place which such measures may occupy in the treatment of many disorders might well be emphasized

The following subjects are offered

The Present Status of Physical Therapy

Physical Therapy in General Practice

Body Mechanics, Posture Training, and Therapeutic Exercise

Massage—Indications and Effects

Pathological Conditions Helped by Physical Therapy

Phototherapy (Radiant Light and Heat)

Hydrotherapy

Diathermy, Medical and Surgical, including Short Wave

The Committee is glad to welcome inquiries or requests

FRANKLIN P LOWRY, M D  
GEORGE R MINOT, M D  
ROBERT B OSGOOD, M D

**MISCELLANY****AIR CONDITIONED AMBULANCES**

Air conditioned ambulances, embodying the world's first commercial application of the new principle of controlled atmosphere for automobiles

which is expected ultimately to become standard equipment on all passenger motor vehicles, are shortly to bring greater safety and comfort to New York's ill and injured

Following an announcement before the Motor Bus Operators' convention in New Orleans that custom made weather for motorists has reached the stage of engineering reality, Willis G Gray made known recently that installation of the first of these motor car air conditioning units would be in one of the ten ultramodern "hospital rooms on wheels" which his concern operates in Manhattan, Brooklyn, the Bronx and London, England

"Invalid transportation offers the most advantageous of fields for application of automotive air conditioning," said Mr Gray "Invaluable medical advantages and practical comforts will accrue to the sick from controlled atmosphere in ambulances

"They can be moved in a moderate temperature in summer and kept comfortable and uniformly warm in winter They will breathe only the purest of purified air, filtered and humidified or dehumidified By keeping the windows closed at all times, the air will be kept constantly and completely clean within, even when it is dirtiest without, and all draft will be entirely eliminated

**THE USE OF PUBLIC FUNDS**

A scathing denunciation of the proposed use of public funds by the PWA for a futile public health project was published in the November 1 issue of the *New York State Journal of Medicine*, the official organ of the Medical Society of the State of New York, which comprises among its membership 13,074 of the practitioners of the state \*

"The project," states the *Journal*, "calls for a survey of deaf children in Monroe County, New York, at a cost of \$10,440 The prospectus states that Monroe County contains sixty of these children Other evidence from the head of the Bureau for Handicapped Children in the New York State Education Department at Albany accounts for only fourteen such, exclusive of those already in the Averill Avenue Nursery Hence, it is intended to spend \$10,440 to survey these fourteen children"

The Medical Society of the County of Monroe, according to the *Journal*, has remonstrated against this step through its Public Health Committee, which reports that the plan has been studied by a subcommittee on Deafness and Hard of Hearing

"Such a project," states the *Journal*, "has no health value whatever It presupposes subsequent training of the deaf child for which no provision is made, and its value is emphatically questioned by educators Since it is impossible to detect deaf children before the age of three years and, since the public and special schools take them over at five years of age, the whole project is limited to children between three and five years

"The project is an unwarranted intrusion into a medical and educational problem by sponsors who

are not certified as competent by either medical or educational authorities. In times of great depression such as we are living through it would hardly seem possible that funds could be wasted on so futile a project. —*Bulletin, Public Relations Bureau N Y State Medical Society*

#### MASSACHUSETTS BOVINE TUBERCULOSIS

The Department of Agriculture has designated Massachusetts as a modified accredited area practically free from bovine tuberculosis. The total number of accredited states is thirty-one.

#### A CRISIS CONFRONTS NEW YORK CITY

Mr E W Reyburn chairman of the commerce and industry committee of the United Hospital Campaign Committee, affirms that a real crisis confronts New York City's 107 voluntary hospitals which are running into debt \$4,500,000 annually. Several have already closed their doors and some have completely exhausted their funds. To meet the situation a public appeal will be made for \$2,500,000.

#### AIDS TO MASSACHUSETTS STUDENTS

More than \$50,000 is being paid out to Massachusetts students each month by the National Youth Administration according to statements by Mr Arthur G Rotch. The money distributed is for work and wages in a school.

Students in Middlesex College Massachusetts College of Osteopathy and the Boston College of Physicians and Surgeons have received small grants.

The three Class A Medical Schools were not included in the recently published list.

#### THE HEALTH SURVEY

On Friday November 1 an important conference was held at the headquarters of the Massachusetts Medical Society at which Mrs Miriam Steep regional supervisor of the survey representing the Surgeon General of the Public Health Service outlined the plan of procedure and informed the group that Miss Rose Flynn would be in charge of the project in Massachusetts and would have headquarters at 41 Pearl Street in Boston. Those attending the conference were Dr Henry D Chadwick, State Commissioner of Public Health Dr Charles E. Monagan President of the Massachusetts Medical Society Dr A. S. Begg Secretary and Drs Walter A. Lane Ernest L. Hunt Michael A. Tighe Francis H. Dunbar of the Public Relations Committee and Dr Dwight O'Hara of the Committee on Public Health.

It was decided that the State Society would cooperate in every possible manner and that the officers of the District Societies, in which the studies are to be made, would be instructed to render all possible assistance. The nature of the investigation is such as to make it mandatory for the physicians of Massachusetts to give it their support if the results are to have any value. Mrs Steep and Miss Flynn ex-

plained the method by which the enumerators would be trained and discussed in detail the schedule which is to be completed for each family study. They pointed out that these schedules are confidential and would not be made available for any purpose other than that of tabulation. Each schedule as completed by the investigator is to be cross checked in the local office and immediately sent to the headquarters in Detroit for tabulation. Matters which concern diagnosis are to be referred to the physicians who were in charge at the time the diagnosis was made. No diagnosis made by a nurse or lay person will be accepted. The entire program is to be carried out as a project under the Works Progress Administration and will provide work for a considerable number of the so-called white collar class.

#### GENERAL PLAN OF THE HEALTH SURVEY

A. Purpose — The United States Public Health Service cooperating with the state and city health departments is making a Health Survey and Study of Chronic Illness and Physical Impairments in the general population.

Information regarding the extent and severity of chronic diseases and physical impairments is meager and health authorities cannot prevent disease unless they know when, where and under what conditions it is occurring. The relative prevalence of various types of disease, the geographic location, the age, sex, occupation and in particular the relation between disability and employment of persons affected will be studied. All this information is necessary before chronic diseases and disabilities can be prevented and controlled with the same degree of effectiveness as has been achieved during the past 50 years in the control of communicable diseases such as typhoid fever, smallpox, diphtheria, scarlet fever, etc.

Modern preventive medicine has increased the expectancy of life from about 40 years in 1870 to 60 years in 1935. But nearly all this good record has been due to the prevention and control of infectious diseases of childhood. It is now proposed to study the causes of chronic illnesses and disabilities which usually appear after middle age and which are so intimately associated with occupation and with the economic and social status and habits of the people. A careful analysis and study of the collected data will provide the Federal and State health authorities with information which it is hoped will serve as a basis for specific recommendations for the prevention and control of the chronic diseases.

B. Scope — The survey is to be carried on in 19 states, divided into 5 areas. Large cities, smaller cities and towns and selected rural communities will be included\*. A list of the states and cities which have been selected as bases of operations is included in Section 4. In the large cities sample areas will be selected for enumeration. In smaller cities and towns the survey will include all families.

\*The centers of the five areas in Massachusetts are Boston, Fall River, Greenfield, Ipswich and Pittsfield.

Rural communities will be selected in areas where supervision and enumeration can be most satisfactorily arranged and where a representative sample of rural families can be interviewed

The survey will include interviews with 750,000 families in about 95 cities and towns. An average personnel of 3500 will be engaged on the project with a peak employment of five to six thousand persons

**C Duration**—The survey will begin on October 15 and will require from four to five months for enumeration and editing in the field, and a somewhat longer period for coding, tabulation, and analysis. The field work will consist of the house-to-house canvass of a predetermined number of families in each city or community, careful editing of the schedules for completeness and consistency, a verification of diagnoses by doctors who attended the cases, and in some places transcription of records of hospitals, sick benefit associations, a survey of medical facilities, and probably, a survey of communicable diseases. The last four will be covered by special instructions later if they are included in the survey and become the responsibility of the present organization

The field work for the Health Survey has been planned to end not later than March 15, 1936. It is hoped that in many cities, towns and rural areas it may be completed before that date

The purpose of the Emergency Relief Appropriation is to provide the means for useful employment of persons who have been receiving relief. Therefore, the rules promulgated by the President and the Federal Works Progress Administrator require that nearly all of the persons employed on this project shall be taken from relief rolls. In order that the work may be conducted in an efficient manner provision is made for employment, in essential positions, of a few non-relief persons, whenever it is found that no competent persons are available from relief

#### DRINKER RESPIRATOR PATENTS HELD INVALID

The District Court of Massachusetts has recently held invalid three patents numbered 1,834,580, 1,906,453 and 1,906,844, granted to Philip Drinker and Louis A. Shaw in an infringement suit brought against John H. Emerson by Warren E. Collins, Inc., manufacturers of hospital equipment in Boston, who were sole licensees under the patents. The defendant, John H. Emerson, maintains a machine shop in Cambridge for the manufacture of hospital and research equipment, and began the manufacture of respirators in 1931

The patents covered the construction of apparatus for producing prolonged artificial respiration, especially for human beings suffering from infantile paralysis as well as in cases of gas poisoning, electric shock and drowning. These respirators worked

admirably and have been in great demand for use in hospitals since 1929

The court found that the defendant began to make his respirators after having seen the Drinker respirator. The defendant, however, excused his infringement on the ground that the patents were invalid because all the alleged novel features covered by the patents were old and disclosed in the prior literature

After considering all the evidence and prior publications produced by the defendant the court agreed with the defendant that the Drinker patents were invalid. The important features of the patent claims of all three patents were found to be anticipated by prior publications, some as far back as 1876, or by prior-issued patents

The patent statutes permit the defendant in an infringement suit to excuse his acts if he can definitely prove that the patent or patents on which the suit is brought are invalid on account of prior knowledge, use or publication more than two years before the filing date of the patent application on which the patent was granted — *Abstract from "Drinker respirator patents held invalid," by Joseph Rossman Science 82 221 (Sept 6) 1935*

#### THE WARREN TRIENNIAL PRIZE

The Warren Triennial Prize, of five hundred dollars, which was founded by the late J. Mason Warren, in memory of his father, and which is awarded every three years to the author of the dissertation considered most worthy of a premium, has been given by the General Executive Committee of the Massachusetts General Hospital to Dr. Norman E. Freeman, for his essay entitled "The Physiology of Gangrene." Honorable mention was given to Carl C. Spedel, Professor of Anatomy of the University of Virginia Medical School for his essay entitled "The Phenomena of Nerve Irritation and Recovery, Degeneration and Repair, as Revealed by Prolonged Observation of Individual Fibres in Living Frog Tadpoles." Previous to 1934 there have been sixteen awards of this prize, thirteen going to men in this country and three to foreigners

#### SEDGWICK MEMORIAL MEDAL PRESENTED TO DR. HAVEN EMERSON

The American Public Health Association at its sixty-fourth annual meeting in Milwaukee awarded the Sedgwick Memorial Medal to Dr. Haven Emerson of the College of Physicians and Surgeons of Columbia University. The presentation was made by Dr. William H. Park, of the Department of Health of New York City. The medal was established in honor of the late William Thompson Sedgwick, of the Massachusetts Institute of Technology, and is awarded for distinguished service in public health — *Science, October 18, 1935*

COMPARISON OF DISEASE INCIDENCE IN CONNECTICUT WITH 1934  
AND SEVEN YEAR AVERAGE

MONTH ENDING NOVEMBER 9 1935

Diseases	1935				Average cases reported for week corresponding to Nov 9 for past seven years	1934			
	Week ending Oct. 19	Week ending Oct. 26	Week ending Nov 2	Week ending Nov 9		Week ending Oct. 20	Week ending Oct. 27	Week ending Nov 3	Week ending Nov 10
Actinomycosis	—	—	—	1	—	—	—	—	—
Amebiasis	1	—	—	—	—	—	1	—	—
Chicken Pox	38	33	79	173	77	50	63	63	110
Conjunctivitis Infections	—	—	2	—	—	—	—	—	—
Diphtheria	5	6	5	2	11	1	3	6	8
Dysentery Bacillary	3	—	—	—	2	—	60	5	—
Encephalitis Epidemic	—	—	1	—	—	2	—	—	—
Favus	1	—	—	—	—	—	—	—	—
German Measles	7	5	1	9	1	2	3	1	3
Influenza	2	—	9	1	2	1	1	2	2
Measles	38	58	66	32	36	46	51	72	145
Meningococcus Meningitis	—	—	—	—	1	—	—	—	—
Mumps	20	22	16	70	34	12	13	20	22
Paratyphoid Fever	—	—	—	3	—	—	—	—	—
Pneumonia (Broncho)	12	15	7	16	21	12	11	19	13
Pneumonia (Lobar)	12	18	12	15	21	11	9	18	19
Poliomyelitis	17	9	7	7	3	—	—	—	—
Scarlet Fever	24	44	30	33	41	24	25	31	37
Streptococcus Sore Throat	3	3	1	1	1	1	1	1	2
Trichinosis	1	—	3	—	—	—	—	—	—
Tuberculosis (Pul)	22	17	28	24	24	24	19	34	25
Tuberculosis (O F)	—	—	2	2	2	—	1	1	2
Typhoid Fever	5	1	2	1	3	1	2	1	—
Undulant Fever	3	1	2	4	1	—	1	2	5
Whooping Cough	65	49	71	68	46	50	57	69	65
Gonorrhea	37	43	61	32	34	30	29	54	61
Syphilis	43	62	63	38	49	55	47	81	69

Remarks No cases of Asiatic cholera, glanders, plague or yellow fever during the past seven years.

DR. AND MRS WOJTASINSKI ARE FOUND  
GUILTY

Dr. Walter Wojtasinski and his wife, Katherine of Ashmont street Dorchester trading as W Wojtasinski Drug Company of Boston manufacturers of 'Katro-Lek,' a patent medicine were found guilty November 14 1935 by a federal district court jury of mislabeling the product in violation of the Pure Food and Drugs Act.

The verdict was reached after the jurors had deliberated five hours. On recommendation of Charles A. Rome assistant U S attorney who prosecuted, the case was continued for sentence by Judge George C. Sweeney.

The government claimed that the circulars and packages had misrepresented falsely the curative and therapeutic remedies of "Katro-Lek."—*Boston Herald November 15 1935*

## FOOD AND DRUG FAKERS

The November 13 1935 *Bulletin of the Department of Agriculture* gives details of more than twenty-five prosecutions with convictions for illicit trades in medicines and foods.

Manufacturers and sellers of medicines with fraudulent claims for the cure or relief of a great variety of diseases, have been fined in large amounts of over a thousand dollars in several instances.

These reports show remarkable success in controlling the distribution of alleged remedies and adulterated foods, for which the public is paying large sums of money.

Such expenditures are wasted and in most cases of drugs more than wasted, for in many cases the resort to such preparations leads to neglect of effective treatments.



CORRESPONDENCE

SUPRARENAL CORTEX EXTRACT IN THE  
TREATMENT OF VOMITING IN PREGNANCY

Worcester State Hospital  
Worcester, Mass

November 6, 1935

Editor, *New England Journal of Medicine*,

In the issue of the *Journal* of Volume 213, p 885 of the week of October 31, the article under the Section of Obstetrics and Gynecology outlining treatment in the cases of vomiting in pregnancy has not taken into account one of the latest methods of therapy which seems to be very beneficial. This treatment consists of intramuscular injections of suprarenal cortex extract.

The articles of Kemp in *Endocrinology* (16 434, 1932), and in the *Canadian Medical Association Journal* (28 389, 1933), also Freeman and Melick in the *American Journal of Obstetrics and Gynecology* (29 602, 1935) would indicate that this treatment has proved effective when other methods have failed. The rationale behind the treatment would appear to be the substitution of an active principle of the suprarenal gland which shows a relative deficiency during pregnancy. It could be postulated that in these cases the hypertrophy of the adrenal gland, which is prone to occur in normal pregnancy, has not been sufficient to take care of the extra load on the mother and for this reason relative deficiency in cortical hormone occurs. This leads to nausea and vomiting of the same type as is found occurring in Addison's disease. The giving of small amounts of suprarenal cortical extract appears to be specific therapy for this condition.

Very sincerely yours,

JOSEPH M LOONEY, M.D.,  
Director of Laboratories

IODINE AS AN ANTISEPTIC

Mallory Institute of Pathology  
Boston City Hospital  
Boston, Mass

Editor, *New England Journal of Medicine*,

The letter from Dr Elliott C Cutler in the November 7th issue of the *Journal*, relative to the recent editorial on "Iodine as an Antiseptic," is deserving of comment. Dr Cutler admits the *in vitro* germicidal efficiency of iodine, but questions its value as an antiseptic, particularly in relation to skin disinfection. It should be noted that no reference to skin disinfection was made in the editorial. Furthermore, the solutions referred to were all aqueous and one would not expect such to be used on the skin, unless the latter had been prepared in some way so that these aqueous solutions could penetrate the hair follicles and sweat glands. Be that as it may, the writer feels that little, if any, experimental evidence has been submitted which has proved iodine to be less effective than any other anti-

septic, regardless of how or where it is used. Even those authors referred to in Dr Cutler's letter, who might be considered the most impartial, came to the conclusions which are at variance with what he maintains. Simmons (U S Army Medical School) concluded, in part, in his 1928 article that "from the standpoint of bactericidal action, tincture of iodine (U S P) was found to be far superior to any of the solutions when used on the unbroken skin" and in his 1933 article that "mercuerochrome should not be considered as a substitute for iodine", and Smith (Medical Corps, U S Army) concluded, in part, that iodine is "an excellent skin disinfectant".

The majority of recent articles on antiseptics reveal the marvelous bactericidal and bacteriostatic properties of certain mercurial compounds and it is the latter—the bacteriostatic or growth inhibiting property—which has led to many conclusions which, to the writer, are false. Shippen was the first to draw attention to the fact that in the standard *in vitro* bactericidal tests sufficient amounts of mercurial compounds may be contained in the single loopful of the antiseptic-culture test mixture to inhibit growth in the culture tube. For this reason, he recommended that a second transfer be made from the first culture tube to a second. A specific example may be taken from experiments conducted in this laboratory. In tests using the "F.D.A. method (special) *S aureus*, 37°C," certain mercurial compounds did not show growth in the first culture, but did in the second, of transfers from test mixtures ranging in concentration of the antiseptic from that recommended for use to a dilution of 1:32. As the test mixture contained 50 cc of antiseptic plus 0.5 cc culture, the transfer (1 loopful) 0.02 cc. and the culture 10.0 cc, this means that a usable solution

	1	5	1	1	1
concentration of	$\frac{1}{32}$	$\frac{1}{55}$	$\frac{1}{50}$	$\frac{1}{10}$	$\frac{1}{17600}$

is sufficient to inhibit the growth of the staphylococci,

even though the undiluted antiseptic is unable to kill the bacteria under the conditions of the experiment. In skin scraping and biopsy tests, such as those cited by Dr Cutler, mercurial compounds have shown up exceptionally well, but no suitable controls, comparable to the Shippen modification, can be made for bacteriostatic concentrations. The antiseptic and bacteria are intimately connected with the material and, unless cultures have been applied to the skin, effective bacteriostatic dilutions are undoubtedly much higher, due to the relative scarcity of bacteria.

It is acknowledged that the bactericidal effect of iodine is diminished by the presence of serum, but the writer has failed to find any mercurial antiseptic which, in the recommended usable concentration combined with an equal amount of horse serum, will kill *Staphylococcus aureus* in five minutes. On the other hand, a 1:32 dilution of Lugol's Solution, U.S.P., will kill under identical conditions. Some mercurial compounds, mercury oxycyanide (1:4000), mercuerochrome (1:50), merthiolate (1:1000) and

merphenyl nitrate (1:5000) will not kill in these usable concentrations even in the absence of serum.

As Dr Cutler has stated "the true appraisal of an antiseptic is a difficult measure. Numerous properties have to be taken into consideration and many claims have to be disproved. So much trash has appeared in the advertisements of commercial antiseptics within recent years that an attempt at an impartial evaluation has been undertaken in this laboratory. Although the work has not been completed everything to date points to iodine as the most efficient ~~wound~~ antiseptic. If equitable and comparable tests can be devised for testing skin disinfectants the writer feels that iodine will again emerge on top.

Very truly yours,

ROBERT N NYE, M.D.

# PNEUMONIA DEATH RATE

The Commonwealth of Massachusetts  
Department of Public Health  
State House Boston

November 6 1935

Editor *New England Journal of Medicine*

On October 26 1935 *The Boston Herald* printed a dispatch from New York to the effect that the death rate in pneumonia can be reduced by 50 per cent by the use of newly developed serums. In part this is true, but the statement needs qualifying. About three-quarters of all pneumonias appear due to pneumococci. These organisms however are not all alike and by immunological methods can be separated into distinct types at least thirty two of which have been recognized in this and other countries. There are serums available to combat pneumonias due to some but not all of these types. Satisfactory serums have not been produced for the treatment of cases caused by other organisms.

The early use of potent serum has been shown to reduce the death rate of pneumonias caused by Type I pneumococcus by over 60 per cent and in Type II cases by nearly 50 per cent. Pneumococci of these two types are of the greatest importance and are responsible for about one-quarter of all cases of pneumonia. Serums used to treat such cases can scarcely be called "newly developed" as they have been in use since 1910. Within the past six to eight years serums have been prepared against several of the other types of pneumococci. They have been somewhat extensively used in New York City and good results are claimed from the treatment of pneumonias caused by these types—such as Types VII and VIII and a few others. Sufficient cases treated with and without such serums have not yet been obtained to establish their value clearly. Nevertheless the results appear very encouraging.

The usual death rate of Type I cases not given serum is about 25 per cent. This can be reduced to 10 per cent if serum treatment is begun within the first four days of illness, and to 7 per cent when such treatment is begun within three days of the

onset. Similarly in Type II cases the usual death rate of 40 per cent can be reduced to 25 per cent or less by early treatment.

A study of pneumonia death rates brings to light the interesting fact that nearly two-thirds of pneumonia deaths occur in males. Excess death rates for males from birth to puberty and from twenty to sixty years of age have been found. This is especially true in the latter age group in the most highly industrialized communities and tends to disappear in rural areas. Further in the United States pneumonia appears far more prevalent along the Atlantic seaboard from Maine to Georgia (inclusive) and in a group of Southwestern states encompassing the Colorado Plateau than elsewhere.

A study of the ten original registration states and of Massachusetts death rates from pneumonia indicates that only a slight downward trend has occurred during the past thirty-five years. Thus pneumonia as a cause of death is but little less common than formerly.

Very truly yours

ROBERT HENKIN, M.D.

In Charge of the State Department  
of Health Pneumonia Study

# DR. CHARLES H. MAYO EXPLAINS CERTAIN QUOTED STATEMENTS IN NEWSPAPERS

Editor *New England Journal of Medicine*

The following is an account of what happened at the meeting of the Inter-State Post Graduate Medical Association of North America in Detroit and a digest of my words and thoughts.

I had my manuscript with me but spoke without it. My main subject was Götter and the Changes in Its Treatment. I recalled the cretins whom I saw several years ago in Switzerland when visiting Dr. de Quervain. Cretins are seldom seen now because of recognition of the disease and administration of thyroid, either to the patient or to the expectant mother also by administration of thyroid to myxedematous persons they can be rendered mentally active. When the thyroid is overactive as it is in exophthalmic goiter there is a markedly increased metabolism. These varied states are due to deficiency or increase of thyroid secretion with secondary effect on the capillary circulation of the body including one would expect, that of the brain.

Reduction in the circulation not always continuous might conceivably bring on mental changes in conditions in which the thyroid was not involved. These changes may go on for varying periods in the early stages, but eventually become permanent and close in part, the function of the brain. Vascular constriction when it occurs in other parts of the body than the head, as it does in Raynaud's disease is not necessarily permanent in the early stages. Emotional disturbances are known to be potent in the crises both of Raynaud's disease and psychic disorders. This similarity in the course of the vascular condition and of certain psychic conditions

tends to suggest that the vascular constriction may be a factor in the psychic abnormality

There is experimental evidence that control of the circulation of the brain can be exerted through the carotid bulb, but it cannot be denied that to prove an effect on the circulation of the brain is difficult, because the vessels of the brain are relatively inaccessible. Nevertheless, the head is an extremity of the body, just as are the hands, and it is well known that when the blood vessels of the hands are not obliterated but are constricted, as they are in Raynaud's disease, they can be made to dilate by local anesthesia, general anesthesia, or induced fever, and that permanent dilation can be brought about by the operation known as cervicothoracic sympathectomy. Also, a temporary good effect has been produced in certain forms of insanity by applying, to the head, methods similar to those that have been applied to the other extremities. There seems nothing unreasonable in the assumption that the cause of the observable effect on the mental condition in early cases might be the same as the cause of the observable effect on the hand or the foot, if the arterial condition of the brain in certain types of insanity is analogous to the arterial condition of the hands and feet in Raynaud's disease. At all events, the treatment has been tried, notably in the catatonic form of dementia praecox.

I do not think that the physicians before whom I spoke were for the most part startled by what I said for they heard the context and my inflections and thus were in a position to sketch in a background which I thought I implied but knew that I had not time to delineate. I said that the effects of the treatment had worn off in three weeks, but I voiced the hope that methods of injection or operation would be found to make them permanent in treatment of patients who had not been mentally affected for too long a time. I spoke to stimulate others to seek methods of controlling the circulation of the brain, such as have been found to control the circulation of other extremities. I estimated that at least five years would pass before such methods would be found.

If my expression of a hope inadvertently took the form of a prophecy it would not be strange, for, in more than fifty years of the practice of medicine, I have seen very many times when the general opinion was that all that would ever be known or done in a certain field already was known or had been done. I never believed this in any instance and I have not been disappointed in my hope that in any field concerning which science has a hint, ultimately more would be known.

However, the effects in the forms of insanity which I referred to have been only temporary, and not I, my colleagues, nor any others of whom I know, are yet prepared to effect a cure.

Sincerely yours,

CHARLES H. MAYO,  
Rochester, Minn.

November 9, 1935

## RECENT DEATHS

**BLANCHETTE**—ALEXANDER BLANCHETTE, M.D., of Haverhill, Massachusetts, died in that city, November 13, 1935, by suffocation due to a fire.

Dr. Blanchette was born in 1869 and graduated from the University of Bishop College Faculty of Medicine, Montreal, Canada, in 1892.

**GOODWIN**—EDWARD EVERETT GOODWIN, M.D., of 436 Elm Street, Brockton, Massachusetts, died in the Emerson Hospital, Boston, November 6, 1935.

He was born in North Mariaville, Maine, October 28, 1864, the son of Mr. and Mrs. George P. Goodwin.

After his early education in Maine public schools he studied in Dedham and Brockton schools, later attending Boston University School of Medicine, graduating therefrom in 1899.

He was a Fellow of the Massachusetts Medical Society and the American Medical Association. In addition to his professional activities he was prominent in religious and civic organizations including the Massachusetts Homeopathic Society, the American Institute of Homeopathy, the Boston Surgical Society, the Brockton Medical Society, Paul Revere Lodge, Free and Accepted Masons, Satucket Chapter, Royal Arch Masons, Brockton Council, Royal and Select Masters, Bay State Commandery, Knights Templars, Massachusetts Consistory and Aleppo Temple, Ancient Arabic Order of Nobles of the Mystic Shrine.

He is survived by his widow, Mrs. Myrtle E. (Hollis) Goodwin, two daughters, a brother, and two sisters.

## OBITUARY

### DR. LEONARD WHEELER\*

Leonard Wheeler, M.D., for sixty-five years a member of the Massachusetts Medical Society and from 1872 to 1912 a practicing physician in Worcester, died at his home there October 2, 1935, aged ninety years and thirty-two days.

Born in Lincoln, where his emigrant ancestor settled in 1642, he prepared for college at Phillips Exeter Academy, joined the sophomore class at Harvard in 1863, graduated in 1866 and in 1870 received his M.D. degree, after three years at the Harvard Medical School and one as medical interne at the Massachusetts General Hospital. The next two years he spent in medical studies in Breslau, Leipzig and Vienna, coming in close contact in the latter city with such men as Rokitsansky, Freund and Schroeder. In 1872 he came to Worcester as Superintendent of the Worcester City Hospital, organized the previous year. This hospital, at that time the only one in the city, had but eight beds and the Superintendent was allowed, in addition to his duties there, to attend to private patients at their homes.

\*Presented to the Worcester District Medical Society by the committee duly appointed.

As a general practitioner giving special attention to obstetrics and operative gynecology Dr Wheeler ranked for forty years among the leaders of the profession in the city and county. In 1874 he resigned his superintendency but retained his connection with the hospital until his death sixty-three years later serving as visiting physician until 1888 as obstetrician from that time until 1896 and for the remainder of his life as consulting obstetrician and a member of the general consulting staff.

Soon after he came to Worcester the Washburn Free Dispensary was opened and from 1876 to the time of his death he was connected with that institution with the Memorial Hospital of which the Dispensary became the Out Patient Department when the hospital opened its doors in 1888. He served on the hospital staff as physician and surgeon until 1900 when he became a Trustee was President of the Board from 1904 to 1917 and Vice-President from 1917-1925.

He was a member of the Consulting Staff of St. Vincent Hospital for twenty five years was a Trustee of the Foxboro Hospital 1905-07 Secretary of the Worcester District Medical Society 1873-75 Vice-President 1893-95 President 1895-97 and Vice-President of the Massachusetts Medical Society 1906-07.

A charter member of the St. Wulstan Society of the Worcester Club and of the Tatnuck Country Club he was also a member of the American Antiquarian Society, the Worcester Fire Society the Worcester Art Museum, of various other civic organizations and of the Harvard Club of Worcester and the Union Club of Boston.

In 1881 he became a Corporation of the Worcester County Institution for Savings a Trustee in 1889 and for the last thirteen years of his life served as one of its three Vice-Presidents.

A discriminating student of history a writer of numerous medical articles the Librarian for many years of the local Medical Society's library it was always a pleasure and a privilege to listen to his opinions on medical social and historical matters.

Handicapped for many years by various physical disabilities he retained to the very end of his life a keenness of mind that was a delight to everyone that knew him. There was no observable failure of his mentality and no one who came in contact with him could have suspected that but one member of the Massachusetts Medical Society Dr Stevens of Cambridge had been a member longer than he.

Dr Wheeler married Elizabeth Bancroft Cheever daughter of the Rev Henry Cheever November 29 1897.

He is survived by his widow four children and three grandchildren. His son Bancroft C. Wheeler is at present an Assistant Surgeon at the Memorial Hospital.

SAMUEL WOODWARD,  
HOMER GAGE,  
DAVID HARELOW.

## NOTICES

### THE APPOINTMENT OF DR. R. H. GUTHRIE

RILEY H. GUTHRIE, M.D. has been appointed Chief Executive Officer of the Boston Psychopathic Hospital.

### A COURSE BY PROFESSOR GEORGES PORTMANN

Professor Georges Portmann will conduct an intensive five weeks' course in Oto Rhino Laryngology in the University of Bordeaux, France beginning July 30 1936. English language, didactic laboratory clinical and operative instruction.

For particulars address Dr James A. Flynn, 1511 Rhode Island Avenue N W Washington, D C.

### BOSTON UNIVERSITY SCHOOL OF MEDICINE SURGICAL CLINIC AT THE BOSTON CITY HOSPITAL

Friday November 22 12-1 Cheever amphitheatre  
Dr Frederic J. Cotton will speak on "Fractures of the Wrist and Ankle."

Physicians and medical students are invited.

## REPORTS AND NOTICES OF MEETINGS

### TESTIMONIAL EXERCISES FOR DR. EDSALL

Dr David L. Edsall recently retired dean of the Harvard Medical School and School of Public Health, was honored with a testimonial meeting and dinner held by the Harvard Alumni Association Wednesday October 23. The afternoon meeting was held at the medical school with Dr Walter B. Cannon presiding. Dr Cannon in reviewing Dr Edsall's contributions to the medical world in the past twenty five years emphasized his investigations in occupational disease and the impetus which he early gave to the study of this relatively new branch of medicine. His efforts in the advancement of the Harvard School have been unequaled except by those of Dr Elliot.

Three addresses were delivered on the subject "The Development of Medical Education in the United States Since the World War." Dr Walter A. Jessup President of the Carnegie Foundation for the Advancement of Teaching was the first speaker in this group. In tracing the evolution of medical teaching from ancient times he told of man's constant struggle against disease, and his steady search for aid in scientific and pseudoscientific fields. Many forces have hindered the study of medicine. Ignorance and superstition long prohibited dissection and the study of gross anatomy. Absolute acceptance of the authority of Hippocrates and Galen hindered advance for centuries. The academic teaching of medicine with law and theology provided little stimulus for experimentation and advancement of medical knowledge. Then for many years the study of medicine became an apprenticeship with medical schools serving only as centers for academic lec-

tures Little or no coordination existed with other branches of the university, if indeed the medical school was connected with a university at all

Early in this century the American Medical Association sought the aid of the Carnegie Institute for the Advancement of Teaching in an attempt to improve the quality of medical instruction. This committee, headed by Dr Flexner, emphasized the necessity of thorough scientific instruction of medical students before clinical exercises were undertaken. As a result of this report many inadequate medical schools have been closed since 1910, and the character of those remaining has been greatly strengthened with the development of strong preclinical departments. An indirect result of this development has been the domination of medical thought by great scientific institutes for research. The application of scientific methods to the solution of public health problems has brought about the practical elimination of certain diseases such for example as typhoid fever, and yellow fever. Large corporations have realized the value of, and have aided in the application of public health measures to industry, with the resultant elimination of many occupational diseases.

Dr Edsall emphasized the importance of personality and human kindness to the physician. He advocated a thorough knowledge of literature, believing that such knowledge was essential for an understanding of human nature and a correct evaluation of laboratory data. Within recent years great strides have been made in the cultural education of students before they enter on a purely medical course.

Under Dean Edsall, Harvard was anxious to meet the demands for education in public health. He established the requirements of a scientific background to such an education, as well as a thorough knowledge of adjoining fields such as sociology and psychology.

Harvard Medical School, one of the most richly endowed schools in the world, has well met her obligation to society. No small part of her success is due to the efforts of Dr Edsall.

Dr Eugene DuBois, Professor of Medicine at Cornell Medical College, talked of the influence of the preclinical sciences on clinical medicine. A generation ago the aim of medical schools was to prepare their students to secure internships. No effort was made to stimulate reading of original articles, and teaching was done entirely from textbooks. Dr Edsall changed the whole atmosphere of medical education. He favored the elimination of the "spoon feeding" system, and advocated the wider use of source material instead of textbooks. He introduced the tutorial system which allowed more leniency to exceptional students, with the opportunity for special work in selected fields.

The division between preclinical and clinical subjects has been overemphasized. The teaching of the preclinical courses in conjunction with other college courses, as is done in some schools, is not desirable.

They should be more closely welded to the clinical departments of the school, at the expense of some separation from the rest of the college courses if necessary.

In recent years the additions made by clinical investigators to scientific knowledge have increased tremendously. The narrow concept that "work on animals is more scientific than work on man" is no longer tenable. Many of the modern reviews on physiology and biochemistry are largely referable to clinical work.

The organization of the present day clinic is open to many criticisms. Some need complete reorganization. Financial depression has limited the funds available for research, which forms an important part of every modern clinic. Young men interested mainly in caring for patients or teaching feel that they must do a certain minimum of research if they are to gain academic advancement. Those interested mainly in research see a future only as assistants if they remain in laboratory work alone. With academic advancement and increase in administrative duties, there is a steady decrease in the extent of researches performed by men formerly very active, and often the appointment to a professorship entirely curtails further investigative work.

A new type of organization is suggested which will take advantage of clinical material, but with appropriations separate from those of the hospital housing it. Its board of directors and connections should be such as to allow the staff to move from one hospital to another to obtain the clinical material needed for the problems under consideration at any one time. Administrative duties should leave the staff adequate time for investigative work. Such a system would improve the character of medical instruction, and while decreasing the quantity of research published would definitely improve its quality.

Dr Lawrence J Henderson, Professor of Chemistry at Harvard, in delivering the closing address of the afternoon spoke of the various interactions between medical and other sciences. In early times the path to other fields lay through medicine, and many of the concepts of other branches of knowledge were made by men who began their careers as physicians. Then came the period in which contributions to medical knowledge were largely made by workers in other scientific fields. This period is exemplified by the contributions made by Lavoisier, a chemist, to the study of metabolism, and the fundamental concepts given by the chemist Pasteur to the field of bacteriology.

A generation ago chemistry, physics and other "pure sciences" were still quite independent of medicine. The frontiers of science were then several and real. Now these several frontiers have become false and unreal. Medicine and the various sciences can no longer be clearly demarcated, and segregated. Advancement in one field usually influences all the rest.

At the time Dr Edsall began his deanship, the

"Guild Economy" was in full swing. The medical school was isolated from the rest of the university and the laboratories were segregated from the clinics. These isolations were intellectual as well as physical. Dr Edsall had experienced the detrimental influence of this system in his early experimental clinical studies and in the application of clinical methods to industrial hygiene. He undertook to eliminate this "pigeon hole" method of investigation and teaching. In the founding of the School of Public Health intimate relationships were established with the Medical School. The close relationships now existent between the school and the Children's Hospital, the Fatigue Laboratory and the Engineering School are examples of the success of his efforts to abolish the Guild System. He had a large part to do with the founding of the Committee on Industrial Hygiene which administers large grants from the Rockefeller foundation. This committee has given funds to such apparently diverse enterprises as the Harvard Expedition to Chile, the Fatigue Laboratory and the department of anthropology. An example of the interrelationships of the various sciences which have been promoted is afforded by the presence of a physician on the Cancer Commission and a mathematical statistician on the faculty of the School of Public Health.

The institution of the tutorial system at Harvard has greatly aided undergraduates in shaping their studies. The presence of young medical men among the college tutors has promoted and inspired a better relationship between the medical and college faculties.

In all these advances toward closer collaboration Dr Edsall has taken a leading part, and it is chiefly through his efforts that many of the results have been achieved.

The testimonial dinner was held at the Harvard Club with Dr Conant presiding. Dr Conant expressed his appreciation of the encouragement, co-operation and assistance which Dr Edsall had so freely given him since his appointment as president of the university. Dr C. Sidney Burwell, new dean of the medical school, spoke briefly of Dr Edsall's contributions to pediatrics, occupational disease, public health, and the advancement of Harvard Medical School. The change from academic to bedside teaching, the development of a well functioning tutorial system and the encouragement given to research contributed much toward keeping the Harvard Medical School among the leaders of present day medical education.

Dr A. Lawrence Lowell, President Emeritus of Harvard University, emphasized Dr Edsall's advancement of the Medical School by the union promoted between the preclinical and clinical sciences and the harmonious relationships developed between the various departments. The value of a general examination over the whole of the four-year medical course was recognized by Dr Edsall and he succeeded in establishing it a year after assuming his office as dean. His introduction of the system of

"self education" instead of the academic teaching of "pre-digested" information has been one of the greatest contributions to modern medical instruction.

The address of Dr Edsall will be printed in its entirety in a future issue of this Journal.

#### HARVARD MEDICAL SOCIETY

The Harvard Medical Society held its first meeting of the current year at the Peter Bent Brigham Hospital, October 22. Dr Henry A. Christian presiding.

Two cases were presented. The first, a medical case by Dr Sullivan.

A thirty-seven year old Canadian male entered the hospital five days previously with the history of persistent vomiting for the past three weeks. He had been under medical treatment for peptic ulcer fourteen and ten years previously but since that time had been well until the onset of the vomiting.

Physical examination revealed him to be markedly dehydrated and cyanotic. There were rales at both apices and tenderness in the right upper and lower quadrants.

Laboratory studies: urine very slight trace of albumin; specific gravity varying from 1.010 to 1.014. P. S. P. test of renal function showed excretion of but 30 per cent of the dye in three hours. Blood: red cells 5,400,000; hemoglobin 123 per cent; white count 15,000.

He was placed under routine ulcer management with frequent feedings and alkali powders but vomiting persisted for the four days. On the fourth day there was marked increase in the cyanosis and the patient complained of headache. Chvostek's and Trousseau's signs were present. The blood carbon dioxide combining power was found to be 108 volumes per cent. He was given ten grams of ammonium chloride in one hundred cc. of normal sodium chloride solution by rectum. He became lethargic and semicomatose on the morning of the fifth day when his blood urea nitrogen was 150 mg. per cent. Forty-five hundred cc. of normal saline solution was then administered subcutaneously and intravenously with subjective improvement, disappearance of lethargy and disappearance of Trousseau's and Chvostek's signs. The carbon dioxide combining power of the blood fell to 88 volumes per cent and the blood sodium chloride rose from 235 milligrams per cent, the next morning to 300 at three P.M. and the serum calcium was 7.4 mg. per cent, the serum phosphorus 11 mg. per cent. Dr Aubin, in discussing the case, emphasized the great constancy of the blood base and the fact that other substances were retained or excreted to maintain it as constant as possible. In this case salt was lost in the vomitus and there had been inadequate elimination of bicarbonate in the urine. There was a decrease in the available calcium ions and tetany developed. High values of blood base result in damage to the kidney with rise of the blood urea nitrogen due to retention.

Dr Emery commented on the frequent upsets experienced by patients on the Sippy diet with high alkali intake. Ill effects are more apt to occur in patients with previously damaged kidneys, although they may occur in those with normal kidneys. Change from calcium to bismuth compounds will relieve the toxic symptoms in many cases, even though the proportion of soda administered remains the same.

Dr Christian stated that either alkalis or acids in large excess above normal will produce a toxic nephritis, experimentally. The development of evidence of alkalosis in ulcer patients should always lead one to expect renal impairment, since the normal kidney is capable of excreting excessively large amounts of bases or acids. Headache is a very early symptom of renal dysfunction in patients on ulcer treatment.

The second case was presented by Dr Ryder. A seventy three year old white male entered with a history of typical angina pectoris for the past ten years. For the past two years he had suffered attacks of upper abdominal pain distinct from his anginal attacks, and characteristic of gall bladder disease. Four months ago he had severe right upper quadrant pain radiating to the angle of the right scapula, associated with nausea, vomiting, and jaundice (icteric index 40). X-ray studies revealed a pathological gall bladder. He was sent home because he was considered a poor operative risk. Thirty-six hours before his present entry he suffered abrupt onset of diffuse upper abdominal pain, worst in the epigastrium, and not relieved by nitrites.

On entry his white count was 14,000, temperature 101°, and his urine showed a 1 plus test for bile. The icteric index was 12.

Dr Cutler expressed the opinion that cholecystectomy was not justified in this case because of his poor condition.

Dr Cheever stated that in his experience, patients suffering from both angina pectoris and gall bladder disease often receive considerable relief of their angina after cholecystectomy. A possible explanation of this phenomenon might be the abolition of reflex nervous or infectious stimulus to the heart. The evidence of gall bladder infection with the last attack points to the likelihood of more trouble in the future. He advised operation.

Dr Christian concurred with Dr Cheever. In his experience patients with combined angina and gall bladder disease stood cholecystectomy well and were often relieved of symptoms of both diseases post-operatively.

Dr Walter B Cannon, George Higginson Professor of Physiology, at Harvard Medical School, then recounted in delightful fashion some of the interesting features and impressions of his recent trip to the Orient, Russia, and Scandinavia.

He was very favorably impressed with the efforts for advancement of public health in China, which are under the able direction of Dr J Heng Liu, a graduate of Harvard Medical School. Recently a

new medical school has been founded in Nanking with the specific purpose of developing men for service in the Public Health Department.

In Russia, Dr Cannon was impressed by the regard paid to the human factor in labor, and by the facilities provided by the Government for the recreation of the working class. An earnest attempt is apparently being made to utilize, profitably, the leisure afforded by the thirty hour working week. Large, beautifully landscaped "parks of culture and rest", provided with reading rooms, outdoor theaters, children's nurseries, game rooms, etc., are to be found in the large cities. An effort to popularize education and appreciation of art is also quite noticeable, although such effort is always colored with propaganda. Young men of promise are now being encouraged to enter the field of medicine by the expedient of doubling the salary paid to physicians by the state, huge institutes for research have been built, and great activity in scientific fields is in progress.

The increase in patients suffering from neuroses has been quite marked in Russia during the last decade. A quite probable explanation of this increase lies in the demands of time and machinery on a previously leisurely, rather primitive agricultural people, and also in the operation of fear.

In marked contrast to Russia were the Scandinavian countries with their fine educational systems, and great coöperative programs. To Dr Cannon these seemed the most civilized countries in the world.

#### WILLIAM HARVEY SOCIETY

The first meeting of the year of the William Harvey Society was held on October 25 in the Beth Israel Hospital. Dr Walter C Alvarez spoke on "Functional Digestive Disorders." He was introduced briefly by Dr Louis F Curran.

In Doctor Alvarez's practice he finds that fully one-third of his patients show no evidence of organic disease and he believes that medical schools do not, as a rule, give adequate training to their students who will later have to meet functional problems almost as often as organic. A detailed history, taken with great care, should reveal the diagnosis of functional trouble even before the physical examination and laboratory work are done. It frequently requires several visits with the patient before the real truth becomes evident, since the idea of a functional disorder is most distasteful to the average person, who wants an operation and a rapid cure. Extreme care is needed in creating the proper frame of mind in such patients if one is to bring about restoration to health. It must be pointed out that many under the strain of certain unfortunate circumstances become neurotic.

Of course it is always necessary to make a most careful examination of all patients regardless of whether the disease is organic, because frequent

mistakes will otherwise be made and because there is nothing so convincing to a patient as a thorough physical examination.

A patient with organic disease is always straight forward and direct in his answers to the doctor's questions while the neurotic individual dodges and refuses to "stick to the point." Dr. Alvarez spoke particularly of what he chose to call the constitutionally inadequate patient. Such people are often intellectually alert but seem unable to meet the strain of everyday life. The doctor cannot cure this type of individual but he can often guide him into some occupation where he will be able to meet the requirements adequately pointing out that there are limitations to every man's ability.

Doctor Alvarez's lecture was replete with excellent examples through which he drove his points home. He particularly stressed the necessity of a careful history and said that frequently when one doctor fails to get at the underlying cause of a functional disorder it is wise to let another physician try to discover an etiology. It is important to find out the precise circumstances under which the difficulty began. It is rare to have functional attacks at night. Note the type of pain and have the patient point out exactly where it is, for a neurotic often complains of burning pains and is indefinite when asked to put his finger on the exact site. Functional pain is usually unrelated to any of the functions of the body and is unrelieved by certain measures that usually help organic digestive disturbances as for instance the Sippy régime in gastric or duodenal ulcer. Pain due to migraine always follows a head ache. The general sensitivity of the patient should be noted. Those patients that cry out repeatedly during a barium enema and have much pain at the dentist are probably abnormally sensitive to all pain.

The family history often makes a diagnosis, for many of the constitutionally inadequate may be mildly insane and give a family history of insanity. In treating these patients, sympathy is most important and a brutal heartless approach will only drive them elsewhere. Insomnia is a frequent complaint and must be combated. Barbiturates may be used, because rest, often in the daytime but certainly at night is essential. Doctor Alvarez often uses some active treatment because it gains the patient's confidence and gets him to return frequently so that the doctor can also treat him actively for his neurosis.

#### THE NORFOLK DISTRICT MEDICAL SOCIETY

A regular meeting of the Society will be held in the Norwood Hospital, Norwood, Massachusetts Tuesday evening November 20, 1935 at 8:15 P.M. Tel. Norwood 1520.

#### Business

##### Communications

"Surgery of the Stomach" Dr. J. J. Hepburn  
"Psychotherapy in General Practice" Dr. A. A. Fenton

Metastasis in Cancer of the Breast. Dr. Valmore Pelletier

##### Discussion.

##### Collation

FRANK S. CRUICKSHANK, M.D., Secretary  
1236 Beacon Street, Brookline

#### ARTHRITIS CLINICS AT THE ROBERT BRECK BRIGHAM HOSPITAL

A bi-monthly series of clinical meetings on the general subject of arthritis will be conducted during the winter months at the Robert B. Brigham Hospital, 125 Parker Hill Avenue, Boston. Physicians and medical students are cordially invited to attend. The next meeting will be held Wednesday, December 4 at 5:00 P.M.

The third clinic this fall was held November 13 when two patients were presented: one a fifteen year old boy with rheumatic fever and rheumatoid arthritis, the other a thirteen year old girl with Still's disease. In addition there was a demonstration of acetyl-beta-methylcholine chloride iontophoresis, a therapeutic measure which has lately attracted some attention in the treatment of chronic arthritis and peripheral vascular disease.

ROBERT T. PHILLIPS

Resident Physician

#### HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held in the Peter Bent Brigham Hospital Amphitheatre (Shattuck Street Entrance) Tuesday evening, November 26 at 8:15 P.M.

##### PROGRAM

##### Presentation of Cases.

The Mechanism and Effects of Abdominal Compression in the Treatment of Pulmonary Tuberculosis. By Dr. Burgess Gordon, Associate Professor of Medicine, Jefferson Medical College.

Medical students and physicians are cordially invited to attend.

MARSHALL N. FULTON, M.D., Secretary

#### SOCIETY MEETINGS CONGRESSES AND CONFERENCES

##### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, NOVEMBER 25, 1935

##### Monday, November 25—

9:10 A.M. Boston Dispensary, 5 Bennet Street, Boston. Heart Clinic. Dr. S. H. Proger and Mrs. C. Janeway

5 P.M. Edward K. Dunham Lecture, Harvard Medical School Amphitheater, Building C.

8:15 P.M. New England Heart Association, Boston City Hospital Amphitheatre of the Mallory Institute of Pathology (Entrance at 761 Massachusetts Avenue, Boston)

##### Tuesday, November 26—

9:10 A.M. Boston Dispensary, 5 Bennet Street, Boston. X-ray Demonstration. Dr. A. Erlinger



- 2 30 P M Pediatric Ward Vislt. Massachusetts Eye and Ear Infirmary
- \*8 15 P M. Harvard Medical Society Peter Bent Brigham Hospital Amphitheatre (Shattuck Street Entrance)
- Wednesday, November 27—
- \*9-10 A M Boston Dispensary, 25 Bennet Street, Boston Ward Cases Dr S J Thannhauser
- †12 M Clinico-Pathological Conference Children's Hospital
- \*5 P M Edward K Dunham Lecture Harvard Medical School Amphitheater, Building C
- Friday, November 29—
- \*9-10 A M Boston Dispensary, 25 Bennet Street, Boston Ward Cases Dr S J Thannhauser
- Saturday, November 30—
- \*9-10 A M Boston Dispensary, 25 Bennet Street, Boston Peptic Ulcer Dr S J Thannhauser
- \*10-12 Staff rounds at the Peter Bent Brigham Hospital

\*Open to the medical profession  
†Open to Fellows of the Massachusetts Medical Society

- November 21—Harvard Medical School Lecture on "The Care of the Patient" Dr David D Scannell. Amphitheatre C at 5 P M
- November 21—Medical Clinic at the Peter Bent Brigham Hospital 3 30 P M
- November 21—The Boston Health League and the Massachusetts Central Health Council at the Parker House, Boston 12 30 P M
- November 21—Clover Hill Hospital, Lawrence, Medical Meeting 4 30 P M
- November 22—Boston University School of Medicine Surgical Clinic at the Boston City Hospital See page 1051
- November 22, 25, and 27—The Edward K Dunham Lectures Harvard Medical School See page 1000, issue of November 14
- November 23—Clinic by Dr S J Thannhauser Boston Dispensary, 25 Bennet Street, Boston
- November 25—New England Heart Association, 8 15 P M Boston City Hospital, Amphitheater of the Mallory Institute of Pathology
- November 26—Harvard Medical Society See page 1055
- December 4—Arthritis Clinics at the Robert Breck Brigham Hospital See page 1055
- December 5 7—National Society for the Prevention of Blindness See page 940, issue of November 7
- December 13—William Harvey Society Beth Israel Hospital, 8 P M

### DISTRICT MEDICAL SOCIETIES

#### FRANKLIN DISTRICT MEDICAL SOCIETY

Meetings are held on the second Tuesday of January, March and May at the Weldon Hotel, Greenfield, at 11 A M.

CHARLES MOLINE, M.D., Secretary

#### NORFOLK DISTRICT MEDICAL SOCIETY

November 26—See page 1055

January 28, 1936—Hotel Kenmore at 8 P M Dr Benedict F Boland—Cauterization of the Cervix Uteri Using Various Electrical Methods" Illustrated with lantern slides

February 25, 1936—Massachusetts Memorial Hospitals at 8 P M Papers by the staff

March 31, 1936—Hotel Kenmore, at 8 P M. (Subject to be announced)

May, 1936—Annual Meeting (Place, date and subject to be announced)

The censors meet for the examination of candidates May 7, 1936 November 5, 1936

FRANK S CRUICKSHANK, M.D., Secretary  
1236 Beacon Street Brookline Massachusetts

#### PLYMOUTH DISTRICT MEDICAL SOCIETY

January 16—Goddard Hospital Subject and speakers to be announced later

March 19—Plymouth County Sanatorium, South Hanson

April 16—Brockton Hospital

May 21—Lakeville State Sanatorium

G A. MOORE, M.D., Secretary

#### SUFFOLK DISTRICT MEDICAL SOCIETY

December 11—Joint Meeting with the New England Heart Association at the Boston Medical Library "Constrictive Disease of the Pericardium" Dr Charles Sidney Burwell. Discussion Dr Edward D Churchill and Dr Paul D White

January 29, 1936—Joint Meeting with the Boston Medical Library at 8 Fenway "Observations Around the World," Dr Walter B Cannon

March 18, 1936—Meeting at the Boston Medical Library "The Laboratory and Clinical Story of Fatigue," Dr Arlie V Bock and Dr David B Dill Discussion Dr Donald J MacPherson and Dr Augustus Thorndike, Jr

April 29, 1936—Annual Meeting at the Boston Medical Library "The Treatment of Septicaemia," Dr Champ Lyons "The Pleurality of Scarlatinal Streptococcus Toxin," Dr Sanford B Hooker Discussion Dr Hans Zinsser

The medical profession is cordially invited to attend all of these meetings

ROBERT L DeNORMANDIE, M.D., President,  
CHARLES C LUND M.D. Secretary,  
FRANCIS T HUNTER, M.D.,  
Boston Medical Library

### WORCESTER DISTRICT MEDICAL SOCIETY

December 11—Wednesday evening St Vincent Hospital, Worcester, Mass Dinner and scientific program Subjects of program to be announced later

January 8, 1936—Wednesday evening Worcester City Hospital, Worcester, Mass Dinner and scientific program Subjects of program to be announced later

February 12, 1936—Wednesday evening Worcester State Hospital, Worcester, Mass Dinner and scientific program Subjects of program to be announced later

March 11, 1936—Wednesday evening Memorial Hospital, Worcester, Mass Dinner and scientific program Subjects of program to be announced later

April 8, 1936—Wednesday evening Hahnemann Hospital, Worcester, Mass Dinner and scientific program Subjects of program to be announced later

May 13, 1936—Wednesday afternoon and evening Annual Meeting of Society Time, place and details of program to be announced in an April issue of the Journal

ERWIN C MILLER, M.D., Secretary

### BOOK REVIEWS

The Woman Asks the Doctor Emil Novak 189 pp  
Baltimore The Williams & Wilkins Company  
\$1 50

In this book Dr Novak has attempted to put into print his answers to the questions which the average woman patient asks her doctor about herself. He has succeeded admirably in accomplishing this purpose Your reviewer does not know of any book which is at all comparable to it. The style is simple and readable Every doctor will recognize the questions which have inevitably come up many times in his own practice Dr Novak has had the skill and the knowledge to answer them in an authoritative manner We can recommend this book in every way, and the price brings it within the reach of any patient.

Section of Primates Physiology, Laboratory of Physiology, Yale University School of Medicine  
Collected Papers, July 1, 1934-June 30, 1935 Vol II New Haven, Connecticut.

This second volume of collected reprints from the very active physiological laboratory of the Yale Medical School is a fitting tribute to the work of Professor John F Fulton, the head of the department The work of this laboratory indicates that under his direction productive research is being carried forward along many lines of neurophysiology Thirty new papers published in the course of a year are conveniently bound for easy reference, with an adequate table of contents

# The New England Journal of Medicine

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NUMBER 22

## SOME OBSTETRICAL ASPECTS OF CARDIAC DISEASE COMPLICATED BY PREGNANCY\*

BY H B NELSON, M.D.† AND M F EADES, M.D.†

It has been frequently said that women with heart disease have easier and shorter labors than when no cardiac disease is present. In order to verify this statement, it was decided to analyze the histories of a large series of pregnant patients with known organic heart disease where sufficient data were present regarding their labors to make satisfactory observations. Such material was available through the cardiac clinic of the Boston Lying In Hospital. The patients had been individually studied and their condition diagnosed as organic heart disease by our cardiologist, Dr B E Hamilton and his staff. All were women with compensated or decompensated organic heart disease who entered the Boston Lying In Hospital either through the cardiac clinic or as emergency cases during the years 1922-1932 inclusive. During this period, 530 pregnant women with organic heart disease were treated. Because of various omissions in the records, for our purpose only 495 records were available for this study.

### FAILURE DURING PREGNANCY

Management of the cardiac patient aims to anticipate failure, recognize it early, and if it occurs, to treat it in the most appropriate manner.

Hamilton found an incidence of cardiac disease at the Boston Lying In Hospital of 500 cases in 45,069 deliveries or 1.1 per cent. Watson reported from Sloane Hospital for Women 240 cases in 18,000 deliveries, or 1.3 per cent. One finds in the textbooks of obstetrics very vague statements regarding the occurrence of failure during pregnancy. In the literature, conclusions are frequently based on relatively few cases. Certain aspects of vascular physiology would seem to have a definite and direct bearing on these problems. Neubauer, and Rowntree and Brown have demonstrated an increased blood volume in normal human gestation. The

latter workers show this change to result from an increased plasma volume. Stander, Duncan and Sisson have reported an increased minute volume output of the heart in animals and in human beings during pregnancy. In normal women they demonstrated that the cardiac output begins to rise at the fourth month of pregnancy and progressively increases until full term is reached. At that time it assumes a value of fifty per cent above normal. In other words, pregnancy imposes a progressive load on the heart from the fourth month until term. We should expect, therefore, to encounter cardiac failure during pregnancy in proportion as this burden on the cardiovascular system is increased.

Of this group of 495 patients with organic heart disease, seventy six or 15.3 per cent developed frank decompensation during pregnancy or labor. Primary postpartum decompensation did not occur in any of this group although six patients decompensated during labor. Seventy patients, or 92.1 per cent of decompensated cardiacs had their heart failure during pregnancy. In this group 47.8 per cent of the failures occurred during the seventh and eighth months of pregnancy. The incidence of cardiac decompensation during the various months of pregnancy and during labor is shown in Chart I.

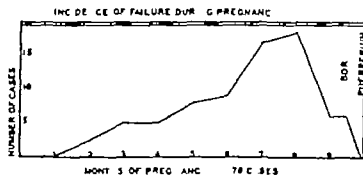


CHART I. Note the marked increase in failure during the seventh and eighth months of pregnancy.

### LENGTH OF LABOR

It has been commonly taught, and we have heard it repeatedly stated that patients with heart disease have easier and shorter labors than comparable normal patients. In explanation it was stated that the increased congestion of the cervix as a result of poor peripheral circulation produced abnormal softening, thus facilitating

\*From the Department of Obstetrics, Harvard Medical School, and the Boston Lying In Hospital.

We are greatly indebted to Drs. P. C. Irving and B. E. Hamilton for their permission to make this study and for their valuable assistance.

†Eades, M. F.—Physician to Out Patients, Boston Lying In Hospital. For records and addresses of authors see "This Week's Issue," page 1101.

ing easy dilatation In the recent literature, little is said regarding this matter Daly states that the labor is "usually shorter and less strenuous in cardiacs" He says further that "spontaneous labor and delivery is usually safe The labors are short and easy as a rule unless there is an obstetric complication "

Corwin, Herrick, Valentine, and Wilson in 196 cases of pregnancy and heart disease give an average first stage of labor as eleven and a half hours They state that these patients were delivered in order to shorten the second stage of labor, so the statistics for the short second stage show only the average duration of second stage labor before artificial termination MacLennan, in a series of thirty-eight cases of definite heart disease and pregnancy, noted an average duration of eight hours in primiparous and six hours in multiparous labors In our series 333 patients were delivered by the pelvic route Ninety-two were primiparae and 241 were multiparae The duration of labor was considered to extend from the first painful contraction until the birth of the placenta The duration of labor in this group is shown in Chart II According to Williams and to

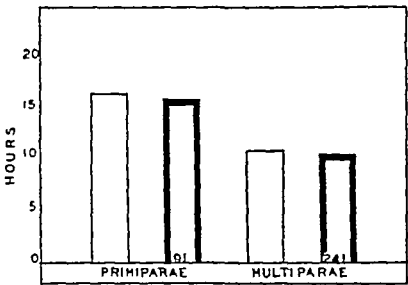


CHART II. Duration of labor in normal cases and in patients with organic heart disease The heavy columns represent the latter group

De Lee, the average duration of labor in normal primiparae is eighteen hours, and in multiparae twelve hours This series, as shown by the chart, shows no comparative shortening of labor in the cardiac group On the contrary since one half of this group had artificial termination of the second stage the average length of labor would, in this group, have been higher than the average normal

DELIVERY

Following the teaching of our cardiologist, the policy of this clinic has been to deliver cardiac patients by the easiest possible method from the standpoint of the mother Generally the plan has been to deliver all patients with compensated heart disease by the pelvic route if no obstetrical contraindication was present These patients were theoretically to be delivered at the end of the first stage of labor by low forceps in order to obviate the straining associated with the second stage of labor How unsuccessful we were in accomplishing this will be shown in a later chart Further, in this clinic, it is the rule that pregnant cardiac patients who had previously failed, were in failure, or had an indicative obstetrical complication, should be delivered by cesarean section This was based on the assumption that this method of delivery best conserved the interests of mother and baby We are aware that differences of opinion exist relative to this policy During the period this group of cases was observed, these policies have been carried out as stated, and we have no comparable series of previously decompensated or actual decompensated cardiac patients where pelvic delivery has been the method of choice

In this group of 495 cardiac patients, 333 or 67.3 per cent were delivered by the pelvic and 162 or 32.7 per cent by the abdominal route

Of the group delivered through the pelvis, it will be noted that 241 were multiparae, almost three times the number of primiparae so delivered It will also be noted that a very small fraction of patients in decompensation were delivered from below 1.8 per cent of the primiparae and 6.9 of the multiparae In those cardiac patients who were delivered by the pelvic route, it was the aim to eliminate the "bearing down" efforts of the patient by effecting delivery under full anesthesia at full dilatation of the cervical os This was thoroughly impressed both upon the house and visiting staff To our knowledge, constant, conscientious effort has been made to accomplish this How successful these efforts were is demonstrated by the fact that spontaneous deliveries occurred in 33.3 per cent of all cases (table 1) It is surprising to

TABLE 1  
PELVIC DELIVERIES WITH RELATION TO SECOND STAGE OF LABOR

	Multiparae		Primiparae		Total	
	Num-ber	Per Cent	Num-ber	Per Cent	Num-ber	Per Cent
Without Second Stage	69	28.2	52	56.52	121	36.33
With Second Stage Shortened	19	7.8	27	29.31	46	13.81
With Complete Second Stage	153	63.4	13	14.1	166	49.84
Total	241		92		333	

note that 63.4 per cent of the multiparae and 14.1 per cent of the primiparae were delivered with complete second stage of labor in spite of constant effort to eliminate it. Watson has reported an incidence of 45.5 per cent normal deliveries in 240 cardiac labors. It is easy to appreciate that in many multiparae the complete dilatation of the cervix is practically synchronous with the appearance of the head on the perineum. With the larger percentage of non-viable and premature infants following spontaneous premature labor in these serious cases of heart disease it is not surprising that there should be an increase of rapid second stage and of precipitate labors. In the primiparae this is somewhat more difficult to explain. Unfortunately in these groups we do not have the data on what percentage was nonviable or premature. These factors we feel go far in explanation of these apparent discrepancies in treatment.

It is probable that in certain instances the attendant may not have kept sufficiently close observations of the patient to anticipate full dilatation of the cervix. Parenthetically, we know of no way to conduct these labors, especially in multiparae, so as to insure delivery at full dilatation, except to be with the patient constantly once dilatation of the cervix begins. Depending on progress one should make preparations for delivery before full dilatation has been reached and not wait until this has occurred. Frequent rectal examinations should keep the observer informed as to progress. This elementary procedure is of utmost importance in conducting cardiac labors with a view to avoiding second stage labor.

#### METHODS OF DELIVERY

The methods of delivery in the 333 patients delivered through the pelvis are shown in Chart

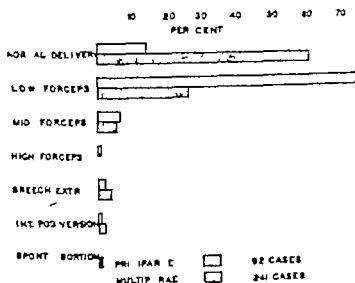


CHART III. Types of pelvic delivery of difficult operative procedures.

III The small number of difficult operative deliveries is to be noted. High forceps were used in only one instance. The total of mid forceps deliveries, twelve per cent, and relative

ly large percentage of low forceps deliveries represent an effort to deliver the patients at full dilatation in order to eliminate the second stage of labor. Drop ether was the anesthetic used almost entirely.

In the group of 162 cases, which was 32.7 per cent of the total number, thirty-five cases, or 21.5 per cent, of abdominal deliveries represent early termination of pregnancy by either hysterotomy or hysterectomy. The remainder were delivered by classical cesarean section under some form of local anesthesia or under drop ether when a general anesthetic was used. The classical type of cesarean section has been used because its technique is simple, rapid, and involves little disturbance of the viscera. Since the operation in this cardiac group is usually one of election, or when the patient has had little labor, the use of the classical operation has presented certain advantages, and in our opinion no increased risk over the lower segment type of operation.

#### STERILIZATION

Since definite organic heart disease does not improve but becomes worse with increasing age, and because it is common clinical knowledge that each pregnancy takes its toll of the already damaged heart, it is obvious that repeated pregnancies in such patients sooner or later lead to a medical impasse. We are not concerned here with the proper advice to the nulliparous patient with organic heart disease. In this clinic we advise sterilization to any patient whose heart has decompensated previously or decompensates during pregnancy or labor. This leaves a large group who must be conducted on their individual merits. In general, if the patient has a cesarean section as the easiest method of delivery because of a serious cardiac condition we feel that sterilization is also indicated. In those patients who are well compensated during their first pregnancies but who show increasing heart strain during subsequent ones, we are inclined to advise sterilization after two or three pregnancies when this is evident. In short, the cardiac patient after childbearing has occurred becomes of increasing social value to her family, and sterilization is advised to protect her life and health from the strain of possible future pregnancies.

Of the entire group of patients here studied, 117 or 35.6 per cent of the total group were sterilized. Thirty-six or 7.25 per cent aborted or were terminated early in pregnancy. As is shown in table 2, the majority were sterilized at the time of cesarean section. Sixty-nine women or 54.3 per cent of 127 deliveries by cesarean section were sterilized. It must be clearly understood that cesarean section was performed because of the heart disease primarily in the great majority of cases and sterilization was only an incidental operation performed at that time. We do not believe that

medical desire for sterilization is an indication for cesarean section. Those cases who were delivered through the pelvis and who consented to sterilization had this operation performed at a subsequent period varying from the second week of the puerperium to several months later. Vaginal sterilization was performed in a small series. The methods used consisted of hysterectomy of the early pregnant uterus, excision of the cornua, Pomeroy's method, and the operation devised by Irving. Complete data on the

TABLE 2  
CHART

Sterilization	Num- ber	Per Cent
During Cesarean	66	56.4
Early Hysterotomy	15	12.8
Early Hysterectomy	20	17.09
Cesarean and Hysterectomy	3	2.56
Following Low Forceps Delivery	5	4.27
Following Normal Delivery	7	5.88
Following Complete Abortion	1	.854
Total	117	

success of the various methods employed were not compiled.

#### MATERNAL MORTALITY

During the period of this study twenty-nine out of 530 cases died—a total gross mortality of 5.4 per cent. Six deaths occurred in undelivered patients and were not considered in this group. In the 495 *delivered* cases analyzed, twenty-three died, a mortality of 4.6 per cent. This mortality figure was applied to these delivered patients during their routine twenty-four day postpartum stay in the hospital. These mortality rates compare favorably with published statistics of recent years. Reid, in an analysis of 830 pregnant cardiac patients, found a mortality of 5.1 per cent. In the particular group of 500 cases studied by Hamilton and Carr, the mortality rate was 6.4 per cent. This is an average mortality rate which has diminished from a rate of twelve per cent twelve years ago to a rate of three per cent the last few years. As these authors point out, one must take into account that approximately one-half of the cases were referred into the hospital as emergencies and had not previously been under the care of the institution. In most cases there had been little prenatal care, and usually no medical supervision of the cardiac condition. This same situation obtained in the group which we have studied. In this clinic, we feel that even under these circumstances the major credit for the decrease in the mortality rate should go to the cardiologist. He has taught us that the great need of these patients is a restricted régime of living and rest. Of probably less importance is the knowledge gained by the ob-

stetrician in handling these patients. Careful individualization of delivery of methods and of anesthetics is necessary. We are not convinced that anyone can state arbitrarily which is the easiest method of delivery. Sterilization of all serious cardiac patients has undoubtedly diminished the percentage of cases in failure and indirectly the mortality rate. It has diminished the number of severe cardiac patients who would have repeated pregnancies until failure and death occurred. We feel that this matter is one of some importance.

The relative incidence of death with or without failure in patients delivered by pelvic and by abdominal methods is shown below (Table 3). In those patients who had cardiac fail-

TABLE 3

Maternal Deaths	Num ber	Per Cent
Pelvic Delivery without Failure	6	26
Pelvic Delivery with Failure	5	21.7
Abdominal Delivery without Failure	4	17.3
Abdominal Delivery with Failure	8	34.7
Total	23	

ure, eight deaths, 34.7 per cent of the mortality group, occurred in abdominal deliveries, and five, 21.7 per cent, in the pelvic deliveries. This does not mean that abdominal delivery per se carries this increased mortality rate, as the most serious cases were electively delivered by this method. This group would have carried a higher mortality rate by any method of delivery. The factor of failure at the time of delivery did not seem to have increased the mortality risk to a great extent. Of the twenty-three deaths, it will be noted ten patients, 43.3 per cent, who died were not in failure at the time of delivery.

Of those patients not in failure, six patients, twenty-six per cent, delivered through the pelvis, died, as opposed to four, 17.3 per cent, in which abdominal delivery was used.

#### SUMMARY

1. A series of 495 patients with rheumatic heart disease complicated by pregnancy has been analyzed.
2. Ninety-two per cent of the cardiac failures occurred during pregnancy.
3. Forty-seven per cent of the failures occurred in the seventh and eighth months of pregnancy. If a pregnant cardiac patient is able to go through the eighth month of pregnancy without failure, her chance of decompensation with proper care during the ninth month or during delivery should be relatively small.
4. We were unable to demonstrate in this series of cases that the cardiac patient has any *shorter* or *easier* labor than the normal woman.

5 Sixty seven and three-tenths per cent of these patients were delivered by the pelvic and 32.7 per cent by abdominal route. The majority of patients in actual decompensation had abdominal deliveries. In spite of our attempts to obviate the second stage of labor 63.4 per cent of the multiparae and 14.1 per cent of the primiparae were delivered normally an incidence of 49.8 per cent of normal deliveries for the entire group.

6 The low incidence of difficult pelvic deliveries is to be noted, also the increased incidence of easy artificial termination in an effort to obviate the second stage of labor.

7 Sterilization was performed in 23.6 per cent of the cardiac cases.

8 In the 495 cases here studied, the mortality rate was 4.6 per cent.

9 The incidence of mortality was little higher in patients delivered in failure than in those without.

10 The importance of treating the pregnant

cardiac patient primarily as a medical problem and secondarily as an obstetrical problem is emphasized.

## REFERENCES

1. Carr, F. B. and Hamilton, B. E.: Five hundred women with various heart diseases followed through pregnancy and delivery. *Am. J. Obst. & Gynec.* 25: 224 1933.
2. Watson, B. P.: (Discussion.) *Am. J. Obst. & Gynec.* 25: 227 1933.
3. Neubauer, W.: Determination of blood volume before, during and after delivery. *Deutsche med. Wchnschr.* 49: 520 1924.
4. Rowntree, L. G. and Brown, G. E.: Studies in blood volume with the dye method. *Ann. Int. Med.* 1: 580 1917 38.
5. Stander, H. J., Duncan, D. E. and Blason, W. E.: Heart output during pregnancy. *Am. J. Obst. & Gynec.* 11: 41 1924.
6. Daly, P. A.: Heart disease in pregnancy. *Illinois M. J.* 57: 205 1929.
7. Corwin, J., Herrick, W. W., Valentine, M., and Wilson, J. M.: Pregnancy and heart disease: a statistical report and summary of 186 cases. *Am. J. Obst. & Gynec.* 13: 617 1917.
8. MacLennan, H. R.: A consideration of the treatment of pregnancy complicated by cardiac disease. *J. Obst. & Gynec. Brit. Emp.* 40: 251 1933.
9. Williams, J. W.: *Obstetrics: A textbook for the use of students and practitioners.* Sixth Edition. New York and London: D. Appleton and Co. p. 222, 1930.
10. De Lee, J. B.: *Principles and Practice of Obstetrics.* Fourth Edition. Philadelphia: W. B. Saunders Co., p. 138, 1925.
11. Reid, William: The prognosis of heart disease in pregnancy. *Am. J. Obst. & Gynec.* 19: 63 1930.
12. Hamilton, B. E. and Kellogg, F. S.: Observations on heart disease complicating pregnancy. *Am. J. Obst. & Gynec.* 13: 525 1917.
13. Newell, F. S.: The treatment of pregnancy and labor complicated by cardiac disease. *Am. J. Obst. & Gynec.* 1: 179 1920-31.

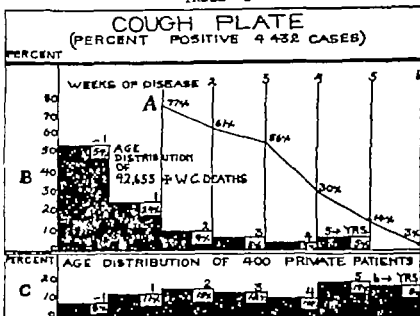
## WHOOPIING COUGH AND ITS PREVENTION\*

BY LOUIS SAUER, M.D.†

THE Cutter Lecture in Preventive Medicine by Madsen<sup>1</sup> a decade ago, inspired American students of the pertussis problem. The first paper on the Danish cough plate method of early diagnosis to appear in this country was that of Lawson and Mueller<sup>2</sup> who wrote "During the winter and spring of 1925-6 the Commission for the Study of Whooping Cough studied the disease at the On Shore Department of the Boston Floating Hospital." They concluded "The method has a wider range of usefulness than was at first expected. Carriers, second cases, and suspected cases in which the patient never whoops, all of which would otherwise remain undetected, may be diagnosed by bacteriologic studies. During the catarrhal stage positive cultures may be obtained with considerable regularity. As the disease progresses, there is a coincident decline in the percent age of positive cultures." This aid in early diagnosis, discovered by Chievtz and Meyer has been in use at the Evanston Hospital since 1925, plates have been exposed to about 500 private pertussis patients. Late in 1932 the Michigan State Department of Health chiefly through the efforts of Doctor Kendrick and Miss Eldering<sup>3</sup>, made the cough plate method of early diagnosis available to the physicians of Grand Rapids and Lansing. In less than two

years over a hundred Michigan physicians have had local health department technicians expose plates to more than a thousand children with suspicious coughs. Table 1, A, gives the per

TABLE 1



centage of positive cough plates in 4,432 collected cases. The earlier that plates are exposed, the more likely will they be found positive. Negative plates do not exclude the disease. The surface of the medium should be cherry red smooth and moist the technician entrusted with the exposure and subsequent examination of incubated plates, should be familiar with the vagaries of *B. pertussis* colonies and stained

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smears Erroneous laboratory reports bring this valuable laboratory aid into unwarranted disrepute Over a score of original papers on the Danish cough plate method of early diagnosis have appeared in this country since Madsen acquainted us with it

The Danish State Serum Institute pertussis vaccine contains, since 1916, approximately 10,000 million bacilli per cubic centimeter To this day they recommend 0.5, 0.7, and 1 cc at three to five-day intervals, a total of 2.2 cc In all, 2700 Danish and Faroe Islands patients had been injected up to 1924 Madsen said "No absolutely sure prophylactic effect was obtained three hundred and sixty-four children were vaccinated, one to three months before being exposed, in spite of this they all, without exception, caught whooping cough" He concluded "Shall we do away with whooping cough entirely? Of course that is our future ideal."

Von Sholly, Blum and Smith<sup>4</sup> of the Bureau of Laboratories of the New York City Health Department, in a critique on pertussis vaccine, warn against drawing conclusions about pertussis vaccine, without making a critical comparison with control cases They point out that members of the same family, ill with whooping cough at the same time, have the disease in varying severity, some escape entirely The personal equation of the examiner must also be reckoned with Many mothers are anxious to please the physician, others exaggerate, hoping for better treatment, or, they lessen symptoms so that the quarantine will be shortened Control cases were injected with B influenzae vaccine or with diluted milk. In recording results, the investigators did not know with which preparation the child had been injected In summary they state "Of the children exposed to whooping cough in their immediate family, 19 received injections of influenzae vaccine, and 30, injections of pertussis vaccine, none developed characteristic pertussis Of 700 exposed children in 243 families, 174 (24.8 per cent) escaped" The shortest course was in unvaccinated controls, or in children injected with diluted milk. They conclude "More critical observations with controls for comparison must be made before the case can be made out for the curative and prophylactic value of a specific pertussis vaccine" The ages of the children who escaped are not mentioned, nor do they give the basis on which a diagnosis of whooping cough was made

Convinced of the inefficacy of commercial pertussis vaccine, it had been discontinued several years before Madsen's paper appeared. Although the Danish results, with a total of 2.2 cc of their potent vaccine, were not very striking, we began to make pertussis vaccine at the Evanston Hospital in 1925 Because Miss Hambrecht had noted that the hemolytic zone was usually

more pronounced in colonies recently isolated by the aid of the cough plate, five to seven such fresh strains were used each time that vaccine was made Our culture medium has always been made with human blood, as we planned to give larger doses, and wanted a vaccine free from unnecessary hazards To carry over as little of the culture medium as possible, the growth was scraped off Made without alien blood, it was not necessary to "wash" this vaccine, whereby soluble antigen might be discarded The vaccine contains no alien protein, formaldehyde or other denaturizing agent It is refrigerated until used. Neither in the Cutter Lecture, nor in the writings of Chievitz and Meyer<sup>5</sup> is the age of the strains used in vaccine production, mentioned\*

Between 1925-8, a hundred private pertussis patients (and definitely exposed nonimmunes) were given a total of 2 cc to 5 cc, divided into three doses, and injected at three or four-day intervals Such data as stage of the disease, age, season, hygienic care, duration, severity and complications were recorded At the same time, similar data were kept on a hundred untreated pertussis patients The percentage of mild (30 per cent), average (50 per cent), and severe (20 per cent) cases, in the injected and noninjected groups, were about alike We concluded "Such variation in the severity of the disease in the vaccinated and the unvaccinated makes it difficult to evaluate vaccine therapy The simultaneous occurrence of mild and severe whooping cough in families who received the vaccine, and in the institutions in which no vaccine was given, indicates that the course is more dependent on the immunity response of the individual and his ability to resist secondary infections than on the virulence of the strain or the influence of vaccine The high mortality during infancy, when the morbidity rate is relatively low, because of lack of exposure, is primarily due to the infant's inability to ward off secondary infections Aside from the age, other subjective factors, such as the previous health, nutritional state, appetite and stability of the central nervous system, seem to influence this immunity response External factors, such as the season of the year, the food, exposure to secondary infections (colds, influenza, enteritis), and nursing care, are equally important Infants and young children should have aseptic nursing, to prevent secondary infections"

From what was known about the prevention

\*Madsen<sup>6</sup> recently wrote that the Danish vaccine is being made from fresh strains and Miller<sup>7</sup> stated last year that the State Serum Institute vaccine is made from strains isolated within the three previous weeks (obviously such a polyvalent vaccine can only be prepared at a Cough Plate Diagnostic Station) Their strains are kept on B-G medium until inoculated on "vaccine medium (3 parts nutrient calf agar 2 parts potato glycerin agar and 2 parts defibrinated horse blood) The three day growth is washed into 1 per cent formalin (0.4 per cent formaldehyde solution in physiological sodium chloride) after a week it is centrifuged and resuspended in 0.5 per cent phenol in physiologic sodium chloride and standardized to 10,000 million bacteria per cubic centimeter

of typhoid fever by the injection of potent typhoid vaccine, it seemed logical that our antigen might actively immunize infants and young children, if injected in sufficient amount sufficiently long before actual exposure occurred. Since 1928, a total of 8 cc. has been given as an immunizing agent. Nonexposed, nonimmune older infants and young children were chosen. The first 394 were selected private patients whose past medical histories were accurately known since infancy. Families with, also older or younger nonimmune children (controls) were given preference. To produce minimal local and systemic reactions, the first 109 children were given 1 cc. weekly (in alternate arms) for eight successive weeks. Then, for about a year 1 cc. was injected, simultaneously in each arm for four successive weeks. Since 1931, the vaccine has been injected as follows: one cubic centimeter is injected just under the skin in the deltoid region of each arm, one week later 15 cc. is injected in the biceps region of each arm, one week thereafter 15 cc. is injected in the triceps region of each arm. Syringes and needles are sterilized by heat (oven at 250°F for 1 hour), the rubber cap of the vaccine vial, and the skin at the site of the injection are briskly rubbed with sterile gauze or cotton saturated with alcohol. More than 11 000 individual injections have been given by me without a vesicle, pustule, infection or scar at the site of injection. Each mother is told just before or after each injection that nothing should be applied locally. Reactions are chiefly local although a transient rise in temperature may occur within four to thirty-six hours after an injection. No local or systemic reaction has been sufficiently severe to postpone a subsequent injection. The local tenderness, redness and in duration do not always occur, they are usually absent in young infants. The peak is usually reached within twenty-four hours in some instances a small, circumscribed, residual induration of the skin or a subcutaneous nodule may be palpable for a few weeks. The latter is rarely as large or persistent as that following alum toxoid injections. Reassurance by the physician when an injection is given allays unnecessary apprehension for the same reason the mother is requested not to take the child's temperature. Should the child feel feverish or indisposed, it is advisable to keep him quiet and to reduce or omit the next meal. As a rule, the younger the child the more likely will there be no local or systemic reaction. We have not encountered any reaction as severe as the mildest smallpox vaccination. When the vaccine is properly administered no untoward effect should occur. This vaccine, devoid of alien protein, will not sensitize, nor will it cause anaphylactic reactions, serum sickness or the Arthus phenomenon. As the reactions have not been severe, attempts to

detoxify the antigen seem superfluous, and might lessen its immunizing qualities. Should a severe reaction follow an injection, the subsequent injection might be postponed a few days, or, it might be better to give only 1 cc. in each arm the next week, with an extra, bilateral injection a week after the third, until a total of 8 cc. has been given.

During the first few years, white cell blood counts and differential white cell blood counts were made before the first injection, and at the time of the last injection. In over 60 per cent of the latter, the counts ranged from 12,000 to 15,000 per cubic millimeter, in several it exceeded 25 000, in about 15 per cent, no increase was noted. In most instances the rise was due to an increase in the number of small lymphocytes in the circulation. In some, the total lymphocytes exceeded 80 per cent. This vaccine, therefore, not infrequently influences the blood picture as does the disease.

Table 2 forms the basis of proof that 8 cc.

(Exposure 4 months to 7 years after injection)				
Vaccine	Num- ber in- ject- ed	Ex- posure in Fam- ily	Ex- posure in Casual	Failures
8 cc. Evanston Vac 1928-32	394	27	124	1 (abortive) injected after measles
8 cc. Approved Vac. No 1 1932	612	35	28	5 (3 injected after measles)
8 cc. Approved Vac. No 2 1934-	203	—	—	—
Total	1209	62	152	6
6 cc. Approved Vac. Neonatal 1932-4 (Cradle) Infants	400	2	4	4 (all mild)

\*Ninety per cent of injected children did not contract pertussis when exposed.

of the vaccine confers immunity in a very high percentage of nonimmunes. The average age of the 1609 children at the time of injection was about eleven months. About two-thirds of them were less than two years of age, only 166 were over four years (mostly kindergartners). To determine whether the very young infants can elaborate active immunity from the vaccine 400 homeless ("Cradle") infants (average age six weeks) received a total of 6 cc. of an ap



proved vaccine Reactions were usually absent Four of the six, exposed more than four months later (subsequent to their legal adoption), contracted mild pertussis, two escaped Each infant is now given the customary total dosage of 8 cc In the course of years, definite information should be available in regard to the earliest age at which immunization against pertussis should be attempted

In seven years, twenty-seven of the 394 children injected with vaccine made at the Evanston Hospital, were intimately exposed for weeks to their brothers or sisters (controls) who had unquestionable whooping cough All but one escaped, the latter contracted it in aborted form, about four months after the injections,

less remain unexplained, i e , for unknown reasons some children fail to develop an immunity It is possible that children of four or more years, or very fat children, may require more than a total of 8 cc To date, none of the 203 children, injected with approved vaccine No 2, have been exposed

Casual (accidental or transient) exposures (see table 2) are seldom very intimate When an injected child escapes after such an exposure, it might be questionable whether the patient disseminated Bordet-Gengou bacilli at the moment of contact, also, whether the injected child actually aspirated bacilli at the time of the presumed exposure The six failures include all injected children who contracted the

TABLE 3

Name	Father	Immunizations	
Address		Phone	
Age			
Pertuss Vac	Diph Tox or AT	Smallpox	Scarlet Fever Tox
Dates			
1			
2			
3			
Make			
Exposure Dates	Schick Test	Scar	Dick Test
Familial			
Casual			
Results			

she had just recovered from measles when the vaccine was given In the course of two years, thirty-five of the 612 children, injected with approved vaccine 1\*, were intimately exposed to their brothers or sisters (controls), who had unquestionable whooping cough All but five escaped, two of the latter had just recovered from measles when the vaccine was given Three of the six failures (50 per cent) occurred in children who were injected very soon after recovery from measles There may exist a causal relationship in the inability to develop active immunity from the vaccine when it is given soon after other diseases, e g , measles One should try to ascertain the underlying cause of any failure The vaccine should be refrigerated, because room temperature accelerates chemical change, and weakens the immunizing fraction of the antigen Syringes should not be sterilized with alcohol The vaccine should not be given soon after or shortly before any other immunization Some failures will doubt-

disease from four months to seven years after the injections, regardless of whether the source of the infection was in the family or otherwise. The percentage of failures (10 per cent) is computed from a total of sixty-two familial exposures and a total of six failures (three from casual exposure) Therefore, ninety per cent of the injected children did not contract pertussis when intimately exposed The casually exposed children who escaped, are not included in the computation

Indisputable evidence, proving the efficacy of the Evanston vaccine as an immunizing agent, was brought by Macdonald and Macdonald<sup>10</sup>, in 1933 They reported four plus complement fixation reactions about nine months after a total of about 8 cc of the vaccine had been injected into two of their four nonimmune sons Five months after injection, the four boys were inoculated with living pertussis bacilli, the immunized failed to contract the disease They were then most intimately exposed to pertussis when it developed in their non-injected, inoculated brothers After recovery from typical pertussis, the complement fixation reactions of the latter were, likewise, four plus positive

\*Two reputable biological laboratories now make the vaccine according to our detailed specifications We supply them with freshly isolated strains each month They grow the bacilli on medium enriched with human blood That these approved vaccines should be kept in a refrigerator has been repeatedly stressed

Which of the four immunizations, smallpox, diphtheria, scarlet fever, whooping cough, should be given first? Whooping cough now causes more deaths of infants than do the other three diseases. The age distribution of 42 655 pertussis deaths in the United States in four consecutive years is shown in table 1 B. Over half occurred during the first year of life. The age distribution of 400 consecutive private pertussis patients is shown in table 1, C. Over a third occurred during the first three years of life. The six private pertussis patients who died in the last fifteen years, were infants. Furthermore, on account of the greater prevalence of whooping cough, it seems rational to give the pertussis immunization first. The following immunization schedule, used for several years, has been found practical. To immunize first against whooping cough (at seven to twelve months), four months later, against diphtheria (with toxoid or alum toxoid). When the Schick test is performed and found negative smallpox vaccination is performed; scarlet fever immunization may be completed before nursery school or kindergarten attendance (table 3).

#### CONCLUSIONS

A total of 8 cc of an especially prepared and refrigerated B. pertussis vaccine (1 cc — 10,000 million bacilli) divided into three, bi-lateral, weekly, subcutaneous injections, should confer prolonged immunity in a high percentage of young nonimmune children, if administered at least four months before exposure. The best age for pertussis immunization is between the seventh and twelfth months of life.

#### REFERENCES

1. Madsen, T. Whooping cough: its bacteriology, diagnosis, prevention and treatment. Boston M. and S. J. 1921: 40 1925
2. Lawson, G. M. and Mueller, M. Bacteriology of whooping cough. J. A. M. A. 89: 275 1927
3. Kendrick, F., and Eldering, G. Significance of bacteriological methods in diagnosis and control of whooping cough. Am. J. Pub. Health 25: 147 1935
4. Von Sholly, A., Blum, J. and Smith, L. The therapeutic value of pertussis vaccine in whooping cough. J. A. M. A. 63: 1481 1917
5. Chierici, L. and Meyer, A. Weitere Untersuchungen über den Keuchhusten, nebst einer Methode zur Frühdiagnose der Krankheit. Arch. f. Kinderh. 66: 186 1918
6. Madsen, T. Vaccination against whooping cough. J. A. M. A. 101: 187 1913
7. Miller, J. J. Experimental observations on antigenic potency of B. pertussis extract. J. Immunol. 25: 47 1934
8. Sauer, L., and Hambrecht, L. Whooping cough vaccine in early diagnosis. J. A. M. A. 91: 1863 1928
9. Sauer, L. Whooping cough, study in immunization. J. A. M. A. 106: 29 1932
10. Macdonald, H., and Macdonald, E. Experimental pertussis. J. Infect. Dis. 25: 225 1922

#### DISCUSSION

DR. PLATT. I have enjoyed this personal account of Dr. Sauer's as much as anything I have heard recently. I think probably the majority of men working with children feel the same way. The merits of the results I think appeal to me more because in the past the results we have obtained and which various others have obtained have made me doubt

ful of the value of vaccine in the disease. I have noticed one striking thing in conversation with my fellow men and I think I understand the reason. The majority of the men I have seen have been very enthusiastic about giving whooping-cough vaccine and quite a number have advised against immunization for scarlet fever. I think the charm of Dr. Sauer's work accounts for that very readily.

Dr. Norton recently in a paper before the Bacteriological Club reported some results with tubercle bacillus in young rats. He found he could not produce any antibodies at all, but in inoculating old rats the antibodies showed in the usual way. He gave another group of young rats of the same age some of the hormones they have in their laboratory and inoculated these young rats again and found that they produced the same immunity reaction as the old rats.

It has been well known that very young babies do not respond very well to many forms of immunization. This clue which Dr. Norton found opens up the possibility of immunizing babies at a very early age.

I should like to know just what age Dr. Sauer recommends for the beginning of whooping-cough vaccine and how late in age he still advises vaccination.

DR. SAUER. Whooping-cough vaccination should be given early—preferably at six to eight months. We have done relatively few after the third year of life.

In children of five or six years more than 8 cc are needed. We inoculated four children—the eldest, a fat girl contracted pertussis a year later, the other three (younger) children did not get the disease.

It is best not to give the vaccine as an immunizing agent soon after any contagious disease. Pertussis is more prevalent than diphtheria, therefore we give the vaccine earlier.

DR. CHADWICK. I have been very much interested in Dr. Sauer's discussion.

Diphtheria is well controlled and scarlet fever is mild and therefore whooping cough leads all the other diseases except tuberculosis in the young age group. So if we can have some method of immunization it will be of extremely great value. I have been watching the progress of this work which Dr. Sauer has been doing, hoping that we would soon have data enough to consider making vaccine available to the physicians in the state. It is about time we began to think seriously of doing something.

DR. HOFFEL. The treatment of pertussis by the use of vaccine has been of great interest to me as a result of my experience in 1928 with an epidemic of this disease in the New England Peabody Home and my subsequent observations in private practice.

The epidemic at the Peabody Home convinced me that the use of vaccine for prophylactic and therapeutic purposes in whooping cough was of great value. Dr. Sauer and many other observers have arrived at the same conclusion following similar experience with the vaccine as originally prepared.

However in spite of the predominant evidence against the value of this form of treatment it is still being used by the physicians of this community. They say with chagrin that the public demands its use and therefore they must comply. This emphasizes the great importance of medical publicity with regard to public health measures of education. Lay persons cannot be blamed for they were led to believe that vaccine therapy was beneficial by the profession who had accepted the

reports in the current literature based on data of a statistical nature. Many of us are now convinced that these statistics led us into error.

Being a skeptic, and with the thought in mind that Dr Sauer's present contribution, based as it is on statistical rather than biological proof, harbors the same danger, I am prompted to discuss some data that might serve to restrain our enthusiasm until the time when greater evidence is obtained for or against its general adoption.

I feel very strongly that before the public and the medical profession should again be encouraged to believe that an efficient vaccine has been obtained, the evidence should be carefully scrutinized. In this connection, I wish to comment briefly on a few points concerning whooping cough that have fortified me in my stand up to the present time, against the use of all vaccines including Dr Sauer's "immunizing agent."

In the Peabody Home epidemic the following facts stood out:

1. The freshly prepared so-called "Floating Hospital Vaccine," probably identical with various commercial vaccines now in use, had no beneficial effect.

2. A great difference existed in the susceptibility of various children to whooping cough, 80 per cent of the patients taking the disease following their first exposure a few weeks after the onset of the epidemic. Two of them did not contract the disease until after three and four months, respectively, of continuous exposure.

3. It proved that 59 per cent of the susceptible children in the control group even though exposed to the disease consistently for four months resisted infection. Therefore, we must recognize that the transmissibility of this infection is very uncertain and freakish.

In seeking further evidence on susceptibility, and especially the incidence of pertussis in the age group that we would like to protect, I studied the case histories of 500 consecutive private patients and 500 records of children attending the Buckingham School, a private day school in Cambridge.

In both groups the incidence of whooping cough infection under three years of age was 9 per cent. An average of 75 per cent of these children became infected from exposure to older children in the family.

We all admit that this group of 9 per cent of the children under three years of age should be protected if possible. Are we justified at the present time to take the remaining 90 per cent of young children and subject them to universal vaccination without more adequate proof that this procedure is justified?

I have briefly reviewed these data to bring out the fact that the behavior of this infection is likely to be very elusive, especially when we consider its transmissibility, incidence, and finally when we attempt to estimate the value of a prophylactic or therapeutic measure on the basis of a statistical criterion only.

DR SAUER: The 20 per cent that escaped is close to the 24 per cent found by Von Sholly, Blum and Smith. My own experience does not make the percentage so high. As far as the age and the failures are concerned—one child was about four. Of the remaining five, two were six and seven years of age.

The mother was anxious to have them inoculated. Another was the fat girl where the three other children in the family escaped, and the other two failures were between four and five years old when injected.

DR DENNY: We have inoculated about one hundred children in Brookline.

DR MORSE: If I am alive five years from now I shall say what I think.

DR FITZGERALD: A few months ago I gave prophylactic doses of whooping cough vaccine to two children in one family. This morning I received a telephone call from the mother, who reported that both children were coughing and that one had a definite paroxysmal cough. I feel that anybody using the vaccine should be guarded about what he tells his patients.

DR TEFFT: Is there any real evidence that pertussis vaccine and toxoid given at the same time result in less immunity response for either one?

DR SAUER: I have never tried any other way than the method I have outlined. As prolonged immunity is desirable it seems advisable to give no other immunizations until the immunity resulting from the vaccine has reached its peak. As a rule, immunity is completed in four months and should last for years. Failures are not frequent, but they do occur. Either the specific bacterial antigen had lost its potency before it was injected, or the individual lacked the power to develop prolonged immunity. As it is rarely, if ever, necessary to crowd the various immunization procedures, the vaccine should not be given within several months after other immunizations, nor should such other procedures follow within four months of the vaccine. I hope in five years from now we can convince Dr Morse.

DR GOLDMAN: What is the effect of freezing the vaccine?

DR SAUER: The effect of freezing is that the vaccine separates as a gelatinous mass when it is thawed out.

A PHYSICIAN: What commercial houses are approved by Dr Sauer for the manufacture of his own vaccine?

DR SAUER (Naming one): That is one of the two approved vaccines.

A PHYSICIAN: When the course is interrupted by a disease, do you start all over again?

DR SAUER: If the interval is more than two weeks, it is advisable to start all over again.

DR WINOGRAD: How sensitive is this vaccine to being carried around? How can this get to the practitioner, going through the mail for several days? Will this affect the vaccine?

DR SAUER: This vaccine is probably not quite so sensitive to warm temperatures as is smallpox vaccine. To keep the cost down, it is not refrigerated while in transit. Jobbers and druggists, however, are requested to refrigerate it promptly, and to keep it refrigerated. Physicians should not inject any of the vaccine if it has not been kept cold. Unused portions should be returned to the refrigerator promptly. It should never be carried around in the physician's bag.

## A MODIFIED TECHNIQUE FOR THE STEREOSCOPIC EXAMINATION OF THE SKULL BY X RAY\*

BY Z. WILLIAM COLSON, M.D.†

IMAGINE that you are viewing a skull made of semi transparent celluloid. For the most accurate observation you will not attempt to study it a yard away. You will take it in your hand and look at it at reading distance say fifteen inches.

Should one attempt to view ordinary stereoscopic films at close range the object would be considerably distorted. This would be true even though the interpupillary shift of the x ray tube were proportionately increased to correspond to the angle of disparateness of the two observing eyes. In the latter case there is only one plane without distortion and that is the horizontal plane at the level of the eyes. When one looks up or down, distortion is apparent in all planes, and this distortion increases in proportion to the difference of the distance from the eyes to the apparent stereoscopic image and the distance from tube to object when the stereograms were taken. In order to make the

stereoscope. The stereoscopic image of the skull does not appear to be 30 inches from the observer, but at just one-half that distance. In this case the proper angle of disparateness is that for 15 inches. Under these conditions each view of the skull is enlarged to double its normal size and each single negative seems enormously distorted. However when these two films are put into the stereoscope the image seems 15 inches away, of normal size and there is no distortion. Of course, under such conditions the stereoscopic image is not so clean cut as when the films are placed closer to the skull.

It becomes increasingly important in close x ray work that the angles the tube makes with the films when the x rays are taken be exactly the same angles that the line of vision of the two eyes makes with the negatives when they are viewed in the stereoscope. The following figure exaggerates these angles to show the point.

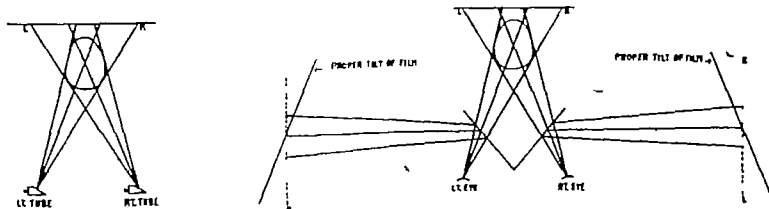


FIG. 1.

stereoscopic image free from distortion in all planes, it is necessary, in making the film exposure, to have the target of the x ray tube at the exact distance from the film that the eyes will assume on viewing the image, and the angle of disparateness that which the eyes would subtend at the target object distance.

It is important in this connection, that one does not confuse the distance from target to object with that from target to film. The unified stereoscopic image will appear to be closer to the observer than the actual positions of the films from which this image is built.

Thus, if skull stereograms were taken at a distance of 15 inches from the center of the skull to x ray target and the films were placed a like distance beyond the center of the skull, the negatives should be placed at a 30 inch distance from the eyes when adjusted in the

stereoscope. Since it is a nuisance to be obliged to measure angles accurately every time the negatives are placed in the stereoscope, it occurred to me that this procedure could be obviated by mounting the films at a right angle to the central line from the x ray in both stereoscopic positions.

One way of doing this would be to mount the tube and film carrier on either end of a pivoting arm with the subject immobilized directly under the axis, thus—

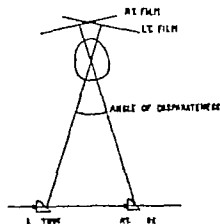


FIG. 2.

Acknowledgment is made to Dr. Harris P. Mosher of the Massachusetts Eye and Ear Infirmary for the use of his laboratory facilities, and to Dr. A. B. MacMillan, Roentgenologist, for his helpful collaboration.  
From the Howe Laboratory of Ophthalmology  
†Colson, Z. William—Clinical Assistant in Ophthalmology  
Massachusetts Eye and Ear Infirmary. For record and address of author see "This Week's Issue," page 1191.

The same thing can be accomplished in a less cumbersome manner by keeping the tube and film holder stationary and rotating the skull through the angle of disparateness required for the given tube-object distance, thus

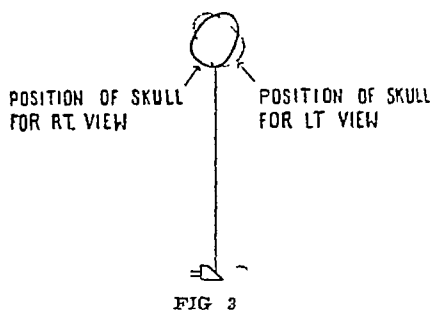


FIG 3

The first piece of apparatus constructed for this work was a chair with a rigid adjustable post which held an arm with the rotating disc and its projecting skull supports over the patient's head. While satisfactory stereograms were made with the patient in this position, some type of cassette holder was necessary to secure the film in its proper position, and any new setting of distance from skull to film was more or less awkward.

A later piece of apparatus is the more conventional box with slanting top. From the back of this extends a rigid adjustable arm which supports the rotating disc. The latter apparatus is more convenient to handle, can be stored away in less space, and is much simpler to construct.\*

The rotating disc is slotted so that it can be attached eccentrically to the axis. This allows the point of maximum clinical value in the skull to be placed approximately in the center of rotation, which appears, from my lay observations, to give more perfect stereopsis to that part.

In viewing stereoscopic films one should be very careful in the placement of diaphragms or any other device to limit the viewing aperture to the size of the film used. If the margins are not exactly placed in proper relation to the films, the observer is likely to fix on the margins and this will break the film stereopsis. Lettering should not be placed on both films in anywhere near the same relative position, as this tends to confuse and may even destroy stereopsis. Also for this reason one should be liberal in choosing oversized films, because the film edges may likewise interfere with proper depth perception.

This technique cannot be applied to stereoscopy of the cervical spine, as the vertebrae do not rotate to the same excursion as the skull and this gives a flat effect to the cervical column.

Since the roentgenologist is not interested in perfect stereopsis so much as in relative position of various structures, it was thought that he might find it feasible to make exposures at greater target distance for better definition and to rotate the skull through the larger disparate angle employed in close stereopsis. Stereograms were taken at a six foot distance and the proper disparate angles for 30, 20, and 15 inches were employed. At first glance these films seemed to show good depth, but on closely observing details the distortion was so great as to make the apparently good films entirely misleading. For instance, bobbie pins worn by the subject appeared to be embedded in the skull and the middle meningeal artery seemed to rise almost vertically from the posterior ethmoid area.

This brings us back to the point already made that for proper stereopsis without distortion it is essential that there is no disproportion between the distance from the tube to object and the angle of disparateness.

It is the usual practice to place the object of interest as close as possible to the x-ray film to give more clean cut definition to the shadow it casts. On the other hand, when one is concerned with three dimensions, as in stereopsis, he desires structures farther removed from the film to have more value. Thus, should a skull be placed half way between the x-ray tube and the film, the x-ray shadow would be twice the size of the skull and the anatomical relationships would be considerably distorted—the definition would be hazy. On the other hand, the relative shadow value of structures nearer the film and those nearer the tube would be more nearly the same. If stereograms are taken with this technique, there is considerably more uniform value to all the structures in the skull and the distortion and magnification, which would make the films worthless if viewed singly, make all the skull structures stand out in their normal relationship and actual size when the two films are combined stereoscopically.

In a recent article Verhoeff<sup>1</sup> has demonstrated quite conclusively that in stereoscopic vision we do not fuse the two images in the commonly accepted sense of the term. In general words, we see the object with the eye in which the image of the object has the higher attention-value, while the other eye aids in placing the object. He has shown even further with stereoscopic drawings that images of unequal attention-value alternated in various portions of the stereoscopic field will be seen exclusively by the eye to which their attention is drawn. This is done simultaneously in various portions of the field so that the right eye may be dominant in certain areas while the left may be dominant in others. Thus, according to Verhoeff's theory a stereoscopic image is made up of a fine mosaic,

\*Should one desire this piece of apparatus it can be obtained from the Crompton Machine Company, Lawrence, Massachusetts.

each unit of which is supplied by one eye only (and placed by the other eye) while the proportion of units supplied by the two eyes is subject to many and varying factors. Both eyes contribute to the proper placement of points in space, although the image of each point is perceived by only one eye at a time.

It would appear from Verhoeff's work that if it were possible to combine a close film made for clear definition with a distant film made for better depth the stereoscopic image would be seen by the eye which observes the clear-cut shadows of the close film and placed in normal relation as to depth by means of the eye which observes the larger shadows of the more distantly placed film. The combining of these two different sized images is made possible by viewing each negative in the stereoscope at the respective target film distances employed when the x rays were taken.

Film pairs have been made in which one close film, taken for clearness, was combined stereoscopically with a larger distant film. To my eye, unpracticed in x ray examinations, the stereoscopic image of the different sized films

could not be distinguished from that of a pair of same sized films. The possible practical value of such an arrangement can best be judged by clinical roentgenologists.

It can also be inferred from Verhoeff's work that it is better, in stereoscopic practice, to take one of the exposures at the angle which would give the best single film view of the anatomical structures in question, letting the angle of the second view fall where it will. Thus at least one film will be ideal as a single plate and the second film will merely place it in proper depth.

An immediate objection which may be raised to this close x ray technique is the gross distortion of the individual radiographs. It is true that, viewed as single plates, they are worth less. It is thus very distortion, however, which gives the true stereoscopic depth in all planes. In fact the single view distortion is an absolute requisite of undistorted near point stereoscopy.

## REFERENCE

- I. Verhoeff, P. H.: A new theory of binocular vision. Arch. Ophth. 13: 151 (Feb.) 1925.

## THE NATIONAL FORMULARY SIXTH EDITION

The American Pharmaceutical Association announces that its Council has officially approved December 16, 1935 as the date when the new N.F. VI will be released for sale in all parts of the country and has also approved June 1, 1936 as the date when the N.F. VI will become official and supersede the N.F. V.

As previously announced the N.F. VI will be distributed for the Association by the Mack Printing Company of Easton, Penna.

The new National Formulary represents a complete and thorough revision of N.F. V. Admissions and deletions are based on information obtained in the U.S.P. N.F. Prescription Ingredient Survey.

This survey was made to determine the materials prescribed and the extent of their use throughout the country. The N.F. VI therefore supplements the scope of the Pharmacopoeia and supplies additional information on simple formulas, diagnostic reagents and standards required by the pharmacist in the practice of his profession.

Of the 689 monographs in the N.F. VI, 208 are Drug or Chemical Monographs and 481 are Monographs of Pharmaceutical Preparations. The more important additions have been in the monographs for ampuls, tablets, fluid extracts, syrups, tinctures and ointments.—*American Pharmaceutical Association*, 2215 Constitution Avenue, Washington, D. C. Bulletin No. 3—1935-1936.

## THE NEW YORK ASSOCIATED HOSPITAL SERVICE

Mr. F. Van Dyk, executive director of the New York Associated Hospital Service, is quoted in the daily press as stating that 156 hospitals are now included in this service with thirty-three thousand subscribers for the three cents a day plan. More than 700 persons have already been given hospital treatment under this arrangement and this coöperative movement is now self-supporting. The Commonwealth Fund has contributed twenty-four thousand dollars to this plan. Other smaller grants have been received.

This is a demonstration of a coöperative spirit in New York.

## MARRIAGE LICENSES IN CONNECTICUT

After the first of January all applicants for a marriage license in the State of Connecticut must pass a Wassermann or Kahn test before a license will be granted. The certificate must be based on a blood examination by an approved laboratory. The blood examination will exclude the possibility of syphilis. Other states requiring medical examination upon the issuance of a marriage license are Wisconsin, Oregon, North Dakota, Alabama, Wyoming and Louisiana. The State of North Carolina repealed its law this year.—*Science*, November 15, 1935.

# The Massachusetts Medical Society

## PROCEEDINGS OF THE COUNCIL

Stated Meeting, October 2, 1935

A STATED meeting of the Council was held in John Waite Hall, Boston Medical Library, 8 Fenway, Boston, on Wednesday, October 2, 1935, at 12 o'clock, noon. The President, Dr Charles E Mongan, Middlesex South, was in the chair and the following 150 Councilors were present

### BARNSTABLE

W D Kinney

### BERKSHIRE

R J Carpenter  
H J Downey  
T H Nelligan

### BRISTOL NORTH

L E Butler  
W H Allen  
A R Crandell  
F V Murphy

### BRISTOL SOUTH

E L Merritt  
G W Blood  
R B Butler  
E F Cody  
E D Gardner  
I N Tilden

### ESSEX NORTH

C F Warren  
E S Bagnall  
R V Baketel  
J F Burnham  
H F Dearborn  
A P George  
F W Snow  
L T Stokes  
W D Walker

### ESSEX SOUTH

J F Donaldson  
C L Holtt  
A E Parkhurst  
O S Pettingill  
J W Trask

### FRANKLIN

A H Wright

### HAMPDEN

T S Bacon  
J M Birnie  
J L Chereskin  
A J Douglas  
Frederic Hagler  
E A Knowlton  
M W Pearson  
G L Schadt

### MIDDLESEX EAST

J H. Blaisdell  
Richard Dutton  
J H Fay  
E M Halligan

### MIDDLESEX NORTH

E O Tabor  
A R Gardner  
T A Stamas  
M A Tighe

### MIDDLESEX SOUTH

S H Remick  
C F Atwood  
E W Barron  
G F H Bowers  
A C Cummings  
D F Cummings  
D E Currier  
J E Dodd  
A W Dudley  
H Q Gallupe  
W G Grandison  
F A Higginbotham  
C M Hutchinson  
A M Jackson  
Josephine D Kable  
A A Levi  
L W McGuire  
J A McLean  
C E Mongan  
F L Morse  
J P Nelligan  
E J O'Brien  
Dwight O'Hara  
C T Porter  
W D Reid  
E F Sewall  
F G Smith  
H P Stevens  
H. W Thayer

### NORFOLK

F G Balch  
A S Begg  
D N Blakely  
D G Eldridge  
I A Finkelstein  
C S Francis  
Maurice Gerstein  
Alice M Gray  
J B Hall  
G W Kaan  
C J Kickham  
H M Landesman  
W A Lane  
J S H Leard  
F P McCarthy  
Samuel Nadel  
Benjamin Parvey  
H F R. Watts

### NORFOLK SOUTH

C S Adams  
W G Curtis  
G V Higgins  
F E Jones  
C A Sullivan

### PLYMOUTH

P H Leavitt  
G A. Moore  
A C Smith

### SUFFOLK

R. L. DeNormandie  
Horace Binney  
Gerald Blake  
W B Breed  
C S Butler  
David Cheever  
F H Colby  
F J Cotton  
W P Cross  
G P Denny  
Reginald Fitz  
Channing Frothingham  
Joseph Garland  
G L Gately  
John Homans  
H T Hutchins  
E P Joslin  
R. I Lee  
G A Leland, Jr  
C C Lund

### J H Means

W R Morrison  
J P O'Hare  
A K Paine  
F W Palfrey  
W S Parker  
W H Robey  
G C Shattuck  
W R Sisson  
Louisa Paine Tingley  
J R Torbert  
Shields Warren  
Conrad Wesselhoeft

### WORCESTER

J C Austin  
W P Bowers  
L R Bragg  
P H Cook  
G A Dix  
E B Emerson  
G E Emery  
David Harrower  
E L Hunt  
E R Leib  
A W Marsh  
W C Seelye  
E H Trowbridge  
F H Washburn  
S B Woodward

### WORCESTER NORTH

A F Lowell  
H. R Nye

President Mongan called the meeting to order promptly at 12 o'clock. The Secretary, Dr Alexander S Begg, read an abstract of the minutes of the Annual Meeting which was held on June 4, 1935. These minutes were published in full in the *New England Journal of Medicine* for July 25, 1935. There being no corrections, the President declared the record approved.

The President appointed Dr Fitz and Dr Kinney to escort the Vice-President, Dr Channing Frothingham, to the platform.

The President then proceeded to address the Council concerning the situation which faces the Society and spoke of the plans which are now underway. His remarks were greeted with much applause. (See Appendix No 1.)

Dr William Reid Morrison of Middlesex South presented the report of the Committee of Arrangements. (See Appendix No 2.) The report was accepted and the recommendations were approved.

Dr David N Blakely of Norfolk presented the report of the Committee on Membership and Finance. This report showed that two Fellows were allowed to retire, six Fellows were allowed to resign, two Fellows were deprived of Fellowship and five Fellows were allowed to change

their membership from one district society to another without change of legal residence (See Appendix No 3) The report was adopted and the recommendations approved Dr Blakely next presented a recommendation from the Committee on Membership and Finance that the Annual Dues for the year 1936 be the same as for each of the last four years, namely \$10.00 for resident Fellows and \$6.00 for non resident Fellows The recommendation was adopted in due form

The President called upon the Secretary to announce the recommendations of the various committees appointed to consider restoration to Fellowship of such Fellows as had applied The committees reporting were (1) in the case of Dr Charles McGinley of Lynn—Drs Hoyt Fraser and Blair, (2) in the case of Dr Henry Lutter of Springfield, the committee consisted of Drs Steele, Stoddard and Walker and (3) in the case of Dr Mario J Carami of Springfield the committee consisted of Drs Birnie, Hosmer and Bacon All three committees reported favorably and stipulated that the restorations should be made provided the applicants paid the amount due the Society within one month of the date of this meeting The Council voted to approve the recommendations of these committees The President asked the Secretary to announce new petitions for restoration There was but one to be submitted, namely, Dr Sanford M Liljestrom from Worcester The President appointed as a committee to consider this petition Drs Ralph W Ellis, chairman, Dr John M Fallon and Dr Raymond W Cutler The Council approved the committee

President Mongan stated that it was customary to appoint the Auditing Committee at this meeting of the Council This committee consists of Fellows who are not members of the Council They supervise the examination of the Treasurer's accounts which is done by a firm of certified public accountants He appointed to this committee Dr Richard M Smith of Boston and Dr Harry P Cahill also of Boston The Council voted to approve the nominations.

The President announced that since the work of the Committee on Public Relations had been divided among various subcommittees he would call upon the chairman of each subcommittee for an informal report.

Dr Michael A. Tighe of Middlesex North recalled the action taken by the Council at the April meeting at which time definite instructions were given to the Public Relations Committee with reference to informing the public of the attitude of the Society toward compulsory sickness insurance Pursuant to these instructions the Public Relations Committee through its Subcommittee on Social Legislation and Insurance formulated a plan which provided for the formation of district public relations committees so that the work of informing

the public might be distributed This part of the work has been completed As a second step it was found necessary to provide information for the medical profession so that its members would be in a position to offer the public authoritative information Literature prepared by the American Medical Association was sent to each district public relations committee in June so that there might be an opportunity for the study of this material during the summer months. It was hoped that arrangements could then be made to reach civic organizations, service groups, parent teachers' associations and others which would be helpful in the dissemination of the physician's viewpoint on compulsory sickness insurance Dr Tighe then proceeded to describe the very successful campaign which he and his local public relations committee had conducted in his district He showed that it was quite possible to interest the press and to obtain a great deal of favorable comment on the attitude of the Society The exhibits which he made were most convincing, particularly the editorial comment by laymen The whole effort seemed to indicate a desire for information from medical sources which appear after all to be those which can be more generally relied upon by the public. The President expressed the appreciation of the Society for the work of Dr Tighe and his Subcommittee and expressed it as his opinion that other doctors might well use Dr Tighe's efforts as a model

Dr Hunt of the Subcommittee on the Adequacy of Medical Care related the steps which had been taken by that Subcommittee up to the present time and recalled to the Council the inadequacy of the appropriation previously made and the inability of the Subcommittee to carry on its studies during the summer He described his efforts to have the study of ten thousand families in Worcester designated as an approved subject under the Works Progress Administration. Dr Hunt recommended that similar projects be offered in other parts of the State so that not only would the information be obtained but work would be provided which would help some members of our own profession since it is apparently the desire of the federal authorities to help the so-called "white collar class" Dr Hunt's report was enthusiastically received by the Council.

President Mongan stated that Dr Henry D. Chadwick, Commissioner of Public Health of the Commonwealth of Massachusetts, had been asked to attend the meeting and called upon him to tell the Council something about the Federal Economic Security Law as it affects the practitioner of medicine. Dr Chadwick then proceeded to discuss the Social Security Act passed at the last session of Congress This comprehensive document is divided into several sections. One is devoted to unemployment insurance and old age assistance with administration of its provisions assigned to the new



Social Security Board of which Ex-Governor John Winant of New Hampshire is the chairman. It is, however, in the other sections that there is the greater medical interest. One of these relates to the United States Public Health Service to which is allotted the sum of \$8,000,000 for the purpose of improving, strengthening and broadening public health work in rural areas. Allotments to the states are to be made through the State Health Departments. Approximately \$20,000 is allotted to each state and in addition an allotment is made which is dependent upon the amount expended by the state at the present time and also somewhat dependent upon the population. It is expected that Massachusetts would, therefore, receive in addition to the \$20,000 approximately \$75,000 per year under the latter provision. There is likewise a section under which several million dollars will be expended by the Children's Bureau of the Labor Department. This money will be expended for maternal and infant care and is designed to supplement what is now being spent by the states through their health departments. Here likewise each state will receive approximately \$20,000 regardless of the population and the amount now being spent by the state. In addition there will be a further amount which will be allotted according to the ratio of live births within a particular state to the total live births within the country as a whole. Massachusetts should receive approximately \$75,000 under this grant.

Another section has to do with the diagnosis, care and treatment of crippled children. The appropriations under this section are to be expended through the State Health Department and in Massachusetts in cooperation with the Department of Public Welfare since it is under this Department that provision is now made for the treatment of crippled children. It will be a cooperative plan but apparently this section has not been so thoroughly organized as is the case with the other sections of the National Security Act.

Another section provides for the care of the blind. This is not under the State Health Department and Dr. Chadwick was unable to give many details on this section. He pointed out that the work under the National Security Act was to be paid for by money provided in the Deficiency Bill which had failed of passage in the last Congress so that no money is available to put the act into effect although preliminary organization was contemplated by the federal bureaus so that the work could go forward when and if Congress subsequently provides funds.

Dr. Chadwick next discussed the difficulties of the problems which face the State Health Departments and stated that he was anxious to have the help of the Massachusetts Medical Society in formulating plans. He spoke of conditions in Berkshire, Franklin and Hampshire

Counties and stated that the State would probably make its start in those Counties. He pointed out the possibility of forming county health districts so that the larger and smaller communities could work together more efficiently. He stated that legislation already exists to permit towns to form joint health districts and pointed out that there are at present in the State two such cooperative units. He then proceeded to discuss the various phases of the work which it is necessary to do in such units. Dr. Chadwick spoke of the survey which Dr. Hunt had discussed and pointed out that the United States Public Health Service has a plan for making a survey on chronic illness within the State. The areas designated are Boston, Fall River, Ipswich, Greenfield and Pittsfield. The Council listened with attention and interest to Dr. Chadwick's talk and Dr. Mongan expressed the thanks of the Council to him for his excellent presentation. Dr. Mongan spoke of the correspondence which had passed between him and the authorities of the United States Public Health Service and stated that he had offered the cooperation of the Society in the undertaking in so far as this can be done. Vice-President Frothingham called for a rising vote of thanks to Dr. Chadwick. This was carried unanimously.

Dr. Mongan introduced another item which has a medical aspect. This has to do with the activities of the Works Progress Administration. Under the provisions of the law the State has been divided into six districts, each district having a director, and a series of conferences has been held by state and district medical officers with officials of the Works Progress Administration. These conferences have to do with the care of accidents occurring under projects being handled by the Works Progress Administration. He next proceeded to read, for the information of the Council, a letter received from the State Director. (See Appendix No. 4.) The President spoke of tentative plans which had been made for carrying information to the physicians of the State and pointed out that nothing further had been done as the necessary information had not been forthcoming from the federal authorities. The compensation officers were provided with a copy of our catalogue of members.

Dr. J. B. Hall of Norfolk made an inquiry concerning a circular which had been sent to physicians and members of the Society in Boston relative to obtaining information regarding physicians in financial need. He stated that he knew a few physicians who had been interviewed by a social service worker but that nothing further had been heard from the project. He asked for information. At the request of the President the Secretary stated that he had accompanied the President of the State Dental Society to confer with Mr. Hobbs in the Park Square Building and that after some prelim

mary discussion was referred to Miss Warren, the head of the Social Service Department. She pointed out that the only way in which these physicians could be helped was in connection with projects that had been approved by the Works Progress Administration. It was the Secretary's understanding that one of the projects that had been approved was the physical examination of people on the welfare list and that Dr. Wilinsky had been delegated by the Health Commissioner of Boston to supervise this work. The Secretary also understood that, while a considerable group of physicians had been interviewed by the social service worker, all of those interviewed had not been placed upon the list. It appeared that this was all that could be done at the present time.

Dr. Lund, Secretary of the Suffolk District Medical Society, offered some additional information. He stated that eighteen men had finally been placed upon the list but that not all of them were in reality doctors of medicine. He also explained that with the change from the Federal Relief Administration to the Works Progress Administration various projects had to be referred once more to Washington and some of these were apparently still there. He informed the Council that he had learned through the Works Progress Administration authorities within the last few days that they expect information momentarily.

The report of the Committee on Postgraduate Instruction was then called for and was presented by Dr. Reginald Fitz of Suffolk (See Appendix No. 5).

The President referred to a vote taken at the Annual Meeting of the Council which created an Advisory Committee to the President and also to another vote which empowered the President to appoint a full time executive officer at the Society's headquarters. He stated that acting under this authority Mr. Robert St. B. Boyd had been appointed to the position.

The Secretary announced that the Cotting Luncheon would be served at the close of the meeting of the Council although no statement to this effect had appeared on the notice of the meeting.

The President announced the death on October 2 of Dr. Leonard Wheeler who was ninety years of age and who joined the Society in 1870. He stated that Dr. Wheeler had been a beloved practitioner in Worcester and that he had been highly respected by the members of the profession throughout the State. He asked the Council to rise in silence for a moment in memory of Dr. Wheeler.

The Secretary then read a communication from the Secretary of the Veterinary Division at the State House calling attention to the fact that some physicians, members of this Society, had been practicing one or more branches of veterinary medicine in direct violation of the law. Such practice included the vaccination of dogs

against rabies and distemper and the treatment of fractures and other troubles. He stated that fees had been collected for some of this work. He also pointed out that this matter had been called to the attention of the profession through the columns of the *New England Journal of Medicine* and that it should be treated seriously since the person disobeying a law may be fined as well as imprisoned.

The President then referred to the Committee on Membership and Finance the name of a prominent teacher in one of the Boston institutions who had been suggested as an Honorary Fellow.

The Secretary announced that he had received the report of the delegates chosen to represent the Massachusetts Medical Society at the meeting of the House of Delegates of the American Medical Association at Atlantic City, June 10 to 13, 1935 (See Appendix No. 6).

The President announced that the Council would now go into Executive Session and all who were not members of the Council including the reporter were asked to retire.

The Executive Session having been completed, the meeting was declared adjourned at 2 20 P.M.

ALEXANDER S. BEGG,  
Secretary

#### APPENDIX NO. 1

ADDRESSES TO THE COUNCIL OF THE MASSACHUSETTS  
MEDICAL SOCIETY BY THE PRESIDENT C. E. MORGAN

Members of the Council of the Massachusetts Medical Society

I desire to take this opportunity of thanking you most sincerely for the honor you have conferred by choosing me to be the President of the Massachusetts Medical Society. The numerous letters of congratulation that I received on the occasion of my election and also the many personal congratulations extended make me feel that already there exists among you a genuine sincerity in all this. This sincerity indicates that your President will not be forced to ask for your cooperation. It is already here and available for his use.

However this spirit of cooperation which is so evident brings to him an appreciation of the responsibility of the office of President of your society. It also engenders in him a feeling of optimism for our future as an organization. The Massachusetts Medical Society has been a society of the highest standards among medical organizations.

It has ever been in the forefront in rendering to the citizens of this state a medical service unequalled in this country. In the past the officers have been unselfish and ever ready to make sacrifices either voluntary or when requested without any hope of material reward. Their only reward has been the satisfaction that comes from deeds well done.

I will endeavor to maintain this standard of the past. I will endeavor to follow the ideals of our organization and to emulate accomplishments of past presidents.

New problems now confront us. Heretofore our Society has been greatly concerned with scientific aspects of medicine. Today we are called upon as a profession to deal with medical problems that are intimately interwoven with our social fabric. It would seem as if every human activity had a medical

aspect The profession will be called upon to act in many fields which before were closed to our services and which now are open because of industrial and social developments We face these problems confident that medicine will play a great part in their ultimate solution.

The Society has not neglected the scientific side of its work The Postgraduate Instruction Course, which is now entering its third year of existence, shows that the society is alert and is giving to its members an excellent opportunity to prepare themselves adequately to serve the community with intelligent medical care that is based on most recent and most scientific principles I must strongly urge you to give support to the excellent work of this activity

#### PUBLIC RELATIONS COMMITTEE

The work of the Committee has been well done The Committee gives justification for its existence This Committee has no formal report to make During the summer it had one meeting The Chairmen of the Subcommittees of the main Committee have had several conferences, one of which was attended by the Commissioner of the Department of Public Health of the Commonwealth, Dr Chadwick Dr Chadwick is here as a guest of the Council and will address you on some phases of the Economic Security Law as it affects the practitioner of medicine in Massachusetts It was thought that the Councilors should get information in regard to the Economic Security Law from the Commissioner himself, as it is probable that Commissioner Chadwick will be the officer who will carry through the provisions of the law The Chairmen of the Subcommittees will inform you of some work that has been done under their direction, especially by Dr Tighe, Chairman of the Subcommittee on Social Legislation and Insurance, and by Dr Hunt who will give you information in regard to the progress of the Subcommittee on Adequacy of Medical Care

The President and the Secretary of the Society have been in communication with certain federal authorities in regard to the medical phases of the Works Progress Administration Your officers feel that the Society should do all in its power to aid and cooperate with the administrators of this law

#### STANDARDS OF EDUCATION

This matter has been considered by the Society for many years Proposed laws bearing on standards of medical education have been introduced into the Massachusetts Legislature many times The members of the Legislature do not seem to understand our position and I am sorry to state that there are many members of this Society who do not understand our position Your President feels that it will be necessary to undertake a campaign of education—to use a colloquial phrase he thinks it will be necessary to sell the Society to its members Certain insidious influences place our Society in the position of one that is trying to control for its own selfish interest the practice of medicine in Massachusetts Consequently we have been dubbed a medical trust and a medical oligarchy The time has come when we should go forth to the citizens of Massachusetts and tell them the true condition of affairs bearing on this question

#### FACULTIES OF APPROVED MEDICAL SCHOOLS

Your President urges that there should be a closer contact of the Massachusetts Medical Society with the faculties of approved schools This proposition is so evident that it scarcely needs comment

#### GRADUATES OF APPROVED MEDICAL SCHOOLS

The Society should consider the matter of urging that graduates of these schools cultivate closer associations with their respective schools Your President has the assurance that graduates of such schools are always welcome to return and that the schools are ever ready to give information that will help the graduate in his work as a practitioner If such an association could be cultivated, there is no doubt it would be of inestimable value both to the school and to the practitioner of medicine

Your President in his work will ever keep in mind the traditions of this Society and its ideals He hopes that these will furnish him with guiding stars in the work of making the Society a worth while influence in the community

#### APPENDIX NO 2

##### REPORT OF THE COMMITTEE OF ARRANGEMENTS

Your Committee of Arrangements for the Annual Meeting wishes to make the following report.

After consulting with the President, Dr Mongan, and the Secretary, Dr Begg, the Chairman of your committee has designated June 8, 9 and 10, Monday, Tuesday and Wednesday for the Annual Meeting of the Society in Springfield Owing to the fact that the city of Springfield is celebrating its three hundredth anniversary, it was imperative to inform the Springfield Chamber of Commerce and the local committee promptly if the Society wished to make use of the Auditorium and Hotel Kimball, which are necessary for the success of our Annual Meeting I therefore designated these dates which agree with the second week in June according to the By Laws, but without the consent of the Council

I make a motion that June 8, 9 and 10, 1936 be approved by the Council, I also propose that fifty cents per person be contributed by the Society so that the price of the dinner be not more than one dollar per person

Your Chairman of the Committee of Arrangements has personally visited the four western county societies, with your President and Secretary and has urged the new members as well as the older men to take a personal interest in the Society's affair and attend the Annual Meeting and Dinner I propose to visit all the other District Societies to inform the members of our plans and ask for any suggestions they wish to make

I have personally inspected the Springfield Auditorium and the Hotel Kimball, and made adequate reservations last month with the proper authorities, including the Chamber of Commerce

We plan to have a larger Scientific Exhibit, and excellent facilities are available for an extensive Commercial Exhibit.

Good clinics, good section meetings, a good dinner, and a good time are offered to all the members of our Society We ask for your support.

An innovation in the form of a good fellowship room is planned, with beer and sandwiches available at any time to our members without charge

Entertainment by the Women's Committee for the wives and members of your families will be available as well as a Kickers' golf tournament with many excellent prizes for the winning participants

An appropriation of \$1600 is asked for the general meeting, and \$400 for the Women's Committee

Your committee expects a large attendance at the Annual Meeting, we shall make every effort to double the registration of the last visit to Springfield

WILLIAM R MORRISON, Chairman

## APPENDIX NO. 3

REPORT OF THE COMMITTEE ON MEMBERSHIP  
AND FINANCE ON MEMBERSHIP

This Committee recommends

1. That the following named two Fellows be allowed to retire under the provisions of Chapter I Section 5 of the By Laws

1. Fogarty William Clemmons Worcester
2. Vose Robert Henry Milton

2. That the following named seven Fellows be allowed to resign under the provisions of Chapter I Section 7 of the By Laws

1. Daly Timothy Joseph Lawrence with remission of dues 1933 1934 1935
- \*2. Fitz-Simmons Henry Joseph Boston with remission of dues 1935
3. Morse Joseph Louis New York City with remission of dues 1933 1934 1935
4. Otis Elmer Filo Brea, Calif. with remission of dues 1935
5. Root, Manly Bronson Washington D. C. with remission of dues 1935
6. Smith Roland Leonard North Attleboro
7. Mahony Francis Roman, Lowell

3. That the following named two Fellows be deprived of the privileges of Fellowship under the provisions of Chapter I Section 8 Clause (a) of the By Laws

1. Dervin Lawrence James Somerville
2. McPeake, John Richard Milton

4. That the following named five Fellows be allowed to change their membership from one District Society to another without change of legal residence, under the provisions of Chapter III Section 3 of the By Laws

Two from Middlesex South to Suffolk

1. Weiss, Soma Cambridge
2. Wolbach, Simeon Burt, Sudbury

Two from Norfolk to Suffolk

1. Baird, Perry Cossart, Jr Brookline
2. Callanan Francis Jervais, Brookline

One from Norfolk to Worcester North

1. Pollner Saul Richard, Brookline.

DAVID N. BLAKELY Chairman

Dr. Fitz-Simmons died October 5

## APPENDIX NO. 4

Works Progress Administration  
Park Square Building  
Boston Massachusetts

September 25 1935

Dr. Charles E. Mongan President  
Massachusetts Medical Society

Employees of the Works Progress Administration who suffer a traumatic injury while in the performance of duty are entitled to medical and hospital care made necessary by such injury

Under the applicable Compensation Act it is provided that medical treatment will be furnished by United States medical facilities where practicable, and it is necessary that such facilities be used to the extent that they are available.

However in locations where Federal medical facilities are not available or where they are in

adequate to furnish the services required, the State Compensation Officer of the Works Progress Administration is obliged to make arrangements for medical treatment to be rendered by reputable private physicians. These private physicians will be paid fees for their services at rates not in excess of the minimum charge prevailing in the community for similar services.

In preparing a list of reputable physicians the State Compensation Officer is instructed to "contact the local Medical Societies to enlist their cooperation in selecting physicians in the locality who are especially well qualified by training and experience to render service in industrial accident cases and who desire to participate in this service under the regulations of the Commission.

It is our understanding that the Massachusetts Medical Society which is, in effect, a federation of many local and County Medical Societies and authorized to speak in behalf of its local and County units, can supply us with this information on a State-wide basis.

We would call to your attention that, under the Rules and Regulations of the United States Employment Compensation Commission there is to be no discrimination against any physician otherwise qualified because he is not a member of a Medical Society.

A physician qualifies under the regulations of the Commission if he is a graduate of a recognized medical school with a degree of M.D. and is licensed to practice medicine in this State.

In accordance with the Rules and Regulations we should like to have your cooperation in selecting physicians especially qualified to render services in industrial accident cases by having your Society recommend to us a list of such physicians.

Very truly yours

JOHN H. MORRIS,  
State Compensation Officer

## APPENDIX NO. 5

REPORT OF THE COMMITTEE ON POSTGRADUATE  
INSTRUCTION

The Committee on Postgraduate Instruction has prepared a curriculum of postgraduate extension courses which has been submitted to each district society. Twelve places will have the course this fall while the balance will be given next spring. The first courses will start in Bristol South (Fall River Section) and Norfolk South District on October 7 1935.

Announcement of all the fall schedules appears in The New England Journal of Medicine, issue of October 3 1935.

FRANK R. ODER Chairman,  
LEROY E. PARKINS Secretary

## APPENDIX NO. 6

REPORT OF DELEGATES HOUSE OF DELEGATES AMERICAN  
MEDICAL ASSOCIATION ATLANTIC CITY SESSION JUNE  
10 TO 13 1935

Your delegates attended all sessions of the House of Delegates at this 86th annual session of the Association. The total registration of more than eight thousand surpassed that of any other medical convention at any time. From Massachusetts two hundred and sixty-nine registered.

The Canadian Medical Association held its annual meeting at Atlantic City by invitation of our national association and participated in the several

section programs and contributed many scientific exhibits. In the words of Dr Routley, secretary of that Association, "We moved our organization down here lock, stock and barrel." Of their council of one hundred and twenty odd, seventy six were present. This, the first meeting outside of Canada, was the occasion for complete revision of the constitution and by laws, a better demonstration of international good will, in the opinion of the secretary, than could be shown otherwise.

Of four special scientific exhibits authorized by the Trustees we are pleased to note the participation by three of our Fellows,—Elliott Joslin, chairman of the committee presenting an exhibit on all the aspects of diabetes, Charles McKhann contributed a display on measles in the demonstration of vaccines and serums, Reginald Fitz, chairman of the committee for the second time, showed an exhibit on nutrition.

All received special commendation from the Committee on Awards.

A special certificate of merit was awarded the group exhibit from the Lahey Clinic on surgical treatment of thyroid diseases, exploration of common duct and abdominoperineal resection of the rectum. Other exhibits in surgery were offered by Drs Berlin, Charles G. Mixter, Freedman and Schlesinger of Beth Israel Hospital, and Drs Hurxthal and Allan of the Lahey Clinic. In dermatology and syphilology Drs Downing and Cousins of the Boston City Hospital exhibited fungi pathogenic to man. Drs Smillie and Wells showed apparatus and charts illustrating airborne infection. Drs Brett, Green, Ober and Legg presented exhibits, five in number, in the section on orthopedics.

In the scientific program twenty one papers were read by Fellows of this Society and the same number participated in discussions.

In our state group of delegates two new members replaced Roger Lee and William Robey. The election of the former to trusteeship we applaud, the automatic retirement of the latter through serving as our President we regret. Their successors, Reginald Fitz and Richard Miller, able and aggressive, both yet on the upgrade of the journey, we, at or approaching the timber line, receive them cordially.

In the organization of the House of Delegates Dr Charles E. Mongan, our President, was designated Chairman of the Reference Committee on Legislation and Public Relations. Membership on the Committee on Reports of Board of Trustees and Secretary was given to Edmond Cody.

The retiring president Dr Bierring, addressed the House on the progress of the past year. The incoming president, Dr McLester, stressed the importance for retaining individualization to maintain the high standards achieved.

The report of the secretary showed as of April 1, 1935 membership as 99,536 and fellowship as 61,406. Massachusetts has 4737 members, 3004 of whom are Fellows. Of 7014 physicians in this state 57 per cent receive *The Journal of the American Medical Association*.

The report of the Board of Trustees showed marked reduction in expenses.

The Treasurer's statement as of December 31, 1934 revealed reserve invested and uninvested \$2,288,051. The total assets \$3,686,443.

Of the publications *The Journal's* gross earnings were \$1,439,761. The net \$613,969. The average weekly circulation was above 85,000. The health journal *Hygeia* showed a loss of \$2059 in 1934 as compared with \$30,127 in 1933. It is of some interest that eighty-one per cent of its subscribers are laymen. The special journals were published at a loss of \$14,936. Their total circulation is 19,384.

The reports of the several councils, bureaus and

committees have appeared in *The Journal* and will not be discussed here save in two instances—The Council on Medical Education and Hospitals, and The Judicial Council.

The Council on Medical Education and Hospitals reported that in accordance with a resolution requesting formulation of standards for schools of occupational therapy, the eleven existing schools had been visited and now the Council presents the Essentials of an Acceptable School of Occupational Therapy.

A resolution was adopted at the Cleveland session to the effect that the staffs of hospitals approved for intern training should comprise only members in good standing in their local county societies. A letter has been sent to all intern hospitals advising them of this action. When the next census of hospitals is taken, the Council will be in a position to know whether further action is needed.

In the matter of compensating radiologists practicing in hospitals investigation and conference with leaders in the field, it was developed that no single method of remuneration is universally applicable, they may accept salary, fees or commission or any combination of these, but in no case should there accrue to the hospital a substantial profit over and above the reasonable cost of maintaining the department, nor should the patient be exploited through excessive fees. During the year the Council's staff has visited 592 hospitals with reference to registration 175, with regard to approval for training in terms 157, for residency approval 30, and 230 tuberculosis sanatoriums.

The Council has prepared and distributed a list of textbooks, reference works and journals suitable for a hospital library.

The Council calls particular attention to the Hospital Number of *The Journal*, issued March 30, 1935, wherein the distribution of hospitals is graphically represented by state maps and the significant fact that the country is already oversupplied with general hospitals is clearly shown. Further it is demonstrated that in those sections of the country where the ratio of beds to population is low and where some are inclined to assume that additional hospitalization is needed, the actual utilization of existing facilities is also low. The conclusion is inescapable that where the public demands hospital facilities they have been provided, and that in sections where the public does not avail itself of more than fifty per cent of the opportunities for hospital care that now exist it would be futile to provide more. During the year 1934 7,730 physicians were licensed to practice medicine in the various states. Of these, 5435 represent actual additions to the number in practice. At this rate, according to the report of the Commission on Medical Education the ratio of physicians to population will steadily increase. This situation greatly enhances the menacing importance of the fact that a number of states continue to examine and license graduates of unrecognized schools. After a quarter of a century of effort on the part of the Association to raise the standards of practice, there are still four states which flagrantly evade the responsibility to protect the lives of their citizens.

The report of the Judicial Council revived an issue of 1932 which we of Massachusetts had assumed to be adjusted following a conference between Drs Robey and Birnie and the Secretary, Dr Olin West. The section follows.

#### MEMBERSHIP IN STATE ASSOCIATIONS

It is a practice in a few state constituent associations to admit to membership in the state association (1) physicians who are nonresidents of the state and therefore not members in any component society

of the state, or (2) physicians resident in the state who for some reason are not members of the county society where they live or practice. Such a procedure is reprehensible in a democratic organization such as the American Medical Association. The theory on which the American Medical Association is built arises from the broad basis of the county medical society all of whose members are members of the state association and the national body and all of whom have definite responsibilities for maintenance of the entire organization. There should be no privileged group to enjoy the advantages presented by the higher bodies without supporting the lower bodies which makes the higher bodies possible. The constitution of the Association states that "members in good standing of the constituent association are the members of the American Medical Association subject, however to the provisions of the bylaws regarding members."

Nowhere does the constitution or the bylaws state that membership in a component society is essential to membership in the state society though the intent is clear in the bylaw covering membership and Fellowship in the American Medical Association, on transfer of residence from one state jurisdiction to another. Membership in two state associations is as inconsistent as being a voter in two states or two congressional districts. Furthermore representation in the House of Delegates is based not on the number of members in the county societies of the states but on the number of members in the state association. A state association that carries on its membership roll nonmembers of the component societies may very possibly have an unjustified representation in the House. In the opinion of the Judicial Council membership in a component society should absolutely be essential to membership in a state association. This section of the Council's report was referred to the Reference Committee on Amendments to the Constitution and Bylaws which committee reported out as follows:

"Your committee recommends that to remove the menace which the Judicial Council reveals with respect to overlapping membership in state associations the Constitution and Bylaws be so amended as to remove all further difficulty in assigning a member to the state in which he practices.

Accompanying this report was an amendment for modification of the existing bylaw which was laid on the table for twenty-four hours, the provision for amendments to the Bylaws. The following day the Chairman of the Judicial Council stated that the amendment just mentioned did not cover the situation so as to make it necessary that each member of a constituent association be a member of a component society in that constituent association and for that reason it did not fully correct the abuses which the Judicial Council brought up in its report. Accordingly the Council had prepared a resolution embodying the desired change in bylaws Section I of Chapter XI to read as follows:

"Membership in this Association shall continue only so long as the individual is a member of a component society of the constituent association through which he holds membership.

The report of the Judicial Council was adopted and a motion that the amendment be adopted was carried.

In addition to resolutions and motions incidental to phases presented by the reports of officers and administrative boards twenty-nine resolutions were

offered from the floor. Contraception led all the rest with ten. These were given to a special reference committee which reported during the Executive Session as follows:

The Special Committee appointed to consider all resolutions concerning the control of reproduction begs leave to report that after a careful study of these resolutions it recommends that not any of them be approved as introduced. The committee desires to present as a substitute resolution the following with this preamble: That the House of Delegates declares that nothing in the following resolutions be interpreted as a declaration or action either for or against birth control.

Whereas, Under the stimulus of large non-medical groups the general use of contraceptives is being advocated and encouraged despite the existing law not only by the above-mentioned groups but by commercial interests as well and

Whereas The ultimate effect of these measures on the health and general welfare of the population of the United States is unknown if not questionable and should accurately and extensively be studied by the medical profession, in whose care the health of the people rests and

Whereas The laws both federal and local governing physicians in their advice to individual patients, where such advice is given as a therapeutic measure seems to be complicated not well understood and generally unsatisfactory and their interpretation difficult therefore be it

Resolved That a special committee be appointed after due consideration by the Board of Trustees to study these related problems and to present at least a preliminary report to the House of Delegates at the 1936 annual session and be it further

Resolved, That the trustees be requested to appropriate the funds necessary in order to carry out the purposes of these resolutions.

The report of this special reference committee was adopted.

The resolution presented by Dr. Wesselhoeft at the annual meeting of this Council opposing the continuation of the so-called Dick scarlet fever patent was read by Dr. Birnie. Referred to the Committee on Legislation and Public Relations it was returned with recommendation for reference to the Board of Trustees.

Election of Officers resulted as follows:

President-Elect James Tate Mason Seattle  
Vice-President, Kenneth M. Lynch Charleston S. C.  
Secretary Olin West, Chicago  
Treasurer Herman L. Kretschmer Chicago,  
Speaker Nathan B. Van Etton New York,  
Vice-Speaker Harrison H. Shoulters Nashville  
Trustees Ralph A. Fenton Portland Oregon  
James R. Bloss Huntington, W. Va.

President McLester renominated Reginald Fitz a member of the Council on Medical Education and Hospitals.

Respectfully submitted  
EDMUND F. CONY

VERMONT STATE MEDICAL SOCIETY

HOUSE OF DELEGATES

IN the absence of Dr Stanley Wilson, President of the House of Delegates, the 1935 meeting was called to order by Dr A M Cram, the Vice-President, at 1 15 Thursday afternoon, October 17, 1935, at the Knights of Columbus Hall, Rutland, Vermont

Secretary E J Rogers, called the roll, vacancies therein being filled

On the roll call for Washington County, Delegate R H Bisson not being in the room, Dr Wark moved that he (Dr Wark) be seated as such delegate

The Chair ruled such motion unnecessary, as Dr Wark, being an alternate delegate, would automatically be seated as a delegate, also ruled that if any of the "regular delegates come in there cannot be more votes cast than the county is entitled to, so that the alternate delegate will have to retire"

On completion, the roll call for the one o'clock session stood as follows

Addison County Medical Society	F C Phelps	1
Bennington County Medical Society	H W Elliott	1
Chittenden County Medical Society	C H Beecher W G Townsend N R Caldwell H E Upton W E Rogers	5
Franklin County Medical Society	L E Sample E A Hyatt C G Abell F J Lawliss	4
Lamoille County Medical Society	None reported	0
Northeastern County Medical Society	P E Buck E A Cramton W R Sargent	3
Rutland County Medical Society	O F Clough C B Ross R H Seeley B F Cook E J Rogers H L Frost	6
Washington County Medical Society	R E Avery C H Goyette W R Hartness L B Allen J A. Wark	5
Windham County Medical Society	L C Stillings O A. Burton Geo B Hyde	3

Windsor County Medical Society	W M Huntington A M Cram	2
		30

Vice-President Cram called for the report of the Secretary of the Vermont State Medical Society, whereupon Dr W G Ricker, the Society secretary, asked for, and received the privilege of the floor, and suggested that the reading of this report be deferred

Dr Beecher moved that the reading of this report, as printed, be deferred until the five o'clock session of the House of Delegates, which motion was seconded, and so voted

Vice-President Cram called for the report of the Publication Committee

REPORT OF THE PUBLICATION COMMITTEE

The Publication Committee wishes to report that material has been supplied to *The New England Journal of Medicine*, as usual The cost of publication is shown in the Treasurer's Report

WM G RICKER, M.D  
C F DALTON, M.D  
L H ROSS, M.D

On motion, duly seconded, it was voted to accept the report of the Publication Committee as printed

Vice-President Cram called for the report of the Executive Committee, and on motion, seconded and carried, the report was accepted, as printed on page 7 of the 1934 Proceedings of the Vermont State Medical Society, without reading

REPORT OF THE EXECUTIVE COMMITTEE

The program in your hands constitutes the report of your Executive Committee

B F COOK, M.D  
WM G RICKER, M.D  
J H WOODRUFF, M.D

Vice-President Cram called for the report of the Treasurer, and it was moved, seconded, and voted that the report, as printed, be accepted

TREASURER'S REPORT

For the Year Ending September 1, 1935

General Account

Receipts

1934		
Sept 1	Balance on hand	\$2199 92
Nov 9	Recd from Vt Peoples National Bank, income Dr H D Holton Trust Fund	58 31
Nov 19	Recd from Surgeons and Physicians Supply Co	10 00
Nov 19	Recd from Lederle Laboratories	10 00
Nov 19	Recd from E F Mahady Co	10 00
Nov 19	Recd from Davies, Rose & Co, Ltd	10 00

Nov 19	Recd from General Electric Co	10 00	Sept. 23	Paid Dr Arthur M. Fishberg ex penses	27 42
Nov 19	Recd from P J Noyes Co.	10 00	Nov 5	Paid The Essex Trust Co., check tax October	32
Nov 19	Recd. from Denver Chemical Co	10 00	Nov 10	Paid Dr William G Ricker serv ices and expenses, fiscal year 1934	246 87
Nov 19	Recd from George C Frye Co.	10 00	Nov 17	Paid Dr Winchell Craig expenses	50 00
Nov 19	Recd from R J Strassenburgh Co	10 00	Nov 19	Paid Ethan Allen Club rent of hall	15 00
Nov 19	Recd. from Elmer N Blackwell	10 00	Nov 19	Paid Gove the Florist, flowers for banquet	3 00
Nov 19	Recd from E L Patch Co	10 00	Nov 29	Paid Dr Sam Sparhawk bills paid by him	51 93
Dec. 29	Recd. from Campbell X Ray Co	10 00	Dec. 4	Paid Susan A Nott, reporting and transcript	96 00
1935			Dec. 5	Paid The Essex Trust Co., check tax November	08
Jan 18	Recd. from The Prior Co	10 00	Dec. 14	Paid <i>New England Journal of Medicine</i> special printing	26 63
	<i>During Fiscal Year</i>		Dec. 14	Paid The Cowles Press, record cards	4 00
	Recd from Addison Co., 12 dues \$5 each	\$60 00	Dec. 31	Paid Dr William G Ricker one-half expenses trip to Cleveland	55 78
	Recd. from Bennington Co., 19 dues \$5 each	95 00	1935		
	Recd from Chittenden Co., 78 dues \$5 each	390 00	Jan. 6	Paid The Essex Trust Co check tax, December	08
	Recd. from Franklin Co., 26½ dues, \$5 each	132 50	Jan 17	Paid <i>New England Journal of Medicine, Journals</i> Oct., Nov., Dec	111 00
	Recd from Lamolille Co., 11 dues \$5 each	55 00	Jan. 23	Paid T S Beck Insurance Agen cy premium on Treasurer's bond	12 50
	Recd from Northeastern Co., 40 dues \$5 each	200 00	Jan 25	Paid Jane M King stenographic services for the council	10 00
	Recd. from Rutland Co 57 dues \$5 each	285 00	Feb 8	Paid The Lane Press postcards and printing	3 45
	Recd from Washington Co., 49 dues \$5 each	245 00	Feb 16	Paid Susan A. Nott, stenographic services	9 34
	Recd. from Windham Co 29 dues, \$5 each	145 00	Feb 16	Paid <i>New England Journal of Medicine</i> reprints, printing and post age	13 37
	Recd from Windsor Co., 25 dues \$5 each	125 00	Feb. 22	Paid The Cowles Press printing notices of dues	5 75
			Feb 22	Paid The Cowles Press, printing receipts	18 28
	Total receipts	\$4120 73	Feb 22	Paid The Western Union Tele graph Co Secretary's telegrams	9 26
	<i>General Account</i>		Apr 27	Paid The Lane Press printing for State Clinical meeting	32 16
	<i>Disbursements</i>		May 9	Paid Dr Sam Sparhawk, error dues paid twice	5 00
1934			May 9	Paid Ethan Allen Club use of rooms	14 40
Sept. 6	Paid The Essex Trust Co., check tax, August	\$ 04	May 9	Paid Dr A. G Mackay bandages for demonstration	3 00
Sept. 23	Paid Dr H E Upton stethoscope student lost and cash paid Mercier for clinic	5 00	May 9	Paid Dr K. McCullough two rab-bits	2 50
Sept. 25	Paid Passumpsic Savings Bank, rent Secretary's safe deposit box	8 25	May 9	Paid Eastman Kodak Co., rental of film	3 00
Sept. 2	Paid The Essex Trust Co stamp for Treasurer's use	1 54	May 1	Paid <i>New England Journal of Medicine</i> , one-half cost of cuts	8 11
Sept. 6	Paid The Essex Trust Co., check tax, September	06	May 27	Paid Susan A. Nott, reporting clinical meeting	25 00
Sept. 13	Paid The American Medical Ass'n Medical Directory for the Secretary	12 00	May 27	Paid H R Gallup services male quartette	12 00
Sept. 13	Paid <i>New England Journal of Medicine, Journals</i> July Aug., Sept	111 58	May 27	Paid Robert Aiken Dorothy Murphy playlet	15 00
Sept. 13	Paid Whitehead and Hoag badges	48 22	May 27	Paid The Cowles Press printing notices	5 50
Sept. 13	Paid Billy B Van services	88 12	May 29	Paid Dorothy Kimball services	8 00
Sept. 13	Paid S H. Carsley orchestra	25 00	June 18	Paid <i>New England Journal of Medicine</i> one-half cost of cuts and tab-ular matter	16 73
Sept. 13	Paid Dr Paul W Aschner ex penses	30 42	June 20	Paid Free Press Ass'n envelopes for Treasurer	5 75
Sept. 13	Paid Dr Albert A Epstein ex penses for self and Dr Swick	51 84	July 15	Paid Dr Charles G Abell one-half expenses, delegate to A. M. A. Convention	33 23
Sept. 13	Paid Dr John Bergland, expenses	47 65			
Sept. 13	Paid Dr Henry D Chadwick, in come Dr H D Holton Trust Fund	58 27			
Sept. 15	Paid The Cowles Press, printing programs and reports	101 92			
Sept. 19	Paid John C French Jr., serv ices	10 00			
Sept. 23	Paid Dr A. B Soule, miscella neous bills paid	17 91			
Sept. 23	Paid Hotel Vermont bills of guests	25 70			
Sept 23	Paid Dr Dean Lewis expenses	26 00			



Aug 31 Paid Dr David Marvin, postage and telephones	6 50
Total disbursements	\$1635 78
Balance on hand	2484 95
Total disbursements and funds on hand	\$4120 73

*Medico Legal Account*

## Receipts

1934

Sept 1 Balance on hand	\$17046 85
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1935

Jan 1 Recd interest on savings account	201 00
July 1 Recd interest on savings account	203 51

Balance on hand and receipts	\$17451 36
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*Medico-Legal Account*

## Disbursements

None

*Total Assets*

General Account	\$2484 95
Medico-Legal Account	17451 36

Total Assets	\$19936 31
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Respectfully submitted,  
DAVID MARVIN, *Treasurer*

Audited and found correct

E H BUTTLES, *Auditor*

Sept. 10, 1935

## AUDITOR'S REPORT

Sept 10, 1935

I have today finished auditing the accounts of the Vermont State Medical Society, Dr David Marvin, treasurer, for the year ending July 1, 1935. I find the accounts correct, with proper vouchers for all expenses.

Very truly yours,  
E H BUTTLES, *Auditor*

Dr Racker called the attention of the House of Delegates to the fact that the Vermont State Medical Society has cash assets of some \$19,000, expressing it as his opinion that this was the wealthiest state medical society, per capita, in the country.

At this point in the proceedings Dr Stanley Wilson, President of the House of Delegates, took the Chair.

President Wilson called for the report of the delegate to the A. M. A., and it was moved, seconded, and voted that this report be accepted as printed.

REPORT OF THE EIGHTY-SIXTH ANNUAL MEETING  
OF THE AMERICAN MEDICAL ASSOCIATION

The eighty-sixth annual session of the American Medical Association was held at Atlantic City, June 10 to 14, inclusive, this being a joint session of the American and Canadian Medical Associations and the first joint session of these societies. The good fellowship existing between the two societies was referred to in Speaker Dr F. C. Warnshuis' address to the House of Delegates, read by Vice Speaker

Dr N. B. Van Etten, "Scientific medicine knows no national boundaries. Medicine is a republic in which its disciples from every country of the world have worked shoulder to shoulder." The Canadian Medical Association extended an invitation to the A. M. A. to meet in joint session with them in some Canadian city some time before 1940, thereby showing their appreciation.

The registration for the session was 8469, this being the largest number of physicians ever assembled at a medical meeting. The scientific exhibits were exceptionally good and one could have spent all four days of the convention very profitably in this department. It was said to be the largest ever exhibited at an A. M. A. meeting. The commercial exhibits were very large, most of the pharmaceutical houses were there, also instrument companies.

The General Meeting was called to order in the ball room of Convention Hall by President Walter L. Bierring Tuesday, June 11, 1935, at 8 00 P. M. An organ recital was given by William Jackson on the largest pipe organ in the world. Hon. Harry Bacharach, Mayor of Atlantic City, gave the address of welcome and told us of the attractions of Atlantic City as a playground and as a health resort. He also said that they seldom had an accident by drowning, due to the excellent supervision of the life savers. Short addresses were given by Dr C. C. Charlton, President of Atlantic County Medical Society, Dr M. W. Newcomb, President of the Medical Society of New Jersey, Hon. Walter Edge, Ex-Senator and Former Ambassador, and also Dr Allan R. Dafoe, of "quintuplet" fame. Several vocal selections, which received generous applause, were rendered by the noted Welsh tenor, Harry Prosser. Dr Jonathan C. Meakins, President of the C. M. A., delivered a very scholarly address entitled, "The Breath of Life." Dr James L. McLester, President of the A. M. A., delivered an address, "Nutrition and the Future of Man." Dr McLester very ably described in his address how the lower animals had been improved by giving them the proper foods and care, and he believes that this same principle can be applied to man and his destiny. The Westminster Chorus of Princeton, N. J., rendered several selections which were exceptionally good and were greatly appreciated, as was manifest by the applause which each number received.

The first meeting of the House of Delegates convened June 10, 1935, at 10 00 A. M., in the Renalsance Room of the Ambassador Hotel, and was presided over by Vice-Speaker Dr N. B. Van Etten of New York, in the absence of the Speaker Dr F. C. Warnshuis, whose address was read by Dr Van Etten. Reference Committees were appointed by the Speaker. Addresses were given by the President, Dr Walter L. Bierring, the President-Elect, Dr James L. McLester, and Vice President, Dr George G. Reindle. Reports of the Officers and Board of Trustees were given and several resolutions were presented in regard to "Care of Indigent Sick, Broadcasting, Medical Service Organizations, Solicitation of Votes, Contraception, Establishment of Courses in Medical Economics in all Medical Colleges in the Country." The delegates of the A. M. A. and the C. M. A. were given a banquet in the submarine grill of the Hotel Traymore, Monday evening. We were very well entertained. Hon. J. Hamilton Lewis, Democratic Senator from Illinois, was one of the speakers.

Tuesday, June 11, Session of the House of Delegates—Reports of the Reference Committee of Sections and Section Work by Dr T. B. Throckmorton, Chairman, Report of Reference Committee on Medical Education by Dr Irvin Abell, Chairman, Refer

ence Committee on Hygiene and Public Health, Dr J N Baker Chairman Report of Reference Committee on Legislation and Public Relations by Dr Charles E. Mongan and the Report of Reference Committee on Miscellaneous Business by Dr John F. Hagerty A Resolution in Opposition of Dick Scarlet Fever Patent was introduced by Dr J M. Birnie of Massachusetts Resolution in Opposition to the Copeland Pure Food Bill and to Advertising of Drugs and Drug Products by Pharmaceutical Houses to the Laity by Dr John F. Hagerty Reports were given by the Board of Trustees Reference Committee on Reports of Officers, and the Judicial Council reported that the first sentence of section 1 of chapter 11 of the By Laws be amended to read "Membership in this Association shall continue only so long as the individual is a member of the component society of the constituent association through which he holds membership Officers of the Canadian Medical Association were introduced by the speaker and made short addresses which were responded to by President Biering and President Elect McLester of the A. M. A. The California situation in regard to compulsory insurance was ably explained by Dr T H Kelley They failed to get their bill passed by the California legislature, but they are hoping the next session will pass a satisfactory bill. The special report of the Bureau of Medical Economics was a very thorough and comprehensive report. Lists were made as far as possible, of State and County medical associations and their methods of classification and care of the sick and remuneration therefrom I quote from the report, "The profession needs and will always welcome the cooperation and advice of all elements affected in health problems but just as the individual physician must constantly assume the tremendous responsibility of decisions that involve life and death with individual patients so the profession as a whole must assume the leadership and responsibility in the organization of medical service in the community

The House of Delegates in the Report of the Special Reference Committee adopted at the special session held February 15 and 16 1935 reported in part "The House of Delegates of the American Medical Association reaffirms its opposition to all forms of compulsory sickness insurance whether administered by the Federal government, the governments of individual states or by any individual industry community or similar body It reaffirms also its encouragement to local medical organizations to establish plans for the provision of adequate medical service for all of the people, adjusted to present economic conditions by voluntary budgeting to meet the costs of illness

The officers of the A. M. A. elected were as follows President Elect—Dr J Tate Mason Seattle Wash Vice-President—Dr Kenneth M Lynch Charleston, So Carolina Secretary—Dr Olin West Chicago Ill Treasurer—Dr Herman L. Kretschmer Chicago Ill Speaker of the House of Delegates—Dr Nathan B Van Etten New York Vice-Speaker of the House of Delegates—Dr H H Shoulters Nashville Tennessee Trustees for five years—Dr Ralph A. Fenton, Portland Oregon and Dr James R. Bloss Huntington West Virginia. The invitations for the next annual meeting of the A. M. A. were from Indianapolis Miami Fla. Chicago and Kansas City Mo The Trustees investigated the invitations and reported that Chicago and Kansas City had ample facilities for taking care of the A. M. A. annual meeting and the ballot was spread There were 126 votes cast, of which Kansas City received 113 votes and Chicago 13

This was a very successful meeting. The lectures

in the several sections were of a high class and very instructive We were well entertained.

C G ABELL

President Wilson called for the report of the Medico Legal Committee, whereupon Dr C H. Beecher moved that this report, and all remaining reports, be accepted as printed Motion seconded.

Dr Hyatt announced that the name of Dr F B Hunt, of Fairfax, did not appear in the report of the Necrology Committee, and was informed that it would be added

Whereupon, Dr Hunt's name was added to the Necrology Committee's report, and with this correction it was voted to accept the report of the Necrology Committee, and the remaining reports as printed.

#### REPORT OF THE MEDICO-LEGAL COMMITTEE

Your Medico-Legal Committee has met as a complete committee twice during the year

Only one new case has been presented to us and this is still in the courts

One case that has been on the docket several years has been closed At the present time we have only one case that is unsettled

EDWIN A. HYATT Secretary

#### REPORT OF NECROLOGY COMMITTEE

Following is the list of deaths of members of the Society during the past year

Dr A. H. Bellerose Rutland December 11 1934.  
Dr E M. Brown Sheldon February 8 1935  
Dr Rolfe S Russell Greenfield Mass. March 17 1935  
Dr John H. Bean Burlington March 25 1935  
Dr Horace L Watson Montpelier May 10 1935  
Dr Rushmore Lape Fair Haven May 3 1935  
Dr Wallace M Pierce Burlington June 1935  
Dr J M Stevens Hyde Park, June, 1935  
Dr John H. Blodgett, Bellows Falls August 2 1935  
Dr A. C Walker Springfield.  
Dr I. R. Doane Springfield  
Dr H. S Ward, Springfield  
Dr F B Hunt, Fairfax.

B D ADAMS, M.D.  
G G MARSHALL, M.D.  
H. L. PRINCE, M.D

Under Unfinished Business President Wilson called attention to the resolution adopted at the 1908 meeting of the Vermont State Medical Society as quoted by Dr Beecher at the 1934 meeting of the House of Delegates (appearing on page 10 of the printed proceedings of the 1934 House of Delegates meeting), which resolution is as follows

"On and after the first day of January 1909 no member of this society shall accept the position of club society lodge, or fraternal organization physician or agree or continue to do any medical or surgical work for any club society lodge or fraternal organization at a less rate than the regular or customary charges for like services rendered by other physicians in the same locality for patients not members of such clubs, society lodge or fraternal organization"

Also, that in no case shall any physician

agree to attend the families of the members of such club, society, lodge, or fraternal organization, at half price or less price than the regular rate

"Nothing in this section shall be construed as preventing any member from attending the worthy poor, or to give free services to those too poor to pay anything

"Any violation of this article shall be considered unprofessional conduct, and it shall be the duty of the House of Delegates to expel such members when proof of such conduct shall be presented to them"

Secretary Rogers called attention to the statement of Dr Ricker (appearing on page 11 of the printed proceedings of the House of Delegates), reading as follows

"Dr Ricker stated that the resolution quoted could not be adopted as an amendment to the Constitution and By-Laws for another year, that the secretary might supply the county societies with a copy of the same, and that next year the county society delegates should be present with positive ideas on what can be done"

And to the added statement by Dr Beecher (same page)

"that this resolution would continue as a resolution, and would be introduced for action next year as an amendment to the Constitution, in regard to the eligibility of a man doing contract work at less than regular rates"

And to the *Motion* of Dr Beecher

"that the resolution read, and adopted in 1908, be considered as an amendment to the Constitution, to be acted on next year Motion seconded and so voted" (Page 11, printed proceedings, House of Delegates, 1934 meeting)

Dr Wark stated that "at our last hospital meeting in Barre last week these things placed for consideration of the Society last year, were again read over and discussed, and all voted on, each individual one, and accepted unanimously by the staff," also "that the attention of this organization at this meeting be brought to the fact that we voted on that unanimously"

Dr Wark then *moved* that this (resolution) be accepted by the Society this year as it was placed before it for consideration last year

President Wilson inquired of Dr Wark Did you say that was discussed at the Washington County Society meeting? To which Dr Wark replied "The monthly hospital meeting"

President Wilson inquired if any county societies had brought up this matter in their county organizations

Dr Cook stated that the Rutland County Medical Society had considered it and felt that the county organization was the place for a rule of this kind, and not the State Medical Society, and had unanimously voted down the proposition.

Dr Hyatt stated that Franklin County felt

that the physicians were not being treated right, and Dr Sample added that this was in particular reference to contract work and not to town charges

Dr Beecher stated that the committee which brought in this resolution at the 1934 meeting was not sponsoring it, but merely introduced it so it could be brought up at the 1935 meeting, because it had to lie on the table for one year, and that under the provisions of the Constitution it must be adopted by a two-thirds vote of the members present of the House of Delegates, as an amendment to the Constitution

President Wilson stated As I remember last year there was considerable discussion with regard to hospitals accepting town charges at reduced rates - As I read this through I don't find anything regarding the disposal of that question of hospitals In the resolution was that intentionally left out, Dr Beecher?

Dr Beecher stated that the House of Delegates last year took such action as is recorded in the proceedings, but it was not added to this resolution because the resolution had been on the books since 1908 that the resolution had not included towns, and quoted the *suggestion* of Dr Martin (page 11 of 1934 House of Delegates printed proceedings),

"that the resolution be amended to include towns, villages and cities, as well as lodges, fraternal organizations, etc, but no action was taken on this suggestion"

Discussion by Dr Wark, Dr Clough, Dr. Hyde and Dr Seeley

The Thompson Fund, at Brattleboro, was referred to, the question being raised whether it would come under the resolution President Wilson was of the opinion that it would Dr Seeley stated that the patient is allowed \$350, the hospital bill being taken out first and the surgeon getting the remainder

Dr O'Brien moved that this resolution be laid on the table Motion seconded

The question was asked whether this meant that it would be laid on the table indefinitely President Wilson ruled it to be under discussion and that it could be opened up later in the afternoon He then called for a rising vote on the motion of Dr O'Brien, which resulted in "Yes" 21, "No" 7

President Wilson then declared the House of Delegates meeting recessed until five P.M.

#### FIVE O'CLOCK SESSION

At five P.M., the recessed session of the House of Delegates reconvened and was called to order by the President, Dr Stanley Wilson

President Wilson called upon Dr Wm G Ricker, the Society secretary, for such remarks as he might wish to make in connection with his report as secretary

Dr Ricker referred to the questionnaire as

proposed on page 9 of the 1934 printed proceedings of the House of Delegates, and read the letter and questionnaire which he had sent out to hospitals, stating that he had neglected to mention this in his report. He also requested that the nominating committee take extreme care in selecting the legislative committee. Referring to frequent communications he receives, as secretary, regarding individuals practicing medicine illegally, Dr. Richer stated he felt it was up to the county societies to collect evidence pertaining to such cases and present it to the state attorney or the attorney general of the state. Also he felt that the matter of socialization of medicine should be left with the legislative committee, and that recommendations, based on information should be in proper form and submitted to the House of Delegates next year. He suggested that \$200 be made available for use of the legislative committee. Also that if the House of Delegates felt that more time should be spent on its meetings, would it favor a Wednesday evening session next year? Also, he felt that the incoming secretary should be authorized to appoint an assistant secretary at not less than \$50.

He also felt that the House of Delegates should consider whether or not it wished each voting delegate to be certified by absolute credentials signed by the president and secretary of his county society.

Dr. Beecher moved that the secretary's report be accepted as printed. Motion seconded, and so voted.

#### SECRETARY'S REPORT

I wish first, to call your attention to the fact that in spite of deaths which have been fairly numerous we have had additions so that we have eight more members than at this time last year. Several names besides those printed have been reported but inasmuch as their official credentials have not been received at this time their names are not included.

The obituary list is as complete as we have been able to make it. I wish to call to the attention of the members of the County Societies that their Secretary should send a notice to the Chairman of the Necrology Committee and to the Secretary of the State Society immediately on the death of a member or even on the death of anyone who is a duly licensed practitioner. The Society wishes to recognize the deceased of each and every one in proper form.

During the past session of the Legislature an attempt was again made to pass a bill licensing a group to practice Naturopathy. A representative of this School was in attendance during a considerable part, if not the greater part, of the time while the Legislature was in session and seemed to be quite active. An attempt was made to effect a compromise with your Secretary who refused even to consider the proposition. The Bill was defeated in due form and an attempt was made to revive it which was not successful. Since that time I have been informed that the School of Naturopathy in New York City has been condemned by the authorities of the State of New York, that their faculty has been convicted of granting a diploma without a charter and that several of the leading members of the faculty were placed under a suspended jail sentence. Since that time I have been informed

that the School has been transferred to the State of Connecticut. Your Secretary some four years ago had visited this School and had reported to the Legislature at its past session and also at the previous session that it did not possess the facilities for giving a medical education. Bitter words were passed in the Senate Chamber but your Secretary still has a clear conscience in withholding his approval of this School of practice. The House of Delegates should take extreme care in selecting their Legislative Committee this year although the Legislature is not in session and it should be the duty of the Legislative Committee to inform themselves thoroughly concerning the background of Naturopathy.

Your Secretary receives frequent communications regarding individuals practicing medicine illegally and that "something should be done about it." I call your attention to the fact that the State Society has no authority to institute legal proceedings. This function belongs to the Board of Medical Registration. Also I wish to call your attention to the fact that the State Medical Society meets once a year only its deliberations being conducted by the House of Delegates, although the function of the Society is continued throughout the year by means of the Council. On the other hand the County Societies hold more frequent meetings. They are duly organized and are in close touch with local situations. Your Secretary believes that it is the function of the County Society to accumulate the evidence and place it before the Board of Medical Registration, and your Secretary is perfectly certain that the Council of the State Society will give the necessary moral support.

Members of the House of Delegates at various times have criticized your Secretary for not maintaining a news column in the *Journal of the American Medical Association*. For several years my private secretary has sent a notice monthly to all County Secretaries for news items. The response to these letters has been extremely disappointing in fact, so much so that we have discontinued sending these letters during the past year. I will be only too glad to maintain a news column both in *The New England Journal of Medicine* and in the *Journal of the American Medical Association* if you as members will communicate with your County Secretary and get him to send to me the items of interest. Needless to say your Secretary cannot spend his time running all over the State picking up personal items. He must have cooperation.

The work of the County Societies the past year has been excellent. Vermont is to be congratulated on the fact that her physicians are active and interested but are not involved in red tape. The County Secretaries are an extremely efficient group. They arrange and conduct good meetings and the fact that they do not bother to write out a report every time or communicate with the State Secretary should not be considered as a criticism.

I wish to call the attention of the House of Delegates to the hold-over amendment to the Constitution and By Laws adopted last year in Burlington. The socialization of medicine is today a live topic for discussion. It may not be known to all of you that when the National Security Bill was proposed in Washington last winter there was a section devoted to the practice of medicine. Vermont, at least, and I assume every State, was supplied with the so-called Model Epstein Bill. (Not the Dr. Epstein who gave us the excellent paper at our State Meeting last year.) This Bill placed the physicians all most absolutely under State control and to my mind was extremely vicious. The American Medical Association called a special session of the House of Delegates to consider this Legislation. I did not

attend because after several days of fever my temperature had only reached normal some four or five hours before my train was due to leave for Chicago. However, I sent them a telegram which expressed our view to the effect that Vermont would assume its own problems. The Legislative Committee of this year should keep very close watch on social medical proposals and legislation. I call their attention to the proposals in California, Alberta, Saskatchewan, Wisconsin and other States that may come to their attention, as well as the situation in Europe.

The matter of remuneration of physicians who are treating cases under the various Welfare Department ought to receive careful consideration. At the present time the budget of the Public Welfare Department, if I am correctly informed, does not have sufficient funds to pay physicians, although up to the present they are paying the Hospital bills. From my interviews with various State officials I feel confident that a moderate fee can be secured from public money if the physicians are willing to accept such. I personally do not believe that officials will grant the higher fee of private practice for the care of all indigents. This subject again should receive careful investigation during the coming year.

Again I wish to express to all members, State officials and County officers of the Society, my appreciation of their cooperation and will be glad to continue in my present capacity, if the House of Delegates so desire, and any changes that are wished will be equally acceptable to me personally.

WILLIAM G. RICKER, *Secretary*

#### SUPPLEMENT TO SECRETARY'S REPORT

	Mem-ber-ship 1934	Mem-ber-ship 1935	In-crease	De-crease
Addison	15	15		
Bennington	22	25	3	
Chittenden	81	83	2	
Franklin	30	31	1	
Lamoille	10	11	1	
Northeastern	44	46	2	
Rutland	63	63		
Washington	53	54	1	
Windham	26	26		
Windsor	26	24		2
	370	378	10	2

President Wilson called for any further unfinished business to be presented at this time.

Dr. Wark asked about the responses the secretary had received from different hospitals in reply to the questionnaire he had sent out, and Dr. Ricker referred briefly to the replies he had received.

Dr. Wark inquired if the fee schedule, accepted some years ago, was obsolete, whereupon Dr. Beecher rose to a point of order, claiming this was not unfinished business.

The question arising as to who constituted the delegation from the Washington County Medical Society, the President requested Secretary Rogers to call the roll for Washington County, which he did, the roll call being as follows: Dr. Avery, Dr. Goyette, Dr. Hartness, Dr. Bisson and Dr. Allen, Dr. Wark being automatically retired as a delegate, the regular delegate, Dr. R. H. Bisson, now being present.

Dr. Rogers moved that Dr. Wark be given unanimous consent to talk on any subject as long as he wished, and the privilege of interrogating any member. Motion seconded and carried.

There being no further Unfinished Business the President introduced New Business.

Dr. Phelps moved that the 1936 annual meeting be held in Burlington. Motion seconded, and so voted.

Under Other Business the President asked if anyone wished to make a motion in regard to holding a Wednesday evening session of the House of Delegates.

Dr. Cook moved that next year the House of Delegates hold a Wednesday evening session at 8 o'clock, in Burlington, and that all delegates and alternates bring their credentials, signed by the president and secretary of their county societies. Motion seconded by Dr. Beecher.

President Wilson put the motion and called for a rising vote, the result being "Yes" 24, "No" 1.

Dr. Beecher moved that a majority of delegates accredited to the state secretary, by the secretaries of the county societies, constitute a quorum of that meeting. Motion seconded by Dr. Cook.

President Wilson stated that would mean that one more than half of the accredited delegates would constitute a quorum, and upon putting the question declared the resulting vote to be in the affirmative.

President Wilson brought up the matter of \$200 for the legislative committee, as suggested in the remarks of Secretary Ricker.

Dr. Phelps moved that \$200 be given for the use of the legislative committee. Motion seconded, and so voted.

Dr. Sargent moved that \$50 be granted the secretary for employing an assistant secretary. Motion seconded and so voted.

Dr. Ricker read an invitation from the Bennington Chamber of Commerce inviting the Society to hold its 1936 meeting in Bennington, and suggested perhaps the House of Delegates might wish to rescind its vote to hold the 1936 meeting in Burlington, but no action was taken on this.

Dr. Tobin said he felt sure the Society would be invited by the Bennington County Medical Society to hold its 1937 meeting in Bennington.

Dr. Ricker referred to the Commonwealth Fund, and read two communications, one dated September 6, 1935, addressed to Dr. George G. Marshall, and the other dated September 20, 1935, addressed to Dr. William G. Ricker, Secretary, Vermont State Medical Society, and suggested this matter be left with the Council, since the funds were not available until December.

After discussion, Dr. Beecher moved that if,

when and as this fund becomes available in December, that the secretary notify each member of the Vermont State Medical Society in regard to the provisions of that fund, and that the secretary write to those in charge of the fund, telling them that the Vermont Society recognizes their effort and will do its utmost to cooperate. Motion seconded and so voted.

Under election of officers, President Wilson called for nominations for president for the ensuing year.

Dr Beecher nominated Dr Lester W Burbank, of Cabot.

Nomination seconded.

Dr Hyde moved that nominations be closed. Motion seconded, and so voted.

President Wilson then placed the name of Dr Burbank before the House of Delegates for vote, and declared Dr Burbank elected as president for the ensuing year.

For secretary Dr Allen nominated Dr Wm. G Ricker to succeed himself. Nomination seconded. There being no other nominations the President placed the name of Dr Ricker before the House for vote, and declared Dr Ricker secretary for the ensuing year.

Dr Hyde moved that the Chair appoint a nominating committee of three to bring in nominations for all the remaining officers of the Society and the House of Delegates, and for the various committees. Motion seconded and so voted.

President Wilson appointed as such nominating committee Dr G B Hyde, Chairman, Dr F J Lawless and Dr F C Phelps.

On motion, seconded and carried, it was voted that the meeting adjourn until 8:30 Friday morning, October 18, 1935, to meet in the same hall.

President Wilson thereupon declared the meeting adjourned until 8:30 Friday morning.

#### FRIDAY MORNING SESSION

In the absence of the President of the House of Delegates, Dr A M Cram, the Vice President called to order the adjourned meeting from Thursday afternoon, of the House of Delegates, at 8:30 Friday morning, October 18, 1935, in the Knights of Columbus Hall, at Rutland, Vt.

Vice President Cram called for the report of the nominating committee.

For the nominating committee Dr F C Phelps reported as follows:

Your nominating committee presents the following nominees for the remaining officers and committees of the Society, and officers for the House of Delegates:

President Lester W Burbank Cabot  
Vice-President John Trotter Jr., Bennington

Secretary Wm G Ricker St. Johnsbury  
Treasurer David Marvin Essex Junction  
Auditor E H Battles Burlington

#### Councillors

First District E A Hyatt, St. Albans  
Second District C M Campbell Manchester Center  
Third District F E Farmer St. Johnsbury  
Fourth District J H Woodruff Barre.

#### Executive Committee

B F Cook Rutland  
W G Ricker St. Johnsbury  
A B Soule Burlington

#### Publication Committee

W G Ricker St. Johnsbury  
C F Dalton Burlington  
A. M. Cram Bridgewater

#### Legislative Committee

C H Beecher Burlington.  
E J Quinn Castleton  
E A. Tobin Bennington.

#### Medical Education

N R Caldwell Burlington  
S W Hammond Rutland  
S S Eddy Middlebury

#### Necrology Committee

B D Adams, Burlington  
G G Marshall Rutland.  
H L Pierce Swanton

#### Medico-Legal Committee

J N Jenne, Burlington.  
F E Farmer St. Johnsbury  
E. A. Hyatt, St. Albans

#### Health and Public Instruction

F J Lawless, Richford.  
A. B Soule, Burlington.  
Stewart Ross Rutland  
A. B Woodman Springfield.  
E H Battles Burlington

#### Delegates

Maine L R Goodrich, Vergennes  
New Hampshire, G B Hyde Wilmington.  
Massachusetts G A Anderson Brattleboro  
Connecticut L. H. Ross, Bennington  
Rhode Island A. L. Fogg Burlington  
New York, L. E. Sample St. Albans  
American Medical Association W G Ricker  
St. Johnsbury Alternate C H Beecher Burlington

#### Anniversary Chairman

O N Eastman Burlington.

#### Members of New England Medical Council

J H Woodruff, Barre.  
G G Marshall Rutland  
W G Ricker St. Johnsbury  
J A Stevenson Chester  
E. A. Hyatt, St. Albans.

#### Nominees to Governor for Appointment to the Board of Medical Registration

#### Officers of the House of Delegates

President F J Lawless, Richford  
First Vice-President Ralph Seeley Rutland

Second Vice-President E D McSweeney, Burlington  
Secretary E J Rogers, Pittsford  
GEO B HYDE,  
F J LAWLISS,  
FRANK C PHELPS,  
Nominating Committee

Dr Beecher moved that the report of the nominating committee be accepted as presented Motion seconded and so voted, and the President declared the nominees elected to the respective offices for which they were nominated

Dr Beecher suggested that inasmuch as the treasurer's report showed an increase of some \$1920 this last year, that it might be well for the Publication Committee to see what arrangements could be made with the *New England Journal of Medicine* in order that each member of the Vermont State Medical Society might receive weekly, instead of monthly, issues of the *Journal*, throughout the year, that under such an arrangement the comparatively few who take the monthly *Journal* might drop that and have the weekly *Journal*

Dr Cramton moved that the Publication Committee be authorized to investigate this matter with the *New England Journal of Medicine* and see if suitable arrangements could be made for weekly copies of the *Journal* to be sent to every member of the Society

Dr Beecher offered the amendment that the committee report back at next year's meeting of the House of Delegates

Amendment accepted by Dr Cramton, and the motion as amended, was seconded, and so voted

Dr Ricker considered this a very good idea and stated that the committee would be very glad to take it up, and also to consider another angle, that inasmuch as the Society is now paying the *Journal* out and out for printing, that possibly a revised printing contract could be secured on the basis of a subscription contract, without its costing very much

Vice-President Cram called for any further unfinished business, and there being none presented, it was moved, seconded and voted that the House of Delegates adjourn

Adjournment

MISCELLANY

VERMONT DEPARTMENT OF PUBLIC HEALTH  
OCTOBER, 1935

The incidence of communicable diseases reported to this Department during the month of October

is as follows chicken pox 194, diphtheria 8, German measles 20, measles 138, mumps 29, poliomyelitis 17, scarlet fever 40, typhoid fever 2, undulant fever 3, tuberculosis 7 and whooping cough 130

The Laboratory of Hygiene made a total of 1,976 examinations in October, the detail of which is,

Examinations for diphtheria bacilli	189
" " Widal reaction of typhoid fever	45
" " undulant fever	74
" " gonococci in pus	172
" " tubercle bacilli	242
" " syphilis	655
" of water, chemical and bacteriological	102
" " water, bacteriological	217
" " milk, market	145
" " milk, submitted for chemical only	3
" " milk, submitted for microscopical	25
" " drugs	1
" for courts, autopsies	3
" " courts, miscellaneous	30
Autopsies to complete death returns	1
Examinations, miscellaneous	72

The Division of Venereal Diseases received reports of 33 cases of gonorrhea and 22 cases of syphilis Five hundred and seventy-six Wassermann outfits and 294 slides were distributed by this Division in October

The Division of Tuberculosis has received orders for 8,000 weight picture cards and 6,000 school inspection cards, from the teachers of the state Sets of posters in posture and nutrition have been supplied to about 500 schoolrooms This Division is now organizing the work of the Christmas seal sales

One hundred and forty-five patients were seen by the Poliomyelitis After Care nurses, 140 of these being at their homes Two patients were admitted to the Audubon Hospital and one patient was discharged from the Massachusetts General Hospital Thirty-one new pieces of apparatus were fitted to patients The Vocational Teacher of this Division reports sales made for the month totaling \$157.21.

The State Advisory Nurse of the Public Health Nursing Division visited twenty towns of the state in the interest of the work of this Division, at tending conventions, assisting in P T A. meetings and giving talks to various groups One thousand, three hundred and sixty-four notifications of birth registration, 489 diphtheria consent cards and 107 baby booklets were mailed to parents during this month

# MEDICAL PROGRESS

## PROGRESS IN TUBERCULOSIS

### 1934-1935

BY JOHN B. HAWES, 2ND, M.D.,\* AND MOSES J. STONE, M.D.\*

THIS past year has shown definite progress in tuberculosis not only in accepting new procedures and ideas, but also in discarding those that have been shown to be not worth while. Surgery of the chest has made rapid strides. There is a better selection of cases as well as a constant improvement in surgical technique. Collapse therapy is no longer looked upon as a last resort measure, while at the same time, there has appeared in the literature a plea for conservatism in this regard much needed in certain parts of this country to check those enthusiasts who would use radical surgery in every case of pulmonary tuberculosis. The B C G treatment—the active immunization of patients with an attenuated strain of tubercle bacilli—is not referred to so frequently in the literature as was the case in the past four to five years. With the exception of W. H. Park and his associates in New York, very little work is apparently being done on this subject in this country. We await with interest the result of Dr. Park's investigations.

Laboratory methods, such as differential leucocyte counts and sedimentation tests, are finding their right place as adjuncts rather than supplementing other tests in diagnosis, prognosis and treatment as their supporters believed would be the case.

#### EPIDEMIOLOGICAL STUDIES

Fellows H. H. (*Am. Rev. Tuberc.* 30 109 [July] 1934) has made a study of the incidence of pulmonary tuberculosis in all applicants for positions at the home office of the Metropolitan Life Insurance Co. In 103 per cent of cases, the x-ray disclosed a definite and characteristic lesion. Among those working in the office and therefore of an older average age, he found an incidence of 3.6 per cent of pulmonary tuberculosis. He calls attention to certain facts which, although recognized for a long time, are well worthy of repeated emphasis.

(1) Routine careful roentgenological examinations disclose a fairly constant and definite percentage of cases of actual pulmonary tuberculosis among the presumably healthy population.

(2) A large proportion of such cases especially in younger persons is apt to be active and in need of immediate treatment or at least careful observation.

(3) Active tuberculosis occurs in older adults more frequently than is generally recognized.

John B. Hawes—President, Boston Tuberculosis Association.  
Moses J. Stone—Assistant Professor Diseases of the Chest, Boston University Medical School. For records and addresses of authors see "This Week's Issue" page 1101.

Reisner, D. (*Am. Rev. Tuberc.* 30 375 [Oct.] 1934) reports the results of an extensive study of the relations between extrapulmonary and pulmonary tuberculosis. In 240 cases with clinically manifest extrapulmonary lesions only about one-fifth presented evidence of active pulmonary lesions. He feels as a result of this work that there is no reason to believe that there is a mutual antagonism between pulmonary and extrapulmonary tuberculosis although he does believe that the individual with a pulmonary tuberculous lesion is far less apt to have some nonpulmonary complication than the reverse. In his experience manifest extrapulmonary lesions are conspicuously rare in the common forms of pulmonary tuberculosis.

Brachman, D. S. (*Am. J. Roentgenol.* 30 303, 1933) urges x-ray examinations of healthy children especially those of high school age. In the course of a study of 35,000 school children including 9,000 of high school age fifteen cases of adult tuberculosis, one per cent of the enrollment, were found in one high school. In only one of these cases were physical signs and symptoms sufficiently evident to demand investigation as to the existence of tuberculosis. The adult type was rarely found in grade school children, but occurred in 0.5 per cent of high school pupils.

Banks, H. S., and Weir, J. H. (*Tubercle* 14 385 [June] 1933) point out that the diagnosis of pulmonary tuberculosis in children is frequently made without sufficient evidence. He stresses especially the fact that pulmonary tuberculosis in children between three and twelve years is very rare and that chronic nontuberculous infection of the lungs at this age is very common. He suggests that more attention should be paid to the efficient treatment of the acute lung conditions. (We would rather disagree with this statement as to the frequency of chronic nontuberculous conditions in young children. J. B. H. M. J. S.)

Pollock W. C., and Forsee, J. H. (*Am. Rev. Tuberc.* 31 203 [Feb.] 1935) discussing the very controversial question whether a slight tuberculous infection is or is not a good thing in that it causes a certain degree of immunity are of the opinion that tuberculous allergy which follows an initial invasion of the host by tubercle bacilli serves when maintained at an optimum level as a protective agent. They do not believe, however, that all primary tuberculous invasions are so benign in character. The protective quality of small infections they feel may hinder or prevent later exogenous reinfections.



When the cavity is larger, collapse in one of its forms should be immediately resorted to unless there are other contraindications. Secondly, he contends that compression should be confined to the diseased portion of the lung, in other words the collapse should be a "selective" one and should not collapse the unaffected parts of the lung (Exactly how he plans to arrange this we do not know J B H-M J S). Thirdly, he believes that the only criterion of a satisfactory result is x-ray evidence of a closed cavity. Fourthly, he stresses the point that in considering collapse therapy for any individual, one should think of it in all its forms, any one or combination of which may have to be used at the appropriate time.

Peters, A, Pope, A. S, Morriss, W H, Packard, E N, and Miller, O O (*Am Rev Tuberc* 31 85 [Jan] 1935) report the results of their survey of artificial pneumothorax in representative American tuberculosis sanatoria. These men were appointed by the American Sanatorium Association to report on pneumothorax therapy in this country.

They found that the proportion of patients in whom therapeutic pneumothorax was induced or attempted varied from less than one per cent to thirty-four per cent with an average of approximately ten per cent. In their survey exactly twice as many females as males received pneumothorax treatment. By far the largest number of these patients were between the ages of twenty and thirty-five. In only thirty-eight per cent of the cases included could an effective collapse be obtained, while in nearly two-thirds of the series studied, it was necessary to discontinue treatment prematurely, most frequently because of the development of pleural complication, especially obliterative adhesions. The later results, however, one to fifteen years after termination of pneumothorax treatment appeared to be distinctly gratifying. Over seventy per cent of those followed were still living and of these seventy-five per cent were able to work. They conclude that considering its limitations, artificial pneumothorax appears to be one of our most valuable therapeutic measures in the treatment of pulmonary tuberculosis. They add that discontinuance of treatment is warranted in many cases after a reasonable and adequate period of effective treatment. They fail though to explain the term "reasonable and adequate period" (It must be admitted that this painstaking survey adds remarkably little to what we already know on this subject J B H-M J S).

Jones, K P (*Am Rev Tuberc* 30 670 [Dec] 1934) discusses the technique of artificial pneumothorax treatment. He finds as a result of a questionnaire sent to ninety different clinics that more than fifty per cent of the men doing pneumothorax work do not use gloves or a sterile gown and that there is a

definite tendency to use ordinary aspirating needles about gauge eighteen and two inches long instead of special ones for this purpose. Fluoroscopy as a check-up to refills is advised by practically all clinics. Opinions varied greatly as to the length of time for the maintenance of pneumothorax treatment, the average time being two and a half years.

Head, J (*Am Rev Tuberc* 30 277 [Sept] 1934) discussing bilateral artificial pneumothorax states that if pneumothorax is stopped on one side and started on the other, or if the pneumothorax on the side continued in collapse, be kept selective, no increased burden is thrown upon the affected areas in the opposite lung.

Myers, J A, and Levine, I (*Am Rev Tuberc* 31 518 [May] 1935) appeal for earlier collapse treatment in the progressive minimal cases of pulmonary tuberculosis. They state that there is no more reason why we should wait to institute collapse therapy until the disease has become extensive and the risk poor than there is for the surgeon to wait until the appendix has ruptured before he operates. They point out that there are two chief dangers from procrastination in progressive minimal pulmonary tuberculosis. The first danger is to the patient himself. The more the disease spreads, the more destruction of lung tissue will result and the more likely he is to become definitely ill from it. Cavities form, and the lung often becomes adherent to the chest wall. The second danger is to his associates. Thus they conclude that if one acts quickly in the institution of collapse therapy, extension of the disease may be prevented, and if the sputum is positive it may readily and early be rendered negative. (The growing tendency toward radicalism in collapse therapy is to be deplored. We still believe that nature should be given a chance and that two to four months of observation in such cases is none too long J B H-M J S).

Kremer, W (*Beitr z Klin d Tuberk* 83 675 [Nov] 1933) discusses the various indications for collapse therapy. He believes that pneumothorax should not be given in the presence of very recent and destructive infiltration, because of the danger of pleural rupture. He feels that it is better to keep the patient at absolute bed-rest until some fibrosis has replaced the infiltration. He is of the opinion that it is useless to continue pneumothorax over a long period of time in the presence of large stiff-walled cavities. In such cases, pneumothorax should be considered only as preliminary to thoracoplasty, partial or complete.

O'Brien, E J (*Am J Roentgenol* 30 315, 1933) is firmly of the opinion that in patients with minimal lesions, the proper use of collapse therapy may lead to recovery in almost all cases. He prefers phrenicectomy as a sim-

pler procedure than pneumothorax and one which accomplishes the desired result in many patients. He finds that temporary paralysis of the diaphragm from simple crushing of the phrenic nerve is sufficient to allow healing in some cases, but that a permanent paralysis with or without pneumothorax is ordinarily desirable. In his experience, the paralyzed diaphragm, although losing its muscle tone becomes a tense firm membrane stronger if anything, than before. (The last statement needs further study and confirmation before being accepted as true J B H M J S)

Morgan, R. (*Am. J Roentgenol* 33 309 [1933]) makes a plea for artificial pneumothorax therapy in bilateral cases of pulmonary tuberculosis. In his experience unilateral collapse commonly has a favorable effect on both lungs. The most reasonable explanation of this effect on the contralateral lung is because of the decreased size of the thorax due to the shifting of the mediastinum. He found that in many cases of far advanced tuberculosis at first looked upon as hopeless much improvement has followed energetic and persistent employment of collapse measures, and he recommends that patients of this type be offered this chance. (Although it is undoubtedly true that bilateral pneumothorax is not used as much as it should be, the fact remains that it is only in comparatively few cases and only after mature study that it should be tried. J B H M J S)

Nehrl L W and Alexander J J (*Thoracic Surg* 2 549 [Aug] 1933) give the results of their extensive experience with phrenic paralysis. The best results were obtained in limited fresh lesions, the worst results in cases with extensive fibrotic lesions containing large stiff walled cavities. On the whole, they are satisfied that phrenic paralysis is of genuine value in the treatment of pulmonary tuberculosis. Paralyzing the diaphragm did not cause adhesion formation which might subsequently interfere with induction of pneumothorax.

Schwatt, H. (*Am J M Sc* 187 338 [March] 1934) studying the behavior of the diaphragm after phrenicocoelectrolysis found that the degree of elevation of the diaphragm bears no consistent direct relation to the time elapsed after operation. The amount and time of the maximum rise depend on the combined action of the intra thoracic and intra abdominal pressures, atrophy of the diaphragm, and the character of the pulmonary lesion, especially when it is in the lower lobe.

McCarthy, C K. (*Am Rev Tuberc* 30 677 [Dec] 1934) gives his results of oleothorax therapy in a series of fourteen cases. He finds that oleothorax is an effective method in combating progressive pulmonary tuberculosis after other methods have failed. He used it in the obliterate

tive pneumothorax cases, in cases of pneumothorax treatment where cavities resisted closure, and in cases of pyopneumothorax. He concludes that the procedure merits more extensive study and trial. (While it is undoubtedly true that oleothorax should be used more than it is at present, it still remains a procedure which should be carried out only in an institution and under close expert supervision J B H. M. J S)

Dufault, P L, and Laroche, A. (*Am Rev Tuberc* 31 139 [Feb] 1935) attempt to answer that very elusive question of how long pneumothorax should be continued. They make an excellent remark that the nature of the pulmonary lesion before collapse is a more important factor than the amount of involvement or the age of the patient. In general they feel that a simple exudative lesion should receive pneumothorax treatment for a period of at least two to three years. In case of older fibroid processes with thick walled cavities a minimum of five to seven years is required. They plead for longer rather than shorter periods of treatment.

Head, J. (*Am Rev Tuberc* 31 386 [April] 1935) reports on the results of a series of fifty thoracoplasties in which different types of operation were used. Fifty-six per cent were arrested, eighteen per cent markedly improved, two per cent unimproved, two per cent died from the operation, and six per cent died later of other causes. He attributes these favorable results to freer and earlier use of this operation and to the fact that in every case the collapse was extremely complete. On the whole, he found that the results in the different groups of cases were in proportion to the completeness of the collapse of the diseased lung.

Crumm, P D, Strayer, J W, and Baker C S. (*Am. Rev Tuberc* 31 1933 [April] 1935) report on ninety two thoracoplasties on fifty consecutive patients in whom there was no operative mortality. All of their cases were definitely improved. They admit that all the patients selected for operation were good operative risks, and that with one exception the disease was inactive. (Under such circumstances it is not surprising that such good results were obtained J B H M J S)

Alexander J. (*Arch Surg* 28 538 [March] 1934) describes his method of pneumolysis with pectoral muscle fillings. He is enthusiastic concerning the advantage of this method but the fact that he employed it only seven times in a series of over 1100 other operations for pulmonary suppuration shows that the indications for this operation present themselves only in rare instances.

Joannides, M. and Shapiro P. (*J Thoracic Surg* 8 815 [Feb] 1934) recommend supraclavicular apicectomy as an additional conservative method to be used for patients in

whom major surgical procedures are contraindicated

Cutler, J W (*Am Rev Tuberc* 30 416 [Oct] 1934) gives a clinical analysis of the treatment of adhesions in artificial pneumothorax. After discussing the various types of adhesions with the indications and contraindications for surgery, he concludes that closed pneumolysis can now be performed with relative ease and safety and is the operation of choice in such cases.

Peters, L S, and Cornish, P G (*J A M A* 101 826 [Sept 9] 1933) discuss the rôle of pneumolysis as an adjunct to artificial pneumothorax. They state that compression is successful only as it is complete. They feel that pneumolysis is of great value by means of which they have converted seventy-five per cent of partial pneumothorax collapse into complete collapse. For patients whose cavities are not closed after a few months time with pneumothorax or an adherent pleura they advise extrapleural pneumolysis, with the introduction of a paraffin pack.

Matson, R C (*Surg Gynec & Obst* 58 619 [March] 1934) urges the use of the electrosurgical method in intrapleural pneumolysis instead of the galvanocautery. He found that the use of the electrosurgical method has eliminated the numerous disadvantages of the galvanocautery, namely heat, smoke, pain reaction after operation, and serious hemorrhage. Of 249 cases treated, sixty-one per cent were technically and clinically successful. There were two deaths, one due to spontaneous rupture of the lung following an asthmatic attack seven days after operation, the other from a profuse hemorrhage after the lung was successfully collapsed. The patient in the latter case was bleeding profusely from an open cavity before operation.

#### CHILDHOOD TYPE OF TUBERCULOSIS

Nalbant, J P (*Am Rev Tuberc* 30 458 [Oct] 1934) makes an analysis of pulmonary tuberculosis in infancy, childhood, and adolescence. In general he concludes that childhood type tuberculosis is a definitely benign disease with a good prognosis, in contrast to the adult type which is progressive and destructive. He speaks, however, of acute exacerbations characterized by fever, loss of appetite, general malaise, cough and even tubercle bacilli in the sputum, which usually soon subside. He feels that the reason these acute exacerbations behave in this favorable way is due to the fact that in these children sufficient time has not elapsed to permit them to lose their high allergy to the invading organism. Later on, when reinfection takes place after the hypersensitivity has subsided, then the response will be entirely different with more localized disease and less tendency to general reaction and greater

destruction of tissue. He notes especially the importance of early diagnosis and the need of surgical treatment of adult type lesions in the adolescent age.

Wood, W B (*Lancet* 2 797 [Oct. 7] 1933) divides pulmonary tuberculosis in childhood into a benign group and a serious group. In the benign group he includes the following:

- (1) Tuberculous adenitis and epituberculous manifestations
- (2) Chronic miliary tuberculosis
- (3) Tuberculous pleurisy with effusion

In the serious group he lists

- (1) Acute miliary tuberculosis
- (2) Tuberculous pneumonia
- (3) Adult type of phthisis

Among other things, he speaks again of "epituberculosis." He describes the signs of this condition as those of a lobar consolidation which usually involves the right upper lobe. It is seldom accompanied by symptoms of acute disease and runs a chronic course. There is no respiratory distress and neither the fine crepitations of incipient tuberculosis, nor the coarse crepitations of resolving pneumonia are heard. The process resolves, leaving a perfectly healthy lung or in some instances slight evidence of parenchymatous scarring. He feels that this whole condition may be an exudative response or an atelectasis due to compression of a main bronchus by an enlarged node. (Despite this we do not like the term "epituberculosis", nor do we feel that it represents a definite clinical entity. J B H-M J S)

Park, W H, Kereszturi, C and Mishulow, L (*J A M A* 101 1619 [Nov 18] 1933) present two groups of children for consideration in order to show the difference between children of tuberculous families after vaccination and without vaccination with B C G. They found that the mortality from tuberculosis among children vaccinated with B C G was definitely lower than that for corresponding controls. They found that B C G is so attenuated that even under the most favorable conditions of artificial cultivation it is difficult to increase its virulence to any degree. Pathological material obtained from children who were vaccinated with B C G and died of other infections showed no evidence that B C G tended to increase in virulence during its residence in the human body. The authors also do not think that slight primary tuberculous infection acquired by natural infection or produced by vaccination diminishes resistance against future superinfections by tuberculosis.

#### SILICOSIS

Bohme, A (*Beitr z Klin d Tuberk* 84 119 [Dec] 1933) observed a group of 300 patients with silicosis. One-half of the patients were observed five to eleven years. After five years

more than one half of all these patients were dead. Of those who died seventy two per cent had an active pulmonary tuberculosis while in thirty five per cent of all cases tubercle bacilli were demonstrated. He also found that the prognosis of silicosis is much graver in younger people. Silicosis in later age is not infrequently quite stationary. In general he found that in the presence of slight or first degree silicosis pulmonary tuberculosis is not noticeably modified, but patients of second or third degree silicosis show a marked susceptibility to tuberculosis and in such individuals tuberculosis is always progressive.

Merewether E. R. A. (*Tuberc* 15 69 [Nov] 1933) gives his results of a very exhaustive study on the subject of asbestosis. He defines asbestosis as a specific occupational disease of the lungs caused by the inhalation of asbestos dust and characterized by the progressive development of fibrous tissue. The symptoms are insidious in their onset and irregular in their course. They consist mainly of cough and dyspnea. The roentgenograms show a diffuse ground glass appearance together with a fine pinhead mottling. Death usually results from a low grade bronchopneumonia, but may be due to lobar pneumonia, bronchitis influenza or less often a subacute tuberculous infection. In the lungs of asbestos workers are found asbestos bodies and spicules. From case histories, he found that when the dust is highly concentrated the minimum period between the commencement of exposure and the production of a serious degree of asbestosis is approximately seven years, although the average interval is about eleven years.

Ellman P. (*J Indust Hyg* 15 165 [July] 1933) points out that the dyspnea in asbestosis which is one of the earliest symptoms is always progressive and may be out of proportion to the physical signs. Emaciation is also a distinctive feature while all the symptoms are worse in cold weather. He points out that formerly it was considered that tuberculosis was an uncommon complication of asbestosis. It is now, however, known from studies made in later stages of the disease that there is a definite hazard of tuberculosis to asbestos workers.

#### LARYNGEAL AND INTESTINAL TUBERCULOSIS

Crawford P. M. and Sawyer H. P. (*Am Rev Tuberc* 30 568 [Nov] 1934) present their findings in 1400 autopsies on patients who died of pulmonary tuberculosis.

In this series 68.8 per cent of cases of fatal phthisis showed at autopsy ulcerative tuberculous lesions of the intestines. Tuberculous laryngitis occurred in 36.6 per cent of cases of intestinal tuberculosis but 96.6 per cent of cases of tuberculous laryngitis showed intestinal ulceration. They found that the portal of entry for tuberculous intestinal infection is the lower

ileum. In cases of fatal phthisis with intestinal ulceration the incidence of amyloid disease is only slightly higher than in those without this complication. They emphasize the fact that a large proportion of tuberculous intestinal ulceration is not characterized by any definite symptoms during life. They conclude that the clinical detection of advanced tuberculous enteritis is of prognostic importance only, pointing toward an early fatal termination of the case.

Dworetzky, J. P. (*Am Rev Tuberc* 31 443 [April] 1935) gives a review of his twenty years' experience with laryngopulmonary tuberculosis. In his experience tuberculosis of the larynx is always a complication of pulmonary tuberculosis. The treatment therefore should be mainly that of the pulmonary disease. Colapso therapy will not only prevent the development of laryngeal tuberculosis but will also promote healing of coexisting laryngeal lesion. As to direct treatment vocal rest is of primary importance especially if the laryngeal lesion is of the acute or subacute type. When the lesion is more or less localized cauterization by galvanocautery is the most valuable remedy we possess at present. When cauterization does not relieve dysphagia, he advises blocking of the internal branch of the superior laryngeal nerve with alcohol.

#### PREGNANCY AND TUBERCULOSIS

Ornstein, G. G., and Kovnat, M. (*Am Rev Tuberc* 31 224 [Feb] 1935) studying the effect of pregnancy on the prognosis in pulmonary tuberculosis found that the bad prognosis did not depend on the pregnancy but on the character of the pulmonary tuberculosis. All their deaths were in the caseous pneumonia group. On the other hand in the resolving exudative and chronic productive groups in which the prognosis is better and usually good, there were no deaths. Compared again with the non-pregnant group, pregnancy in itself had only a minor effect on the prognosis of the disease in the caseous pneumonia group. They conclude that the death rate differs very little in the pregnant women from the nonpregnant group if analyzed according to a qualitative classification rather than a quantitative.

Krause A. K. (*Editorial Am Rev Tuberc* 31 254 [Feb] 1935) discusses the subject of pregnancy and tuberculosis editorially. He feels that just as normal and healthy women react differently to pregnancy, there being some for whom pregnancy is a positive physiological boon and again others an unmitigated evil, likewise in case of the tuberculous woman pregnancy may arouse or it may quiet down active tuberculous processes. He points out that pregnancy may exert a harmful effect on tuberculosis in those women who, without tuber-

culosis would naturally tolerate pregnancy poorly, and a harmless or even beneficial effect on those tuberculous women who without tuberculosis, would stand pregnancy well or even have their bodily economy improved by pregnancy

## MISCELLANEOUS

Frommel, E (*Rev de la tuberc* 1 256 [March] 1933) finds that when primary carcinoma of the lungs is associated with tuberculosis the two were always situated in the same lung, and almost always at the same level in the same lobe, that the tuberculosis always preceded the carcinoma usually by several years, and that at death the tuberculous tissue is usually destroyed by the carcinomatous growth

Beaumont, G E (*Lancet* 2 918 [Oct 21] 1933) studying the relationship of vital capacity to activity in pulmonary tuberculosis found that an early *active* lesion will usually lower the vital capacity more than an extensive quiescent one. He did not obtain any evidence to suggest that the lowering of vital capacity in active tuberculosis was due to toxic weakening of the power of the expiratory muscles

Rienhoff, W F (*Bull Johns Hopkins Hosp* 53 390 [Dec] 1933) reports two complete pneumonectomies. In one case of a child of three, and in another, a woman of twenty-four, the left lung of each was removed because of the presence in one of a benign and in the other of a malignant tumor. Two weeks before operation the lung was collapsed by pneumothorax thus establishing a new circulatory, and respiratory equilibrium. Following removal of the lung, the wounds were not drained, and aspiration revealed only a small amount of serosanguineous fluid. In each case the heart was displaced to the left and the right lung expanded into the left chest within three months

Jackson, C, and Jackson, C L (*Am Rev Tuberc* 30 599 [Dec] 1934) suggest that the primary causes of bronchiectasis are as follows

(1) Excessive viscosity of the primary pathological bronchial secretions

(2) The secondary changes which this putrefactive process brings about in the walls of the bronchi

They conclude that the chief means of preventing bronchiectasis is by forestalling the septic-tank processes by bronchoscopic aspiration of the viscid pathological bronchial secretions before they have time to decompose. They find that the primary pus in bronchiectasis is not coughed up, hence sputum studies are misleading and, autogenous vaccines ineffective. The important organisms are found only in the residual pus removed bronchoscopically from primary foci after the bronchiectatic septic tank has been emptied by bronchoscopic aspiration

Overholt, R H (*Am Rev Tuberc* 31 121 [Feb] 1935) makes an interesting observation in cases of bronchiectasis of the left lower lobe. He points out that only the secondary effects produced in the upper lobes may be visualized on the plain x-ray film as the process itself may be hidden by the cardiac shadow. The secondary effects are revealed in the plain roentgenogram as a difference in density of the lung fields (indicating distention of the upper lobe on the affected side) and as an inequality in the position of the diaphragm best seen in the lateral roentgenogram. He feels that when such changes are seen in the ordinary P-A and lateral views, by inference an atelectatic bronchiectasis of the lower lobe should be suspected. The investigation then can be supplemented by bronchoscopy and bronchography to confirm the diagnosis

Cocke, C H (*Am Rev Tuberc* 31 404 [April] 1935) discusses pleural shock and air embolism. He is of the opinion that shock from air embolism is a rare occurrence, whereas shock from pleural irritation is probably a relatively common occurrence

Wasson, W W and Waltz, H D (*Radrol* 22 432 [April] 1934) studied the relationship of sinusitis to pulmonary infection in 158 children. They feel that there is a definite relationship between sinus disease and non-tuberculous chest disease. The onset in both regions is approximately coincidental and progress in one parallels the other. They also found that cessation of sinus disease is usually accompanied by cessation of progress of non-tuberculous chest disease

## CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C CABOT M.D.

TRACY B. MALLORY, M.D., Editor

### CASE 21481

#### PRESENTATION OF CASE

Approximately one year before entry the patient, a forty year old Portuguese-American restaurant worker, began to complain of generalized weakness. He consulted a physician who believed his symptoms were due to a run down condition. His weakness progressed and approximately six months before entry he first noticed shortness of breath on climbing stairs and later even upon walking on level ground. He was forced to stop working and for the past five months remained at home. He was forced to use two pillows at night. Six weeks before admission he noticed edema of his legs, especially after standing, a symptom which progressed during the past two weeks. The edema developed even while sitting in a chair. During this period he had frequent attacks of nocturnal dyspnea. Three weeks before entry he caught a cold which was associated with a persistent relatively unproductive cough. Two weeks before admission he had an attack of chills and fever at which time he had chest pain in the region of the left shoulder girdle and also two or three precordial twinges. For a few days, during which time he coughed quite severely, the phlegm was blood streaked. Ten days before entry he consulted his physician who prescribed some white pills, six to eight a day, which relieved his nocturnal dyspnea and produced some alleviation of his other symptoms. The pills, however produced nausea and he stopped the medication two days before entry.

His family history is non-contributory.

At the age of eighteen he had an attack of acute rheumatic fever with involvement of several joints. The symptoms persisted for about seven months. He had had no attacks since then. There was no history of scarlet fever, chorea or pneumonia. He had consumed a large quantity of alcohol in the past, drinking about one quart or so of whiskey a day, but during the past year limited himself to an occasional glass.

Physical examination showed a well-developed and nourished man sitting upright in bed in slight respiratory distress. The neck veins were congested. The chest was slightly barrel

shaped, and examination of the lungs showed numerous râles throughout. In addition, the bases were slightly dull. The heart was enlarged, the left border being 9 centimeters from the midsternal line, the right 2 centimeters. The heart sounds were distant, no thrills could be felt. There were systolic and diastolic murmurs at the apex. No murmurs could be heard at the base. The rhythm was irregular. The blood pressure was 130/90. The abdomen was distended, moderately tympanitic, but in addition contained some fluid. There was pitting edema of the lower extremities.

The temperature was 97.4°, the pulse 118. The respirations were 20.

Examination of the urine showed a specific gravity of 1.010 to 1.020 and a slight trace of albumin. The blood showed a red cell count of 5,650,000, with a hemoglobin of 90 per cent. The white cell count was 13,700, 57 per cent polymorphonuclears. The stools were negative. A Hinton test was negative. An electrocardiogram showed normal rhythm, rate 90, interrupted by ventricular premature beats. There was left axis deviation and slurring of Q-R-S complexes. There were also low, slightly diphasic T waves in all leads. Lead 4 showed absent Q, tall R, and deep T waves. The sedimentation rate was plus or minus 0.30 millimeters per minute. Two blood cultures were negative.

X-ray examination of the chest showed both costophrenic angles and the lower lung fields obliterated by dullness. The lung markings were somewhat increased. The heart was enlarged in both diameters, particularly in the region of the left ventricle. The aorta was slightly tortuous but not widened.

He was put on digitalis and in addition was given salyrgan intravenously on the seventh day. Salyrgan was again given on the tenth, fourteenth, seventeenth and twenty second days without any diuretic effect. He developed edema of his hands and during the fourth week had a thrombosis of the right median vein which had previously been used for salyrgan injection. At about this time his temperature began to rise, reaching 103°. He also had some pleural pain. His white blood cell count was 8,600, and the sedimentation rate was 0.53 millimeters per minute. His fever continued and he rapidly went downhill. The lung fields on both sides were dull and moist râles were heard throughout. He had a hemoptysis and died one month after admission.

#### DIFFERENTIAL DIAGNOSIS

Dr. J. H. MEANS. The history is that of progressive congestive heart failure developing during a period of one year or less, with the added picture at the end of pulmonary infection, chills, fever, chest pain, cough and bloody sputum. The frequent attacks of nocturnal

dyspnea suggest a lesion gravely involving the myocardium

There is a story of rheumatic fever at eighteen but that by no means proves that this man's heart disease is rheumatic in its etiology. Rheumatic fever coming for the first time at the age of eighteen is rather apt to spare the heart. It is much more likely to involve the heart in childhood than in adult life. In this particular case the onset of symptoms of heart failure coming on for the first time at the age of forty incline me to suspect more syphilitic heart disease or some type of degenerative heart disease than rheumatic heart disease. Hypertensive heart disease may behave in this fashion.

The physical examination showed a man with orthopnea and engorged neck veins. Engorged neck veins in the upright position are always important. They indicate of course a high venous pressure. Any type of right sided heart failure may produce such a picture. The conditions which produce engorgement other than ordinary congestive failure are constrictive pericarditis, mediastinal disease which occludes the great veins, and under acute circumstances pulmonary embolism. There is nothing to suggest the last mentioned in the early stages of this case. Later, although we are told of no sudden episode other than hemoptysis it appears that the man had some venous thrombosis from which an embolus could have been derived. The cardiac enlargement present is entirely left sided. The murmurs present could be due to either mitral or aortic disease. We would have to know more about them than we have been told, to say much. Of course the absence of murmurs at the base points more toward the murmurs being mitral but there are cases where aortic murmurs are heard only at the apex. The rhythm is described as irregular but it turns out later that cardiogram shows this not to be fibrillation. There is no mention of engorgement of the liver so we must assume that it was not demonstrable. Some pitting edema of the lower extremities and slight ascites were present.

The most important items in the laboratory findings are the negative Hinton test, which is considerable evidence against syphilis, although not absolutely excluding it, and the cardiogram showing ventricular premature beats and left axis deviation. The first sedimentation rate described is within normal limits and the second one just slightly above the upper border of normal. The two negative blood cultures may be significant.

The x-ray findings are consistent with a slight amount of fluid at the base of each chest.

One other aspect of the case is that the natural therapeutic effort to produce a diuresis with salyrgan was apparently complicated by a thrombosis of his right median vein. If we

were told that he had had some pleural pain subsequent to this incident it might represent an embolism. But since the pleural pain antedated his hospital entry it does not seem to me that embolism is an important part of the total picture. Certainly it had nothing to do with the engorged neck veins which he had before the thrombosis was produced.

There is no doubt that this man died of some kind of heart disease. The question is chiefly what kind. An old rheumatic mitral disease with a very recent fresh bacterial endocarditis on top of it is a possibility. We are not justified in making such a diagnosis with finality because we have no evidence of embolic phenomenon or an infection of the blood stream, nor have we a right to make a diagnosis of syphilitic heart disease, although I believe it is entirely possible. There is no evidence to suggest disease of the coronaries, nor can I say with certainty that there is any involvement of the pericardium. I am obliged somehow to account for the fever. I have mentioned the endocarditis possibility. I believe a more likely one is that the infectious process is in his lungs and is a low grade terminal bronchopneumonia, a type of infection to which patients dying of heart failure are especially prone.

I believe this was a death from congestive heart failure with a superimposed infection, possibly bacterial endocarditis, possibly bronchopneumonia. My alternate diagnoses are syphilitic heart disease with some terminal infection, or hypertensive heart disease with some terminal infection.

#### CLINICAL DIAGNOSES

Rheumatic heart disease  
Congestive failure  
Bronchopneumonia

#### DR J H MEANS'S DIAGNOSES

Congestive heart failure, probably rheumatic in origin  
Bronchopneumonia

#### ANATOMIC DIAGNOSES

Rheumatic heart disease  
Endocarditis, chronic rheumatic, mitral and aortic with slight stenosis  
Cardiac hypertrophy and dilatation  
Petechial hemorrhages of the pericardium  
Thrombosis of the right median basilic vein  
Pulmonary embolism  
Pulmonary infarction  
Ascites  
Hydrothorax, bilateral  
Peripheral edema  
Pleuritis, chronic fibrous  
Congestion of the liver, spleen and kidneys

## PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY Dr. Means was quite right in believing that this man died primarily from congestive heart failure, and was probably wisely cautious about trying to name the exact cardiac lesion. The murmurs found were consistent with either mitral or aortic disease, as he pointed out, and although their location favored mitral involvement the other clinical findings, such as the predominant left-sided hypertrophy, the very rapid progression of the decompensation, the lack of auricular fibrillation, the left axis deviation, the attacks of nocturnal dyspnea, and the slight anginal episodes, all favored aortic disease.

What we found at autopsy was a considerably enlarged heart, weighing 525 grams with hypertrophy of both the right and the left ventricles, though the left ventricular enlargement was the more marked. Both the aortic and the mitral valves were involved both certainly stenotic and both probably somewhat insufficient. The character of the valve lesions left no doubt of their rheumatic origin and there was no trace of any fresh endocarditis.

The pulmonary complication, which both Dr. Means and the clinicians on the wards had interpreted as bronchopneumonia, turned out to be multiple pulmonary emboli with infarcts varying from one centimeter up to five centimeters in diameter. Every year we have two or three cases in which unsuspected infarction of one or another organ has caused fever and leukocytosis, and is consequently mistaken for an infectious process. There is comparatively little doubt that the emboli arose from the thrombosed median vein in the right arm which at autopsy still showed fragments of adherent thrombus. Since none of the emboli were large however, and most of the patient's symptoms antedated them by several weeks, I do not believe that they represented a very important element in his death.

The rest of the body was essentially negative except for the evidences of severe chronic passive congestion and the accumulation of large amounts of fluid in the pleural cavities and abdomen.

## CASE 21482

## PRESENTATION OF CASE

A seventy year old white American male was admitted complaining of a swelling in the neck.

For about a year before entry the patient had observed a slowly growing mass in the lower anterior portion of the neck, more on the left side, which had gradually increased in size until at the end of six months it was quite conspicuous. There had never been any pain or respiratory difficulty. Occasionally when attempting to swallow a particularly large bolus

of food he had a slight sensation of constriction in his throat but there was no other dysphagia. He had noticed no change in his voice. There had been no nervousness, loss of weight, or abnormal sweating. Recently he had had occasional difficulty in initiating his urinary flow.

His first wife had died of tuberculosis two years after marriage. The remainder of the family history is non-contributory.

Physical examination showed a well developed and nourished elderly white man who was not acutely ill. The left pupil was slightly larger than the right but both reacted to light and distance. The teeth had been removed. A large mass was seen and felt in the lower portion of the neck, more on the left side. The mass was soft and nodular in character and seemed to be fairly well fixed to the deeper neck structures. The heart and lungs were negative. The blood pressure was 184/100. The prostate was symmetrically enlarged, firm and smooth. There was a dermatitis about the scrotum and groins the character of which was not recorded.

The temperature was 98°, the pulse 78. The respirations were 20.

Examination of the urine showed a specific gravity of 1.010 to 1.026. There was a slight trace of albumin. The sediment was normal. The basal metabolic rate was plus 8.

X ray examination showed a large soft tissue mass in the neck which displaced the trachea to the right. There was no evidence of sub-sternal goiter. The lung fields were clear. There was tortuosity of the aortic arch.

Three days after admission an operation was done upon the neck and an infiltrating mass extending from the left lobe of the thyroid was only partially removed because of its extension into the deeper tissues. The patient made a fair recovery postoperatively except for some difficulty in voiding. The wound did not heal so promptly on the left side as it did on the right. The temperature remained normal throughout save for occasional transient rises to 100° during the first postoperative week. He received four x ray treatments to the neck and was discharged four weeks after admission.

After his discharge he was followed in the Outpatient Department where he received several courses of x ray treatment to the neck. His general condition slowly improved. The small non-draining sinus persisted within the operative scar. Two and a half months after discharge the scar was reported to be deeply pigmented and on the left side of the neck there was a large, atony hard, irregular mass extending back to the trapezius. It came to the clinic irregularly for about a year and then did not return until three years later. At this time he stated that he had had a "cold" with hoarseness and loss of weight for two months. There had been some choking sensation and dysphagia.



He had had "shingles" three months before. The mass in the neck was now entirely stony hard and extended from the angle of the left jaw to the clavicle.

*Second Admission*, six months later, four and a half years after the first admission.

He was again admitted complaining of increased difficulty in swallowing and hoarseness. The dysphagia, which had been slowly progressive, had become much worse during the three weeks prior to entry. He was compelled to chew foods very thoroughly and occasionally wash them down with some liquid. His weight had decreased during the preceding year from 175 to 140 pounds. The hoarseness had become more pronounced. He had occasional dysuria with the passage of dark blood streaked urine which contained many shreds and considerable sediment.

Physical examination showed a fairly well-developed but poorly nourished elderly man. The tonsils were small and buried. The uvula was bifid and the pharynx was slightly injected. The epiglottis was slightly thickened and irregular and was compressed to the right by the mass in the left side of the neck. The left arytenoid was swollen and edematous and the false cords were reddened and thickened. The right cord moved but the left did not. The mass in the neck measured 3 by 3 by 1 inch and was attached to the skin. There were no nodes palpable on the right side. The heart was normal except for frequent extrasystoles. The blood pressure was 124/78. The lungs were negative. The prostate was not enlarged but there was a small nodule in the right lobe.

The temperature, pulse and respirations were normal.

Examination of the urine showed a slight trace of albumin. The sediment contained 25 white blood cells per high power field but was otherwise negative. The blood showed a red cell count of 4,800,000. The white cell count was 9,400, 46 per cent polymorphonuclears, 54 lymphocytes. Hinton and Wassermann tests were strongly positive.

On the day following admission a tracheotomy was performed under local anesthesia. Three days postoperatively a slight reddening was observed about the wound and the temperature rose to 101°. This reaction subsided in two days. On the ninth postoperative day the temperature again rose to 101° and the patient appeared to be quite weak. A red, slightly indurated, sharply outlined eruption appeared on the neck and spread from the tracheotomy wound. This gradually extended to the chest, abdomen and left arm, and the temperature rose to 103°. The patient became progressively weaker and died on the thirteenth hospital day.

#### DIFFERENTIAL DIAGNOSIS

DR. MARSHALL K. BARTLETT. We are told that this is a tumor arising in the left side of

the thyroid so we do not have to speculate about other possibilities. It is interesting, however, to speculate as to what type of enlargement this is. I think we can rule out thyroiditis. It is asymmetrical, nodular and soft. It gives pressure symptoms. All of these can be explained by a nodular goiter. None of the symptoms are particularly suggestive of toxicity and the basal metabolic rate is normal. The other possibility that we must consider is malignancy. In favor of that are the following: first, his age, seventy; secondly, the statement in the physical examination that the tumor is fairly well fixed to the deeper neck structures; and thirdly, the fact that it is noted that the pupil on the left side is larger than the right. Against malignancy are the consistency of the mass, which is soft and nodular, and the fact that he has had no weight loss and no voice changes. It would be interesting to know in addition whether the left vocal cord moved but I take it it did. We would also like to know how much the mass moved with swallowing. But in the presence of inequality of the pupils, with a mass which is fixed to the deeper structures in a man of seventy, in spite of inconsistencies, we have to suspect strongly the possibility of malignancy.

The difficulty in voiding is probably explained on the basis of the prostatic enlargement noted in the physical examination.

I would conclude from the operative note that this was a malignant tumor and was only partially removed for that reason. The interesting thing to decide from now on is what type of tumor this is.

"Two and a half months after discharge on the left side of the neck there was a large, stony hard, irregular mass extending back to the trapezius." That is very important in view of the recent series of x-ray treatment that he had had. Apparently this tumor, whatever it was, did not respond well to radiation.

I would like to know the distribution of the shingles. It is believed that, in some cases of malignancy, involvement of the posterior root ganglion leads to shingles over the distribution of the corresponding nerve.

The blood pressure has gone down considerably since the first admission, when it was 184/100.

At the first admission the prostate was described as smooth and symmetrically enlarged. It is now noted as not enlarged, with a small nodule in the right lobe. I think we can probably explain the urinary symptoms and the passage of blood streaked urine on the basis of his prostate, but I do not believe it is related to the process in his neck.

So far I think his story is entirely consistent with that of thyroid malignancy with an attempt at operative removal and x-ray treatment but with steady progress of the disease. I think the most likely diagnosis is carcinoma of the

thyroid Everything fits in with that. It fails to respond to x ray I do not believe that his prostate has anything to do with it, nor do I believe that the Hinton and Wassermann have.

The patient died on the thirteenth hospital day which is about ten days after the first appearance of sepsis in the wound. That is presumably a cellulitis of the neck starting in the operative wound and extending from there I think the diagnosis is carcinoma of the thyroid and the terminal event is cellulitis following tracheotomy.

Dr. GEORGE W. HOLMES I have not had an opportunity to go over these films before the clinic I take it that this is one of the early films and shows the characteristic appearance of a man of that age a moderate degree of emphysema in the lung fields slight tortuosity of the aorta, and no enlargement of the heart. That film was taken a year before his death.

Dr. HARRIS P. MOSHER The throat department served in this case in a terminal capacity. The man came in requiring a tracheotomy. In these cases the tracheotomies are often extremely difficult but as the tumor was localized on one side the tracheotomy was easy. When however, the tumor involves the median line, tracheotomies are best done in our experience with diathermy. The left vocal cord was immovable. That is a pressure condition and well known. About the specimen, I am sorry I did not bring it over but Dr. Richardson informs me that there was very little involvement of the larynx.

I should like to ask for my own information why the disease lasted so long—four years—and whether that is the usual course in these tumors, also what part the x ray therapy played in this long delay of time.

#### CLINICAL DIAGNOSES

Carcinoma of the larynx

Lues

Erysipelas

Dr. MARSHALL K. BARTLETT'S DIAGNOSES

Carcinoma of the thyroid.

Cellulitis in the tracheotomy wound.

Lues.

#### ANATOMIC DIAGNOSES

Recurrent papillary adenocarcinoma of the thyroid with metastases to the lung  
Bronchopneumonia

Septicemia, streptococcus hemolyticus  
Erysipelas of the abdomen and thigh  
Chronic passive congestion of the liver  
Splénomegaly, type undetermined.  
Hypertrophy of the adrenal.  
Arteriosclerosis, generalized, marked.  
Operative wound Tracheotomy  
Cavernous hemangioma of the liver  
Prostatic hyperplasia.  
Pleuritis chronic fibrous, right.  
(Syphilis)

#### PATHOLOGIC DISCUSSION

Dr. TRACY B. MALLORY I think a partial answer to Dr. Mosher's question about the duration of life following the appearance of the disease is provided by the type of tumor found. It was a characteristic example of one of the more sharply defined types of carcinoma of the thyroid, a papillary tumor growing evidently at first within a cyst. You can see in the specimen how the pedunculated masses dangled into the cyst cavity from its wall. This type of cancer of the thyroid is of interest from several points of view. It is the one type of cancer of the thyroid that is by no means rare in childhood. We have seen cases in the early teens in several instances. It is also the type which often develops in aberrant nodules of thyroid tissue. It is often fairly sensitive to radiation, more so than some of the other types. The majority of these tumors if they can be got out with the cyst intact offer a perfectly good prognosis. If the tumor has already spontaneously burst its sac or if in the course of operation it is necessary to break it and tumor contents are spilled in the wound, recurrence is the rule. Some cases are on record with long arrests of growth and even apparent cure from radiation. On the other hand there are other cases in which the effect of radiation is not very great. Of all the possible types of malignancy of the thyroid I think it would be fair to say that this is the least malignant and offers on the whole the best prognosis.

At autopsy besides the local recurrence small pulmonary metastases were found. There were no metastases in the bones but possibly if we had done postmortem x rays we would have found them. The terminal infection was rather poorly described in the summary but if Dr. Bartlett had been able to see the case himself he would probably have agreed with the men on the ward that it was erysipelas rather than cellulitis.

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## DO LABORATORIES COST TOO MUCH?

If the present scheme of medical education is reviewed from the point of view of efficiency and weighed in the balance, it is found wanting. The first defense is that efficiency has nothing to do with education. Then, after consideration, it is conceded that while it may have something to do with education, it is not an adequate test of an educational system. Yet after all why should efficiency be limited to the material production of a factory? It ought to mean doing well whatever is to be done, and is just as applicable to immaterial as to material projects, but the standards of achievement are not the same. The purpose and the end results must be contrasted and compared.

Since an important factor in the increase in the cost of medical education in the past twenty-five years, perhaps the most important factor, has been the development of the laboratories for the preclinical sciences and for what may be called the paraclinical studies, their efficiency

should be studied closely. The laboratory has a double function in the medical school, namely, through its indirect and through its direct bearing on the care of the patient. It is its indirect bearing on the care of the patient that needs sharpest scrutiny.

Consider, for example, the anatomical laboratory and its use in the course in anatomy. As lectures have so largely disappeared, it has become more important than ever. In so far as anatomy is an experimental science, it has one function in education. In so far as it represents a mass of knowledge (or information) to be more or less completely acquired by the medical student, it has another function. In so far as it has a peculiar methodology it has a peculiar function. In so far as dissection develops manual dexterity, it has another function. Perhaps manual dexterity might be developed better in other ways.

How then can the course in anatomy or any other experimental science be arranged to perform the functions mentioned (and any others which may seem important) so that the student gets the most out of the course? In the first place, it is not possible to arrange a course for one hundred students, for example, so that all the students will get the most possible benefit out of the course. It is a matter of the greatest good for the greatest number and at this point the criticism of the usual laboratory course becomes pertinent. It is too often employed chiefly as a means of imparting information and too rarely as a means of acquiring method.

While this is true of all of the laboratory sciences, it is more strikingly true in physiology and in pathology. How many students acquire the habit of thinking of their patients in terms of physiological or pathological processes? It is true that physicians have often been accused of forgetting that their patients are persons, but is this because they are too accurate in their thinking about physiological and pathological processes?

The great inefficiency, the great waste, in the laboratory of experimental science in education, is that its use goes so little beyond the effort to impart mere information. Of course information is valuable, we must know the facts, but that is only a beginning. But the disproportionate cost of the laboratory as compared with books, demonstrations, pictures (still and moving), does not justify the enormous expense, if there is grave misuse.

The real test is the quality of the physician who emerges at the end of the process. Is he more scientific? Does he observe more accurately or acutely? Does he think more clearly? Does he reason more soundly? There is some ground for thinking that, as an educational procedure, the laboratory in the experimental sci-

ence, has not hitherto justified its cost. It has not been given the opportunity to fulfill the promise of its early days. Is it because the mind of the average physician is not capable of becoming truly scientific?

### THE MEDICAL WORLD IS SELDOM SET ON FIRE AT ELEVEN P.M.

A SCIENTIFIC medical meeting may be in some of its aspects, compared to a play. At it the speakers have roles comparable to the principal actors of the play, the discussors have secondary roles, and the committee of arrangements and the officers compare to the directors. Films and slides may by a slight stretch of the imagination be compared to scenery.

Now those successful empiricists who direct the theatre have found that audiences are very fickle in their tastes and that all kinds of factors militate for and against the success of their efforts. Scientific audiences are just as fickle. In order to "put on a good show" at a medical meeting or on the stage, certain conditions having to do with the psychology and physiology of the audience must be met. There must be absolute teamwork and subordination of the individual to achieve these ends.

First the meeting must start and finish on time. Very few worlds are set on fire by addressing tired doctors at 11:00 P.M. The responsibility for the time schedule rests squarely with the officers of the meeting. The speakers and discussors make a very poor impression not only on the officers, but also on the audience when they depart from schedule. They must expect to be cut off when their time is up.

Secondly, the subject of the paper must be timely, well presented and attuned to the interests of the audience. For modern medical audiences dogmatic assertions on the authority of the speaker are never well received. If a subject is so well understood by the audience to be true that one can be dogmatic about it, there is no use presenting it, and if the subject is controversial the audience wants the reasons for the assertion. In science authority is a mighty small thing nowadays and does not compare in importance with a few simple observations or a well planned experiment.

Discussors as stated above have subordinate roles, but nevertheless important ones. They also must keep to the schedule. If they are allowed five minutes they must not take twenty. Furthermore, and most important, they must discuss the paper and not give a separate address on some other subject only remotely connected with the paper. They also must not be dogmatic. If they disagree with the author of the paper they should not be content to state this fact, but the reasons why they disagree. Many very fine and important physicians seem

to find it difficult to subordinate themselves to this extent. If they only realized the harm they are doing to their reputations with the audience by infringing these rules of good taste they would often be the last ones to act this way. We must all recognize the reason that many men take the trouble to write or discuss papers is often more a selfish one than an altruistic one. Even from the selfish standpoint the rules given above are exceedingly important.

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

NELSON, H. B. A.B., M.D. Harvard University Medical School 1927. Assistant in Obstetrics, Harvard University Medical School and Massachusetts General Hospital. Address: 19 Bay State Road, Boston. Associated with him is

EADES, M. F. A.B., M.D. Harvard University Medical School 1922. F.A.C.S. Assistant in Obstetrics, Harvard University Medical School. Physician to Out Patients, Boston Lying In Hospital. Assistant Obstetrician, Massachusetts General Hospital. Gynecologist and Assistant Obstetrician, Newton Hospital, Newton, Mass. Consultant Gynecologist, Adams Nervine Asylum. Address: 19 Bay State Road, Boston. Their subject is "Some Obstetrical Aspects of Cardiac Disease Complicated by Pregnancy." Page 1057.

SAUER, LOUIS. A.B., M.A., Ph.D., M.D. University of Chicago 1913. Associate in Pediatrics, Northwestern University Medical School, Chicago. His subject is "Whooping Cough and Its Prevention." Page 1061. Address: 636 Church Street, Evanston, Illinois.

COLSON, Z. WILLIAM. M.D. Tufts College Medical School 1923. Ophthalmic and Aural Surgeon, Lawrence General Hospital. Clinical Assistant in Ophthalmology, Massachusetts Eye and Ear Infirmary. His subject is "A Modified Technique for the Stereoscopic Examination of the Skull by X-Ray." Page 1067. Address: 301 Essex Street, Lawrence, Mass.

HAWES, JOHN B., 2ND. A.B., M.D. Harvard University Medical School 1903. Formerly, Assistant Visiting Physician, Massachusetts General Hospital, Director, Pulmonary Clinic and Non-Pulmonary Clinic, Massachusetts General Hospital, Consultant, Diseases of the Lungs, New England District, United States Veterans Bureau, and Secretary, Massachusetts Tuberculosis Commission. Now President, Boston Tuberculosis Association, Director, Massachusetts Tuberculosis League, Rutland Cottage Sanatoria and National Tuberculosis Association.

Consultant, Beth Israel Hospital, Jordan Hospital, Plymouth, and Henry Heywood Memorial Hospital Address 330 Dartmouth Street, Boston. Associated with him is

STONE, MOSES J M D Tufts College Medical School 1921 Assistant Professor, Diseases of the Chest, Boston University Medical School Physician, Chest Clinic, Massachusetts Memorial Hospitals and Tuberculosis Clinics, Boston Health Department Assistant in Medicine, Beth Israel Hospital, Boston Address 330 Dartmouth Street, Boston. Their subject is "Progress in Tuberculosis 1934-1935" Page 1087

#### CORRECTED STATEMENT OF THE POSITIONS OCCUPIED BY DR A H GORDON

GORDON, A. H M D C M McGill University Faculty of Medicine, Montreal 1899 F R C P Canada Associate Professor of Medicine, McGill University Physician, Montreal General Hospital Physician-in-Chief pro tempore, Peter Bent Brigham Hospital, Boston, April 14-21, 1935

His subject was "A Clinical Lecture on Migraine" Page 1017, issue of November 21

Address 1414 Drummond Street, Montreal, Canada.

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#### TREATMENT OF THREATENED MISCARRIAGE

Since statistics show that many miscarriages occur at the time one would be menstruating were she not pregnant, it is well to instruct every patient to be extremely careful of everything she does at that particular time

When a patient first consults her physician, she should be told what to do in order to reduce the possibility of a miscarriage to a minimum Proper instruction should be given as to the care of the bowels and the taking of enemata An enema, either high or low, is not conducive to quieting a uterus that doesn't require much stimulation to cause it to contract at the time corresponding to the menstrual period if not pregnant

If a patient has had other miscarriages she should be instructed to remain quietly in bed at the time corresponding to the menstrual pe-

riod if not pregnant, and this routine should be carried out for the first four months of her pregnancy She should be told that it might be well not to have coitus at that particular time

Although automobile driving or riding does the expectant mother absolutely no harm, if done sensibly and in moderation, it is well, nevertheless, to instruct the patient who shows a tendency to miscarry to avoid riding or driving at particular times

If, regardless of all prophylactic measures, the patient shows signs of miscarrying, either by the uterus contracting or by a slight staining, she should be put to bed immediately One should bear in mind that a very small amount of blood, be it either red or dark brown, may be just as indicative of a threatened miscarriage as is the loss of a large amount of blood

The patient should be placed under the care of a trained nurse and should not be allowed to leave her bed to go to the toilet Urination and bowel movements should be taken care of by a bedpan.

Rest in bed is the all-important method of treatment

The application of an icebag is a procedure that has been passed down from one medical generation to another, but the writer of this article questions the wisdom of following this custom Since ice will probably cause the uterus to contract, why use it?

If the patient is bleeding, and the uterus is not contracting, there is no need of administering an opiate However, once the uterus starts to contract, it would be well to give the patient a hypodermic injection of Morphine gr  $\frac{1}{4}$ , to be repeated as often as is deemed necessary

The patient should be kept in bed for at least forty-eight hours after all evidence of bleeding or staining has ceased, or for forty-eight hours after all tendency for the uterus to contract has ceased She should be told how absolutely essential it is for her to take things quietly for some few weeks to come, especially at the time she would be menstruating were she not pregnant, and should be advised not to have coitus for at least one week after all signs and symptoms of the threatened miscarriage have disappeared

#### A RECEPTION TO THE PRESIDENT AND PRESIDENT-ELECT OF THE AMERICAN MEDICAL ASSOCIATION

In response to an invitation by Dr Mongan, President of the Massachusetts Medical Society and Dr Begg, Secretary, Dr James S McLester, President of the American Medical Association and Dr J Tate Mason, President-Elect of the American Medical Association were entertained at the Harvard Club, November 27, 1935

\*A series of short selected articles by members of the Section is being published weekly  
Comments and questions by subscribers are solicited and will be discussed by members of the Section

**LOCAL COMMITTEE OF ARRANGEMENTS  
FOR THE ANNUAL MEETING**

W R. MORRISON, M.D., Chairman of the Committee of Arrangements for the 1936 Meeting of the Massachusetts Medical Society to be held in Springfield, June 8, 9, and 10, has appointed the following General Local Committee of Arrangements

H L SMITH, M.D.  
T S BACON, M.D.  
ALLEN G RICE, M.D.

**THIRD ANNUAL POSTGRADUATE MEDICAL  
EXTENSION COURSE**

The following sessions have been arranged by the Committee for the week beginning December 1

**Barnstable**

Sunday December 1 at 4 00 P.M. at the Cape Cod Hospital Hyannis Subject Kidney and Bladder Diseases (B) Medical Chronic Nephritis Cardiorespiratory Disease The Use of Diuretics. Instructor W R. Ohler  
J L B Vail Chairman

**Bristol South (Fall River Section)**

Monday December 2 at 4 00 P.M. at the Stevens Clinic of the Union Hospital Fall River Subject Lung Diseases (a) Significance of Symptoms and Signs in Chronic Lung Disease Tuberculosis Bronchiectasis etc. (b) The Value of Surgery in Above Diseases. Instructors R. H. Sweet and F T Lord.  
Eugene A. McCarthy Sub-Chairman.

**Essex North**

Friday December 6 at 4 00 P.M., at the Hotel Bartlett 95 Main Street, Haverhill Subject Pediatrics Abdominal Disease in Childhood Medical and Surgical Aspects. Instructors P J Mahoney and J L Morse Francis W Anthony Chairman

**Essex South**

Tuesday December 3 at 4 00 P.M., in the Nurses Home of the Salem Hospital Salem. Subject Kidney and Bladder Diseases A (Surgical) Hematuria its Significance in Surgical Diseases of Kidney and Bladder Instructor G O Prather Walter G Philippen Chairman.

**Hampden**

Thursday December 5 at 4 00 P.M. at the Academy of Medicine Professional Building 20 Maple Street, Springfield and at 8 00 P.M. at the Holyoke City Hospital Holyoke. Subject Lung Diseases (a) Significance of Symptoms and Signs in Chronic Lung Disease Tuberculosis, Bronchiectasis, etc. (b) The Value of Surgery in Above Disease Problems. Instructors J W Strieder and S H Proger George L. Schadt and George D Henderson, Chairmen

**Hampshire**

Wednesday December 4 at 4 15 P.M. in the Nurses' Home of the Cooley Dickinson Hospital Northampton. Subject Psychiatry Management of Psychotic States in the Care of General Diseases Especially Chronic Disorders Subpsychotic States Instructors G C. Caner and Maurice Fremont Smith. Robert B Brigham, Chairman

**Middlesex South**

Tuesday December 3 at 4 15 P.M., at the Cambridge Hospital, Cambridge Subject Dermatology Ten Common Skin Diseases—Diagnosis and Treatment. (1) Impetigo Contagiosa, (2) Scabies (3) Acne Vulgaris (4) Psoriasis and Seborrheic Dermatitis (5) Epidermophytosis (6) Herpes Simplex and Zoster (7) Eczema, (8) Erythema Multiforme (9) Verruca Vulgaris and (10) Dermatitis Medicamentosa and Dermatitis Venenata. Instructor C G Lane Edmund H. Robbins Chairman

**Norfolk South**

Monday December 2 at 8 30 P.M. at the Quincy City Hospital Quincy Subject Kidney and Bladder Disease A (Medical) Acute Nephritis—Etiology Diagnosis and Treatment. Nephrosis and its Treatment. Instructor E. M. Chapman David L. Belding Chairman.

**Plymouth**

Tuesday December 3 at 4 00 P.M. at the Brockton Hospital Brockton. Subject Industrial Surgery and Medical-Legal Problems Instructor F J Cotton W H Pulsifer Chairman

**Worcester North**

Friday December 6 at 4 30 P.M., at the Burbank Hospital Fitchburg. Subject Lung Diseases (a) Differential Diagnosis and Treatment of Lobar Pneumonia. (b) The Surgical Problems of Empyema Instructors J H Pratt and R. H. Overholt. Edward A. Adams, Chairman.

**MISCELLANY****AN HONOR TO DR. FRED B LUND**

A testimonial dinner was given to Dr. Fred B. Lund at the Harvard Club by his friends and associates of the Carney Hospital on November 6 1935

This occasion was but a small expression of their affection for their former beloved Surgeon-in-Chief a kindly doctor and a gracious gentleman

Dr. William E. Browne as toastmaster of the evening introduced the following speakers: Dr. John Cunningham Dr. Louis F. Curran Dr. Louis E. Phaneuf, Dr. William Robey Dr. Irving J. Walker Dr. A. McKay Fraser Dr. William Morrison, and Dr. Nathaniel Hunting

Among those present were many of Dr Lund's former associates of the Boston City Hospital, where for many years he was Surgeon in Chief

Dr Lund was presented with a ship's wheel mounted clock as a memento of the occasion. The guest of honor responded in his usual gracious manner.

### HARVARD MEDICAL SCHOOL

#### RESIGNATIONS

Effective Sept 1, 1935

George Pengwerne Matthews, Instructor in Anatomy

Effective Sept 1, 1936

Reid Hunt, as Professor of Pharmacology (becoming Emeritus)

Effective Sept 1, 1935

Eugene Beverly Ferris, Jr, as Research Fellow in Medicine

#### APPOINTMENTS FOR ONE YEAR FROM SEPT 1, 1935

Orville Taylor Bailey, Instructor in Pathology

John Hartwell Harrison, Assistant in Genito-Urinary Surgery

Edward Allen Edwards, Research Fellow in Anatomy

Morris Frank Shaffer, Research Fellow in Bacteriology

Marjorie Allen Benedict, Research Fellow in Physical Chemistry

Jack Spencer, Research Fellow in Medicine

Harold Clifford Wagner, Research Fellow in Medicine

Samuel Jacob Beck, Research Fellow in Psychology

For one year from Jan. 1, 1935

Robert Sidney Schwab, Assistant in Neurology (M G H)

#### CHANGE IN TITLE

For one year from Sept 1, 1935

Frederic Andrews Gibbs, from Research Fellow in Physiology to Research Fellow in Neurology

### HEALTH OFFICERS' MONTHLY STATEMENT OF VENEREAL DISEASES REPORTED IN THE NEW ENGLAND STATES

SEPTEMBER, 1935

State	Syphilis		Gonorrhea	
	Cases Reported During Month	Monthly Case Rates per 10,000 Population	Cases Reported During Month	Monthly Case Rates per 10,000 Population
Connecticut	171	1.03	143	.86
Maine	24	.30	46	.57
Massachusetts	462	1.07	553	1.28

New Hampshire	18	.38	26	.55
Rhode Island	86	1.22	63	.89
Vermont	17	.47	33	.91

—Treasury Department, Public Health Service

### RECENT DEATHS

**BUCK**—MAURICE ALLEN BUCK, M.D., of Concord Road, Billerica, Massachusetts, died at his home, November 19, 1935, after a few hours' illness.

He was born in Wilmington, June 6, 1874, and acquired his premedical education in the public schools of Wilmington and Phillips Exeter Academy. He graduated from the Harvard Medical School in 1898, was a Fellow of the Massachusetts Medical Society and the American Medical Association, and had served two years in the House of Representatives of the State Legislature.

Dr Buck had served his town for thirty years on the school committee and had been chairman of the board of selectmen for several years. His fraternal associations were with the Masons, Elks, Odd Fellows and the Billerica Grange.

Dr Buck is survived by his widow, Mrs Bessie C (Cole) Buck, a brother, George W Buck, of Wilmington, and a sister, Mrs Charlotte Radeau, of Pawtucket, R I.

**BACON**—JOHN LOWELL BACON, M.D., of Southboro, and physician to St. Mark's School, died at the Framingham Hospital, November 21, 1935. He was born in Belchertown, in 1876, the son of John Lowell Bacon and Sarah Charles Bacon. He graduated from the Hahnemann Medical College and Hospital of Philadelphia in 1897, and later took postgraduate courses at the University of Pennsylvania Medical School. He served at the State Hospital in Westboro for a time, began practice in Southboro in 1901, and was a Fellow of the Massachusetts Medical Society. In addition to his appointment at St. Mark's Academy, he was the physician at the Fay School. He was chief of the Framingham Hospital Staff, assistant medical examiner, fifth Worcester District, and chairman of the Southboro board of health and water board at the time of his death.

Dr Bacon was a Royal Arch Chapter Mason. He is survived by his widow, Mrs Ruby Barney Bacon, two nephews and a niece.

**DuVALLY**—NICHOLAS DuVALLY, M.D., died suddenly in his office, 601 Tremont Street, Boston, November 20, 1935.

He was born in 1880 and graduated from the Tufts College Medical School in 1916.

He had formerly maintained an office on Stanford Street, West End, and had served as police surgeon.

He joined the Massachusetts Medical Society in 1919.

Dr DuVally is survived by his widow, Dr Alice Butler DuVally, a son, Jeremiah, aged ten, and two

brothers Dr James F DuVally of Medford and  
Dr Frank DuVally of Fall River

## NOTICES

### MEDICAL CLINIC AND STAFF ROUNDS AT THE PETER BENT BRIGHAM HOSPITAL

At 3 30 P M on Thursday December 5 in the amphitheater of the Peter Bent Brigham Hospital Dr Henry A. Christian Physician-in-Chief Hersey Professor of the Theory and Practice of Physic in the Harvard Medical School will give a medical clinic. To it are cordially invited practitioners and medical students

On Saturdays in the wards of the Peter Bent Brigham Hospital, from 10 to 12 staff rounds will be conducted by Dr Christian

### SATURDAY MORNING CLINICS BY PROFESSOR S J THANNHAUSER

Dr Thannhauser formerly Professor of Medicine at Heidelberg and Freiburg Germany is giving a course of clinical lectures for practicing physicians on Saturday mornings at 9 A M in the Assembly Hall of the Boston Dispensary The subjects to be presented for the remainder of the year are as follows

December 7—Obesity

December 14—Pituitary Disease

December 21—Treatment of Diabetes

Practitioners from any part of New England are cordially invited This course is made possible by a grant of the Brigham Associates Fund for the Advancement of Rural Medicine

### UNITED STATES CIVIL SERVICE EXAMINATIONS

The United States Civil Service Commission has announced open competitive examinations as follows

#### Children's Bureau Positions

Applications for the positions of director Division of Maternal and Child Health \$6,500 a year and director Crippled Children's Division \$6,500 a year Children's Bureau Department of Labor must be on file with the U S Civil Service Commission, Washington, D C., not later than December 9 1935

The salaries are subject to a deduction of  $3\frac{1}{4}$  per cent toward a retirement annuity

Applicants must have been graduated from a medical school of recognized standing with a degree of M D and, in addition, must have had certain specified experience

Full information may be obtained from the Secretary of the United States Civil Service Board of Examiners at the post office or customhouse in any city which has a post office of the first or the second class, or from the United States Civil Service Commission Washington, D C

#### Principal Medical Officer

Applications for the positions of principal medical officer Indian Service at Large, must be on file with the U S Service Commission Washington, D C., not later than December 9 1935

The entrance salary is \$6 600 a year subject to a deduction of  $3\frac{1}{4}$  per cent toward a retirement annuity

Applicants must have been graduated from a recognized medical school with a degree of M D and must be licensed to practice medicine in a State or Territory or in the District of Columbia. They must have had not less than 5 years experience in the vaccination of newborn infants with Calmette-Guérin vaccine according to the method of Calmette, and must have had not less than 3 years experience in city State or Federal public health laboratories with work in tuberculosis The two types of experience mentioned may run concurrently

Full information may be obtained from the United States Civil Service Commission, Washington D C

## REPORTS AND NOTICES OF MEETINGS

### FAULKNER HOSPITAL CLINICAL MEETING

The November clinical meeting was held at the Faulkner Hospital on Thursday November 7 at 5 00 P M

Two cases which had come to autopsy were discussed The first was a man of forty two years of age who had been a patient in the Out Patient Department of the Peter Bent Brigham Hospital for over a period of seven years. Nothing of importance had been made out until May 1935 when a gastric ulcer was discovered on the lesser curvature of the stomach and a note was made that the duodenum flexum and cecum were normal. Upon a diet the symptoms referable to the gastric ulcer disappeared Four days before his admission to the Faulkner Hospital in August he had diarrhea with blood in the movements and severe pain in the right lower quadrant. It was thought at first that he might have an attack of acute appendicitis but it was felt that he did not. His physical examination and clinical pathology were essentially negative During his stay of two and a half weeks in the hospital he had, usually loose bowel movements sometimes only one a day sometimes three or four There was no gross blood in the bowel movements. Some of the time the test for occult blood was positive but other times negative and his diet was not arranged to keep meat or meat extractives out of it. A barium enema showed signs of an inflammatory lesion around the cecum. The barium entered the terminal ileum which appeared to be normal Suddenly evidences of peritonitis and intestinal obstruction developed and the patient died following exploration. This happened before the gastrointestinal tract was studied by x ray with the barium given by mouth. The striking findings at the postmortem examina



tion were multiple ulcerations extending throughout the small intestine and for a short distance in the cecum. Several had perforated. The cause for these ulcerations after exhaustive study was not demonstrable. The lesion did not appear like the lesion of so-called regional ileitis, in that the induration and thickening of the bowel wall were absent. There was a scar in the stomach where the gastric ulcer had healed.

The other case was in a man seventy four years of age. The lesson learned from this case was the importance of not putting too much faith upon any one diagnostic procedure. In this instance a negative x-ray study in the hands of an excellent roentgenologist led the clinician away from the correct diagnosis. This patient for three months had been having epigastric pressure with gas formation and loss of appetite. The pressure was sometimes relieved by food and other times not. There was some vomiting which had become worse as time went on, and a few days before admission there had been some diarrhea and some tarry stools. The patient had lost fifteen pounds in weight. Three years before, a partial thyroidectomy had been performed for symptoms of hyperthyroidism with pronounced relief. The possibility of a recurrence of the hyperthyroidism was considered, but a study of the basal metabolism seemed to rule this out. Shortly after admission to the hospital the patient vomited blood and had more tarry stools. X-ray studies of the gastrointestinal tract just before entrance to the hospital were reported as negative. It was felt that exploration for a bleeding point in the intestinal tract with the gastrointestinal studies by x-ray negative would offer more risk than expectant treatment. A sudden large hemorrhage while under this investigation caused death. At autopsy a large duodenal ulcer was found which extended more than half way around the duodenum and it was from this point the blood came. On recapitulation the roentgenologist felt that the size of the ulcer is what had caused the difficulty in diagnosis, because the cavity formed by the ulcer was so large that the barium went into it and gave the appearance of a good duodenal cap.

Following the discussion of these two cases Dr. Chester M. Jones discussed a few of the conditions which are grouped as enteritis. He called attention to the fact that in some inflammatory conditions of the small and even large intestine, constipation might be present rather than diarrhea. Just why some cases of diarrhea associated with a lack of free hydrochloric acid in the gastric juice or with a sprue or pernicious anemia are benefited by small doses of free hydrochloric acid is not clear but is a clinical fact. The diarrhea of pernicious anemia or sprue is practically always controlled by the administration of liver in some form. He called attention to the fact that functional diarrhea practically

never interferes with the patient's sleep and is usually started up by taking food. This is a diagnostic point of considerable importance. He mentioned four causes which produce symptoms of enteritis: Tuberculosis, Regional or Terminal Ileitis, Ulcerative Colitis and Cancer.

The ulcerative colitis may be subdivided into ulcers of unknown etiology and ulcers due to amebae.

In the tuberculous lesions there usually is diarrhea but not necessarily so. The lesions are usually around the cecum or terminal ileum. If there is pain it is apt to be around the umbilicus. In the past it has been claimed that tuberculosis of the intestine is always secondary to tuberculosis of the lung, but he showed x-ray pictures of the lungs which were normal in a patient in whom tuberculous lesions in the region of the ileocecal valve had been confirmed at operation.

The cause for regional or terminal ileitis is unknown. Usually there is diarrhea. The pain which is generally present is not as a rule so near the midline as in tuberculosis. The lesion is a granulomatous one which starts in one place and spreads. It is similar to the lesion of tuberculosis but there are certain distinguishing features. It is difficult to distinguish it from tuberculosis without the aid of the microscope. It is rare for the process to extend into the cecum, but if it does it is usually confined near to the ileocecal valve. Resection is the best form of treatment and it must be borne in mind that the process may extend into the area where the bowel appears normal. Extension of the process with the need of subsequent operation sometimes occurs.

In ulcerative colitis the ulcers are usually low enough down in the bowel so that they can be seen with the proctoscope and rarely extend into the small bowel. Therefore, by proctoscopic examination this condition can usually be diagnosed.

For the treatment of tuberculosis and regional ileitis, operation is indicated. For ulcerative colitis Dr. Jones had little to offer in the way of specific therapy. He called attention to the need of ileostomy in certain cases as a life-saving procedure or as a means of getting the patient economically established.

Cancer of the small intestine is rare but should be suspected in long continued diarrhea of unexplained origin associated with loss of weight. In some instances it is possible to diagnose it by the x-ray but not always.

He completed his address by giving a short description of a case of terminal ileitis which involved both the cecum and twenty cm. of the terminal ileum. The question was raised whether the first of the cases presented for discussion could represent the early stages of so-called regional ileitis. It was felt by the pathologist that the lesions were not the same and it was also felt that it would be unusual for regional ileitis to start over such an extensive area.

## FAULKNER HOSPITAL CLINICAL MEETING

The next clinical meeting will be held on Thursday the fifth of December. In addition to the usual clinical pathological conference Dr Tracy J Putnam will talk on "Surgical Treatment of Athetosis" (With an illustrative case.)

All physicians are invited

## PLYMOUTH DISTRICT MEDICAL SOCIETY

A stated meeting of the Plymouth District Medical Society was held at the Moore Hospital, Brockton Mass., October 24 1935. The meeting was called to order by the President, Dr Hanson at 11 15 A.M.

Dr G A Moore reported on cases of breast cancer treated at the Moore Hospital presenting patients that had passed the five and ten year period without evidence of recurrence. Patients that had been followed for five years were divided into two main groups. Of those treated by operation alone thirty per cent were living without evidence of recurrence and of the group that received postoperative radiation forty three per cent were classified as five-year cases. Methods of the early diagnosis of cancer of the cervix were discussed and patients presented who had survived without evidence of disease five and ten years after x-ray and radium treatment.

Dr A L Duncombe discussed narcolepsy and presented a case. The patient a twenty-one year old white Armenian boy had been well until three years ago when he began to have a frequent and irresistible desire to sleep. He would fall asleep under all circumstances even while driving his car and eating his meals. The sleep was usually of five to ten minutes duration. The patient awakened refreshed. Two years ago he began to have cataplexy losing all muscle tone and falling to the ground upon any emotional excitement, especially laughter. After terrifying dreams he likewise would be completely paralyzed. These attacks of weakness lasted a relatively few seconds. Physical examination was entirely negative as were the routine laboratory examinations and lumbar puncture. The glucose tolerance was unimpaired. He has been completely relieved of his symptoms by the use of ephedrine sulphate  $\frac{1}{2}$  grain every three to five hours. The importance of differentiating this disease and petit mal epilepsy was stressed since narcolepsy is a distinct clinical entity responding symptomatically to a stimulating drug ephedrine sulphate, while epilepsy is benefited by sedation.

Dr Francis T Hunter Assistant Physician at the Massachusetts General Hospital, gave an interesting talk on "Egyptian Mummification with X-Ray Studies of Mummies at the Boston Museum of Fine Arts." Dr Hunter discussed the methods of mummification practiced from the earliest times illustrating his remarks with lantern slides of tombs and mummies. Photographs and x-rays of mummies in the Boston Museum were shown, depicting the method of preservation of the dead and pathological lesions of skeletons. The Edwin Smith papy-

rus was briefly described and its probable source from the writings of Imhotep many centuries earlier discussed. Dr Hunter concluded his talk by citing some of the case histories recorded in the papyrus emphasizing the similarity to present methods of diagnosis and treatment.

## HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held in the Peter Bent Brigham Hospital Amphitheatre (Shattuck Street Entrance) Tuesday evening December 10 at 8 15 P.M.

## PROGRAM

## Presentation of Cases

Types of Syncope Their Mechanism and Treatment. By Soma Weiss M.D.

Medical students and physicians are cordially invited to attend

MARSHALL N FULTON M.D., Secretary

## CARNEY HOSPITAL

There will be a clinical meeting at the Carney Hospital Monday December 2 at 8 30 P.M.

Subject Back Pain—By A. R. MacAusland, M.D. Discussion from a neurosurgical point of view—W J Mixer M.D. from a gynecological point of view—R. J. Heffernan M.D. from a urological point of view—Roger Graves, M.D. Physicians and medical students invited.

SOCIETY MEETINGS CONGRESSES  
AND CONFERENCESCALENDAR OF BOSTON DISTRICT FOR THE WEEK  
BEGINNING MONDAY DECEMBER 2, 1935

## Tuesday December 2—

2 30 P.M. Pediatric Ward Visit. Massachusetts Eye and Ear Infirmary

7 45 P.M. Gardner Auditorium State House, Boston How Psychiatry Can Aid in Meeting Problems of Modern Life Donald Greig M.D.

## Wednesday December 4—

113 A.M. Clinico-Pathological Conference Children's Hospital

5 P.M. Arthritis Clinic, Robert Breck Brigham Hospital 125 Parker Hill Avenue Boston.

## Thursday December 5—

2 30 3 30 A.M. Clinic, Surgical and Orthopedic Staffs of Children's Hospital, at the Children's Hospital.

2 30 P.M. Medical Clinic at the Peter Bent Brigham Hospital.

5 P.M. Faulkner Hospital Clinical Meeting

## Friday December 6—

1 A.M. Clinical Meeting of the Children's Medical Staff. Ether Dome Massachusetts General Hospital.

## Saturday December 7—

9 A.M. Boston Dispensary 25 Bennett Street Boston Clinic "Obesity" Professor S J Thannhauser  
10 1 p.m. Staff rounds at the Peter Bent Brigham Hospital.

Open to the medical profession  
Open to Fellows of the Massachusetts Medical Society

December 2—Clinical meeting at the Carney Hospital. See notice above

December 4—Arthritis Clinics at the Robert Breck Brigham Hospital. See page 1055 issue of November 7

December 5—Faulkner Hospital Clinical Meeting See page 1107  
 December 5—Medical Clinic Peter Bent Brigham Hospital. See page 1105  
 December 5-7—National Society for the Prevention of Blindness See page 940, issue of November 7  
 December 7, 14, and 21—Boston Dispensary, Clinics by Professor S J Thannhauser See page 1105  
 December 10—Harvard Medical Society See page 1107  
 December 13—William Harvey Society Beth Israel Hospital, 8 P M

### DISTRICT MEDICAL SOCIETIES

#### ESSEX SOUTH DISTRICT MEDICAL SOCIETY

December 4—Wednesday Salem Hospital Clinic 5 P M Dinner 7 P M Speaker Soma Weiss M.D. Subject 'The Interpretation and Management of Clinical Problems in Bright's Disease'  
 January 8—Wednesday Danvers State Hospital, Hathorne Clinic 5 P M Dinner 7 P M Speaker Dr Hoskins Subject To be announced later  
 February 5—Council Meeting, Boston.  
 February 12—Wednesday Addison Gilbert Hospital Gloucester Clinic 5 P M Dinner 7 P M Speaker and subject to be announced later  
 March 4—Wednesday Lynn Hospital Clinic 5 P M Dinner 7 P M Speaker Dr Timothy Leary Subject Arteriosclerosis  
 April 1—Wednesday Essex Sanatorium Middleton Clinic 5 P M Dinner 7 P M Speaker Dr Richard H Overholt of the Lahey Clinic. Subject Chest Surgery  
 May 7—Thursday Censors Meeting  
 May 13—Wednesday Annual Meeting Salem Country Club Dinner at 7 P M Speaker Dr Paul White Subject to be announced later

R. E. STONE, M.D., Secretary

#### FRANKLIN DISTRICT MEDICAL SOCIETY

Meetings are held on the second Tuesday of January, March and May at the Weldon Hotel, Greenfield at 11 A.M.

CHARLES MOLINE, M.D., Secretary

#### NORFOLK DISTRICT MEDICAL SOCIETY

January 28, 1936—Hotel Kenmore at 8 P M Dr Benedict F Boland—Cauterization of the Cervix Uteri Using Various Electrical Methods Illustrated with lantern slides.

February 25, 1936—Massachusetts Memorial Hospitals at 8 P M Papers by the staff.

March 31, 1936—Hotel Kenmore, at 8 P M. (Subject to be announced.)

May, 1936—Annual Meeting (Place, date and subject to be announced.)

The censors meet for the examination of candidates May 7, 1936 November 5, 1936

FRANK S CRUICKSHANK, M.D., Secretary

1236 Beacon Street Brookline Massachusetts

#### PLYMOUTH DISTRICT MEDICAL SOCIETY

January 16—Goddard Hospital. Subject and speakers to be announced later

March 19—Plymouth County Sanatorium South Hanson

April 16—Brockton Hospital.

May 21—Lakeville State Sanatorium

G A. MOORE, M.D., Secretary

#### SUFFOLK DISTRICT MEDICAL SOCIETY

December 11—Joint Meeting with the New England Heart Association at the Boston Medical Library 'Constrictive Disease of the Pericardium' Dr Charles Sidney Burwell. Discussion Dr Edward D Churchill and Dr Paul D White

January 29, 1936—Joint Meeting with the Boston Medical Library at 8 Fenway 'Observations Around the World,' Dr Walter B Cannon

March 18, 1936—Meeting at the Boston Medical Library 'The Laboratory and Clinical Story of Fatigue' Dr Arlie V Bock and Dr David B Dill Discussion Dr Donald J MacPherson and Dr Augustus Thorndike, Jr

April 29, 1936—Annual Meeting at the Boston Medical Library 'The Treatment of Septicaemia,' Dr Champ Lyons 'The Pleurality of Scarletinal Streptococcus Toxin' Dr Sanford B Hooker Discussion Dr Hans Zinsser

The medical profession is cordially invited to attend all of these meetings

ROBERT L DeNORMANDIE M.D., President,  
 CHARLES C LUND M.D., Secretary,  
 FRANCIS T HUNTER, M.D.,  
 Boston Medical Library

#### WORCESTER DISTRICT MEDICAL SOCIETY

December 11—Wednesday evening St. Vincent Hospital Worcester, Mass Dinner and scientific program. Subjects of program to be announced later

January 8, 1936—Wednesday evening Worcester City Hospital Worcester, Mass Dinner and scientific program. Subjects of program to be announced later

February 12, 1936—Wednesday evening Worcester State Hospital, Worcester, Mass Dinner and scientific program. Subjects of program to be announced later

March 11, 1936—Wednesday evening Memorial Hospital, Worcester, Mass Dinner and scientific program. Subjects of program to be announced later

April 8, 1936—Wednesday evening Hahnemann Hospital, Worcester, Mass Dinner and scientific program. Subjects of program to be announced later

May 13, 1936—Wednesday afternoon and evening Annual Meeting of Society Time, place and details of program to be announced in an April issue of the Journal.

ERWIN C MILLER, M.D., Secretary

### BOOK REVIEW

Clinical Parasitology and Tropical Medicine Dá maso de Rivas 367 pp Philadelphia Lea & Febiger \$5 00

The first three chapters in Part I are devoted to general concepts which should be helpful to those who are beginning the study of parasitology. Subsequent chapters dealing with clinical and laboratory diagnosis and with treatment contain much which is based upon the experience of the authors. Some of their views are markedly at variance with the opinions of other competent authorities. For example, the value of several drugs which are in use for the treatment of amebiasis or for helminthic infestations has not been adequately appraised. Neither has the importance of examining *perfectly fresh fecal* material for vegetative amebae been sufficiently stressed, and the diagnostic value of culturing the stools for ameba has not been mentioned.

Part II "Diseases Caused by Protozoa" and Part III "Diseases Caused by Metazoa" are of interest especially with regard to the striking results claimed by the authors in the treatment of intestinal infestation by means of their thermal method. Part IV deals very briefly with a group of diseases caused by well-known bacteria.

Some of the subsequent chapters which are included in Parts V or VI practically disregard recent work which has received wide acceptance. The use of liver extract which has revolutionized the treatment of sprue, for example, is scarcely mentioned.

The "intraintestinal thermal method," which the authors have used against a variety of intestinal parasites over a considerable period of time and in large numbers of cases, has given excellent results in their hands and has caused no serious ill effects. On the other hand, the experiments of Maurice C Hall and Jacob E Shillinger (1926) and the work of a few subsequent investigators of the subject indicate that there may be grave danger in the use of the method in man.

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## CANCER OF THE LARYNX\*

### A Study of Two Hundred and Two Cases With End Results

BY SAMUEL W. GARFIN, M.D.†

#### INTRODUCTION

THIS report is based on a study of 202 unselected and consecutive cases of cancer of the larynx treated at the Collis P. Huntington Memorial Hospital over a period of fourteen years, dating from January, 1919 to July 1933. During this period there were 12,466 cancer patients admitted, 202 of whom suffered from cancer of the larynx, giving an incidence of 1.6 per cent for cancer of this organ.

Unfortunately, in a large majority of these patients the disease had progressed to such an extent that any expectation of a cure was out of the question and the most one could hope for was palliative relief. The unwarranted hopeless attitude assumed among some in the profession, and the failure to recognize the early symptoms of cancer may in great part account for the late arrival of patients for treatment. Early diagnosis offers a patient his best chance of cure. This is especially true, as will be shown later, in the early intrinsic type.

**Historical**—The modern study of cancer of the larynx is closely associated with the development of laryngology as a distinct specialty in medicine. This dates from the discovery of the laryngoscope by Garcia in 1855 and its introduction into medicine by Türk (1857) and Cermak in 1858.

We are greatly indebted to Sendziak for his contribution to our knowledge of the history of malignant tumors of the larynx. Although the disease was known to the ancients, it was imperfectly understood by them and their observations are only of academic and historical interest. Aritaeus (about 100 A.D.) refers to cancer of the larynx. Galen (about 200 A.D.) gives a description of malignant ulceration exhibiting an infiltrating character and also, of new growth of the pharynx and the base of the tongue, leading to mechanical dyspnea by compression of the upper part of the airway. During the Middle Ages very little, if anything, was recorded in the literature on the subject.

In 1668 Boerhaave of Leyden described a cancerous angina and Morgagni of Padua (1732)

gave a clear description of cancer of the larynx in two cases. These patients succumbed to dyspnea and dysphagia and necropsy showed malignant disease of the pharynx and larynx. During the ensuing century, no contributions of note appear to have been made on this subject.

In 1833 Albers of Bonn reported a case in a man aged fifty-four who died of asphyxia caused by a malignant tumor the size of a nut. In the same year Brauer of Louvain devised a thyrotomy operation for laryngeal polyp and this procedure was later (1884) adapted by Ehrmann for the treatment of cancer.

In 1836 Bellocq and Trouseau wrote upon "laryngophthisis carcinomatosa." Their work shows that granulomas and neoplasms were still not clearly distinguished. In 1846 Trouseau is said to have performed the first tracheotomy for the relief of laryngeal carcinoma. Before the discovery of the laryngoscope (1855) cancer of the larynx was considered a rare disease.

In 1851 Dr. Gurdon Buck of New York first performed a thyrotomy for the removal of laryngeal cancer.

In 1855 the discovery of the laryngoscope by Garcia, mentioned above, laid the foundation for a more accurate study of cancer of this organ. It is of interest to note that Garcia was not a physician, but a singing teacher in London and invented the laryngoscope in order to observe the vocal chords.

The first total laryngectomy was performed by Patrick Heron Watson (1868) of Edinburgh. The patient survived but a short time. Billroth of Vienna (1873), after experimenting on dogs successfully removed the larynx of a man who survived several months. In 1874 Heine and Mars repeated the operation. In the same year Gussenbauer also operated and devised an artificial larynx, the first of its kind.

In 1877 Foulis D. of Edinburgh reported his first case (*Lancet* 2:531 [Oct. 13] 1877) and in 1891 published a paper in which he had collected reports of thirty-two complete and six partial laryngectomies. The results of these cases were bad, the method was unanimously and severely criticized (*Trans. Internat. Med. Congress* 3:251 1891).

From the Cancer Commission of Harvard University.  
†Garfin, Samuel W.—Assistant Surgeon, Aural Service, Boston City Hospital. For record and address of author see "This Week's Issue," page 3147.

The first laryngectomy in this country was performed in 1879 by Dr Frederick Lange, a surgeon residing in New York

In 1883, Dr J Solis-Cohen, of Philadelphia, collected sixty-five cases, all of the reports and statistics available and published the results of the operation to date (*Trans College of Physicians* 6 353 [Apr 4] 1883) Fifty per cent of the patients died from the operation. The initial shock was severe, the operation had cost the sacrifice of a certain number of lives, and the conditions of the survivors had often been described as pitiable in the extreme. In the opinion of Solis-Cohen, "laryngectomy had not tended to the prolongation of life, and the prolonged existence of a very few cases seemed purchasable only at the sacrifice of the remnant of existence of many others" It was because of the unsuccessful efforts that the operation was abandoned for a brief period in this country

About the same time, Gluck of Berlin, adopting the best ideas of his predecessors, had put them in practice and added his own. He suggested the operation in two stages in order to overcome the hitherto dangerous reactions. In the first operation he severed the trachea from the larynx and sutured it to the skin, two weeks later removing the larynx. Later, he performed the operation in one stage, as we know it today

In 1892, following the improved method of Gluck, Solis-Cohen removed the larynx of a patient and, for the first time in this country, attached the severed end of the trachea to the skin. The whole procedure, including the anesthetization and dressing, occupied one hour. Indeed, a very creditable showing, even in this day. The subsequent care given the patient personally by Dr Cohen and his assistants is deserving of great praise

In 1895, this patient, Daniel Hickey, was exhibited at the annual meeting of the British Medical Association in London. He was in perfect health, entirely comfortable, breathing freely through a tracheal opening in the neck without a tube, and the first in this country to have acquired a pharyngeal voice, plainly audible at a considerable distance

The next decade was to witness what is, perhaps, up to the present day the greatest advent in the surgical treatment of laryngeal cancer. With a clearer understanding of the surgical indications, improvement in technique and better postoperative care, the results of operation, both in this country and abroad, showed a most striking improvement

Topia of Madrid reports 106 laryngectomies with no fatalities, but unfortunately in these there were thirty-two recurrences. F O Lewis, Tucker, Mackenty and others in the country were able to make a comparable showing. The

latter in 130 laryngeal operations as follows: twenty-two thyrotomy, six hemilaryngectomy and 102 total laryngectomy with no operative mortality following thyrotomy or hemilaryngectomy. Two died, one from septic bronchial pneumonia, and the others from general sepsis, both had diabetes

F O Lewis reports that out of 156 operations, forty-nine patients are alive and well over five years, seventeen extrinsic, thirty-two intrinsic

Thomson, St C has obtained seventy-six per cent of lasting cures in intrinsic cancer and in his opinion, when operated on early, following his procedure, results can be secured which cannot be surpassed in the treatment of cancer in any other internal region of the body

The credit is due largely to the zeal and untiring efforts of such men as Gluck, Soerensen, Schmiegelow, Moure, Topia, Semon, Thomson and others in Europe. In our own country, the early efforts of Solis-Cohen and Mackenzie of Baltimore deserve high praise. In more recent times, the contributions of Jackson, Fielding Lewis, H B Orton, J E Mackenty and many others have placed laryngeal surgery on par with surgery in any other part of the body

#### OTHER METHODS

**Radium**—The early use of radium in laryngeal cancer not only produced indifferent results but in many cases, increased the sufferings of the already miserable patient. Until about 1910, the belief was prevalent that "radium did no good", (Sir W Douglas Harmer) "that radium killed more people than it relieved". Because of these opinions, the early workers in the field of radiotherapy met with scant encouragement

In the past decade a considerable amount of work has been done in radiotherapy throughout the world, so much so that the early opposition to radiotherapy has been replaced by enthusiastic acceptance of radium as a valuable therapeutic agent. Professor Forssell (1931) at the third International Congress of Radiology stated that in the history of cancer surgical treatment was the achievement of the last century, and the formation of radiotherapeutic centers can be considered as the great contribution of our generation to the social struggle against cancer

Dominici and later Finzi were the earlier pioneers of radiotherapy in England and were the first to suggest interstitial radiation

Strangeways (1920-1922) studied the effects of radiation on living cells and made observations on the character and behavior of normal tissue cultures preparatory to a study of the effects of x-rays on cells growing in vitro

Canti and Donaldson (1923) investigated the histological changes produced by radium in cases

of carcinoma of the cervix uteri. After radiation, sections were taken at frequent intervals and studied microscopically, the results confirming the earlier findings of Lacassagne and Monod (1922) that immediately after irradiation there was no longer any mitosis present. It was found however, that mitosis returned on the second day, but that it was strikingly abnormal. Thus it was realized that further knowledge of the biological action of radium was essential in treatment of cancer if success is to be attained. Later considerable experimental work was carried out jointly by these same investigators (Strangeways, Canti and Donaldson) which produced valuable information regarding the biological action of both radium and x rays on tissue cultures.

Both in this country and abroad, there are a number of radium centers or institutions admirably suited for carrying out radiotherapy. In England until 1932, there were nineteen such centers, all supervised by competent men. Sir W. Douglas Harmer (London) is perhaps the best known for his work in radiotherapy in the field of laryngology. In Paris, the Radium Institute is in charge of Regaud. In Stockholm the Radium Hemmet under Forsell and Berven have published good results with the use of radium, likewise, the Institute of Brussels organized by Bayet and Murdock. In this country the Memorial Hospital in New York, Michael Reese Hospital in Chicago and our own hospital, the Collis P. Huntington, are institutions similar to those abroad.

Harmer states that, with cancers strictly localized to the vocal cords (early cases), he has had a high percentage of good results. Recurrences have occurred only at the anterior commissure or below the cord. In advanced cases with fixed vocal cords and subglottic extensions, the results have been bad. He believes this is due to faulty technique, namely, failure to cover the growth and thereby failure uniformly to radiate all parts of the tumor. He suggests the fenestration of the thyroid cartilage (Ledoux's method) and introduction of platinum needles containing radium. In his opinion, small doses over a long period of time produced better results than large doses for a short time. Platinum needles of 0.6 or 0.8 mm. even 1 mm. in thickness are used. He also favors the use of x rays first if the disease is extensive 1/3 of the erythema dose over a period of a week, followed immediately by insertion of radium.

Outler, following the biological radium experimentation of Strangeways, Canti Spear and their coworkers, believes that the hitherto considered radioresistant squamous-cell carcinoma can be successfully treated by protracting the time during which radiation is administered es-

entially applying the principles used in x ray therapy by Coutard.

### *Röntgen Therapy*

By far the best results obtained with radiotherapy are reported by Coutard. He has modified his former technique so that the reactions he previously obtained are not so severe and the accidents which occurred in the earlier periods have been appreciably reduced. The result of treatment by his method in seventy-seven cases of cancer of the larynx is here cited.

Cases Treated from 1920 to 1926	Survival After Five Years	Survival After Seven Years
77	22 (28%)	21 (27%)

He believes that Röntgen therapy of cancer of the larynx is relatively easy and yields good results in early cases before there is invasion of the cartilages and when the growth has only slightly immobilized the muscles. The cutaneous dose necessary for the healing of these cancers is comparatively small on an average a total of 6000 r (on the skin) with fields of 50 sq. cm. delivered in a period of fifteen to twenty days. Röntgen treatment of radioresistant cancers of the larynx, which have immobilized the hemilarynx, infiltrated the muscles and invaded the cartilage is generally difficult. In spite of heavy doses, these cases are rarely cured and untoward complications may occur. Doses of 7000 to 8000 r or more, are required and constitute the maximum tolerated by the tissues.

In order to avoid osteochondro necrosis following roentgen therapy, he practices resection of the thyroid and cricoid cartilage on the side of the lesion especially when they are frankly ossified. He further believes that this operation is indispensable when the growth has invaded the cartilages, is deeply infected and only slightly radiosensitive. Previously resection of the angle of the mandible was practiced for the same purpose, but this has now been abandoned as the Röntgen treatment has been modified to avoid osteoradionecrosis.

Three principal types of epithelial radioreaction are described by Coutard as guides during the x ray therapy and are as follows: (1) The cutaneous "radioepidermitis" of Regaud and Nogier (1913) (2) the "radioepithelitis" of Coutard and (3) the "radioepithelitis" of the columnar epithelial cells. Radioepithelitis of the stratified cells generally appears about the thirteenth to fourteenth day after the beginning of irradiation. This is the earliest epithelial radioreaction of this region. Lower in the larynx, at the level of the vocal cords where the stratified epithelium resembles that of the skin, radioepithelitis appears at about the twenty-seventh or twenty-eighth day at the same time as the cutaneous radioepidermitis. At the level of the ventricular bands and below the

glottis on the mucosa covering the tracheal rings, the epithelium is cylindrical or columnar, the reaction in this region appears at the thirty-ninth or fortieth day

If irradiation is more intense, the reactions appear earlier, on the tenth and the twenty-fourth day respectively for the first two, sometimes the third reaction appears a very few days after the second

Since it has been learned that radioresistance of cancers is the result of excessive daily doses with too high intensity rather than the irradiation having been spread over too long a time, the duration of treatment was prolonged

From 1927 to 1933 Coutard and his collaborator, F. Baclesse, extended the duration of treatment of certain neoplasms from thirty to ninety days by means of weak daily doses (in the order 175, 250 r per day) distributed in two sances without varying the other factors particularly the size of the fields. In this way, they were able to bring about disappearance of growths which up to then were considered radio-resistant

In conclusion, we may summarize Coutard's results as follow

- (1) Cure of cancer by x-rays is still difficult
- (2) Cure of cancer by x-rays is still dangerous
- (3) A very small margin exists between the dose which will determine a cure and the dose which will provoke an injury
- (4) The daily examination of the patients is necessary, modification of normal tissues and of the general condition by x-ray treatment sometimes appears so quickly that it is often necessary to diminish the daily dose or the size of the fields in the course of treatment

He further concludes that there exists no fixed method of treatment, but a simple clinical treatment for each individual patient and for the special type of tumor

At the present time, there is a lack of agreement as to what is the best method of treatment for cancer of the larynx, because not only the size and location, but the grade of tumor must be considered. Laryngologists with extensive experience in this field of surgery still prefer surgical removal with or without post-radiation. If it can be shown that radium or x-rays alone or combined can produce as high a percentage of permanent cures as surgery, it will be a safer method of treatment and will be welcomed by the surgeon and be a blessing to the patient

*Etiology*—The origin of cancer is still unknown. However, experimental research, notably the work of Rous, Borrel, Murphy, Gye and Bernard, has thrown light on the question of whether there is an external agent concerned in its production. Sir Charles A. Ballance in an address to the American College of Surgeons at Boston, October 11, 1928, speaking on the na-

ture of cancer, summarized our present state of knowledge in the following words: "The efficient cause lies beyond the irritation or injury which are but the partial causes of the disease. The injury prepares a nutrient soil favorable for the growth of the effective agent of malignant disease."

*Predisposing Causes*—Overuse of the voice, heredity, irritant inhalations, excessive use of tobacco and alcohol have been cited as etiological factors

*Use of Tobacco*—In the present series of cases, there were ninety-one patients who smoked, forty-one smoked and chewed, four chewed only, six stated they did not use tobacco in any form and in fifty-eight, this fact is not recorded. The ratio of incidence of cancer of the larynx in tobacco users and nonusers of tobacco is such that we cannot draw definite conclusions on this as an etiological factor. Repeated injury and long-continued irritation and inflammation are potential factors of cancer. We recognize leukoplakia as a definite precancerous lesion. There is a pathological slide in my possession showing the transition from leukoplakia to carcinoma

*Vocal Abuse*—This is frequently cited but is difficult of proof, because of the incompleteness of the records. Most laryngologists are familiar with the patient who by overuse or incorrect use of the larynx, especially singing in the open air beyond one's tonal reach, presents himself with the history of having suddenly lost his voice. Upon examination one finds red-streaked vocal cords, hemorrhage of the cord from abuse. The practice persisted in may lead to hypertrophic laryngitis. Jackson states that out of 582 cases of proved cancer of the larynx in his experience there had been undoubted vocal abuse in 376 (64.6 per cent). Of the 376, approximately one half 187 (49 per cent) were professional or vocational voice users. These included not only speakers, teachers, singers, hucksters, streethawkers, salespersons, foremen, drill-masters, etc., but also mechanics and factory employees required to talk loudly in noisy, dusty places, and persons employed in many other vocations ordinarily little suspected of requiring excessive use of the voice. The balance 189 (50.2 per cent) used their voices for continuous conversation.

When talking every person is for a time mouth-breathing and mouth-breathing is a well-recognized cause of chronic laryngitis. The assertion by certain authorities that although vocal abuse cannot be said to be the cause of cancer it is, nevertheless, one of the commonest causes of chronic laryngitis, keratoses, papillomata and granulomata and that these conditions when perpetuated by vocal abuse and other causes can be suitable soil for the development of cancer. The common observation of vocal abuse is probably best demonstrated by the

hematoma of the vocal cord resulting from improper use of the voice, and the therapeutic effect of absolute silence in certain forms of laryngitis

**Malignant Transformation**—In this series there were a number of patients in whom cancer developed in an original benign neoplasm. There were eleven cases of papilloma which later developed carcinoma, in seven of which the transition was proved by biopsy, two had laryngeal polyp with subsequent malignant degeneration, one developed carcinoma in a scar following an operation for branchial cleft. Alfred Denk reports a case of carcinoma developing in scar tissue following an attempted suicide twenty years earlier. There was a marked infiltration of the interior of the larynx which required a tracheotomy and later a laryngectomy was performed. In four patients of this series (Nos. 20, 47, 70 and 160) there is clinical evidence that the disease was probably the result of extension of branchial cleft carcinoma to the larynx. Crile and Kearns report a direct extension of a branchial carcinoma to the pyriform sinus of the larynx proved by necropsy. There was one case (151) of thyroglossal duct cancer with extension of the larynx.

Semon, in a collective study of 10 747 cases of benign tumors of the larynx, found a malignant transformation in forty-five cases. Of 2531 benign growths of the larynx in which no operation was performed, malignant degeneration occurred in twelve, whereas in 8216 intra-laryngeal operated cases it occurred thirty-three times. The inference to be drawn from this study is that intralaryngeal operations on benign tumors do not influence the development of malignancy. Hinsberg cites a case of transformation of benign tumor of the larynx into a malignant growth. This was the case of a man of seventy-three who had a "walnut" sized tumor removed which upon histologic examination was benign. The patient remained well for some time (sixteen months) when another specimen removed from the original site showed carcinoma.

The transformation of a benign, papillomatous growth into a malignant process is explained by Ewing in four possible ways

1. The original disease is a simple papilloma which really changes its clinical character and develops infiltrative growth
2. The original disease is carcinoma, but the examination is from tissues which are inadequate as specimens
3. An original papilloma is removed but the disease occurs elsewhere as a carcinoma.
4. An original papilloma is imperfectly removed and the remnant is stimulated to a typical cancerous growth

TABLE 1  
INCIDENCE OF LARYNGEAL CANCERS BY YEARS

Year	Male	Female	Combined
1919	15	1	16
1920	8	2	10
1921	16	1	17
1922	21	2	23
1923	26	0	26
1924	13	0	13
1925	6	3	9
1926	6	0	6
1927	6	2	8
1928	10	0	10
1929	7	1	8
1930	10	2	12
1931	15	2	17
1932	14	1	15
1933	9	3	12
	182	20	202

**Age**—Age is an important factor in the incidence of the disease as shown by the following table

TABLE 2  
AGES AND SEX  
Age of Onset by Decades

Ages Years	Males	Females
20-30	0	1
31-40	9	0
41-50	34	4
51-60	72	3
61-70	47	8
71-80	15	4
81-90	2	0
Age not stated	3	0
	182	20

The greatest number occurred between fifty and sixty—seventy-one or 34.6 per cent. The next in frequency is between sixty and seventy, with fifty-six or 26.8 per cent. The two oldest cases in our series were eighty-two and eighty-six respectively, both males. Our youngest case was a woman (20354) of twenty years of age of proved cancer, case No. 24. The oldest female was seventy-five (163). The youngest male was thirty-four, the oldest was eighty-six. In studying the age table, one must bear in mind that there are fewer people living past the age of sixty and there is, therefore, a drop in the incidence of cancer after this period.

**Sex**—There were 182 males and twenty females.

The table shows that the condition is not very rare between thirty and forty, and is less frequent in the aged. McBride records the case of a girl, aged twenty-four, with postcricoid involvement. Lally reports a similar case in a young woman, aged twenty-two. F. H. Figg and Gordon New report a case of intrinsic cancer in a youth of fifteen and in a woman of twenty-four. Garl treated a girl of eighteen for cancer of the larynx and Chiari had a case



of epithelioma of the vocal cord in a girl of sixteen. Our figures agree with those of other clinics which show the greatest number of cases in the fifth decade of life.

**Nationality**—It is of interest to note that all the laryngeal carcinomas were in white people, there being no Negroes or Chinese among them. That may be because there are very few Negroes or Chinese that come to our clinic for any condition. Practically one half of ninety-nine cases were in American white, there being twenty-five Canadian French and the remainder Europeans.

**Occupations**—The occupations of the patients cited in our series comprised all industries and professions.

#### SIGNS AND SYMPTOMS

**Duration**—In forty-five cases the duration of the symptoms before the first visit was less than six months, in forty-six cases from six months to one year, in thirty-four cases, one to two years elapsed before the first visit, in sixteen, two to three years, in five cases, three to four years, in three cases, four to five years. In one case, the duration was six or seven years. This was in a male sixty-five years of age with a growth on the right vocal cord which began as a papilloma and later became malignant by transformation. The shortest duration was that of a man sixty-five who complained of a sore throat for one month before admission. The longest duration was in a man fifty-seven years of age who was hoarse ten years.

TABLE 3

#### DURATION OF SYMPTOMS BEFORE ADMISSION

Less than 6 months	45
6 " to 1 year	47
1-2 years	34
2-3 "	16
3-4 "	5
4-5 "	3
6-7 "	1
10 "	1
Not stated	50
	202

Where there is a history of three years' duration or more before admission to the hospital a number of explanations are possible. A lesion starting on the cord, particularly at its anterior edge, may remain more or less dormant for a long time before invading the surrounding structures. This may be explained by a very meagre lymphatic supply, by the anatomico-histological structure of that part of the larynx, low grade malignancy, and long presence of a papillomatous growth undergoing transformation. Frequent instances of this have been shown by Jackson, Thomson, Semon and others.

**Symptoms**—The symptoms will vary with the site of the lesion and will depend largely upon how much the normal function of the larynx is impaired. A growth situated on the edge of the cord near the anterior commissure will cause more hoarseness, because it prevents complete closure of the glottis, than a larger growth on the cord in the region of the posterior commissure where the closure of the glottis is not so much affected. There may, therefore, in early stages be no symptoms or mere fatigue of voice or transitory hoarseness. As the growth progresses and invades the glottis the hoarseness becomes more pronounced. This may go on for months or even years, as some of our cases have, and the patient or perhaps his medical attendant, regards it as "cold." With the advance of time the voice becomes altered, and the breathing is impaired, especially on exertion, and the voice may be reduced to a coarse whisper, finally leading to aphonia.

The mild symptoms very often complained of by the patient bear a disproportionate relationship to the size of the lesion and the seriousness of the condition. A man aged sixty-seven (case No. 8) complained of a tickling sensation in the throat with no other discomfort. Examination showed an extensive lesion involving the arytenoids and posterior regions. The patient died a month after his first visit to the hospital. With the exception of urgent dyspnea, in advanced cases of intrinsic carcinoma, and dysphagia in the extensive extrinsic cases where there is involvement of the esophagus, the symptoms are not very alarming, nor is pain very severe. This is especially so in the early stages. Many patients are able to continue their usual occupations and some have even been accepted as good risks for life insurance, the examining physician not being aware that cancer is present.

Only the patients' chief complaint is recorded in this study. Generally speaking, the intrinsic type is characterized by a varying degree of hoarseness in the early stages. As time progresses, the hoarseness is increased and normal respiration is interfered with, often leading to aphonia and dyspnea. Pain is usually not a factor in this type of lesion.

In the extrinsic type, the symptoms vary greatly with the site of the lesion and its extent. There is at first some vague discomfort in the throat such as feeling a lump or perhaps some slight difficulty in swallowing. As time goes on, these symptoms increase in severity. Pain is at times quite common in this type and is very often referred to the ear.

#### SYMPTOMS

##### *Enlargement of the Cervical Glands as the First Symptom*

In twenty-two patients, the sole complaint was a swollen neck with no other discomfort.

Hoarseness was a predominant complaint in 100 cases, in forty seven patients, the chief complaint was sore throat of varying degree. Dysphagia was present in nineteen cases. Swollen neck or enlarged cervical glands with no other complaint was recorded in twenty two instances. Loss of voice was the only discomfort complained of in four cases. Two complained of feeling a lump in the throat. One had a tickling sensation in the throat. Four had dyspnea. Thus, it may be seen that the symptoms depend largely on the location of the tumor and the extent it interferes with normal function. Generally speaking, in the middle-aged and elderly people, any kind of abnormal sensation persistently felt in some part of the throat should be regarded seriously.

TABLE 4  
CHIEF COMPLAINTS

	Male	Female
Hoarseness	94	6
Sore throat	44	3
Swollen neck	20	2
Dysphagia	11	8
Dyspnea	4	0
Loss of voice	3	1
Lump in throat	2	0
Tickling sensation in throat	1	0
Not stated	3	0
	182	20

*Site of the Lesion*—As recently as 1880 Stoerk, professor of laryngology in Vienna, remarked that carcinoma is rarely found limited to the larynx, but most frequently arises in the mucous folds between the epiglottis and the tongue, or between the epiglottis and the esophagus and then spreads to the larynx. Our present conception is that it is primary in the larynx and may extend by contiguity from the pharynx to involve the larynx, the so-called laryngopharynx type of extrinsic cancer. Among the male pa-

TABLE 5  
INTRINSIC  
Male Female

Vocal band (2 L. & 3 Rt.)	5	1
cords bilateral	11	2
"    rt. with subglottic ext.	23	0 — 63 cords
"    left, with inv. of band	13	0
Cords, site not stated	7	1
Ventricles	2	1
Ventricle rt.	1	0
Subglottic	9	0
Interior of larynx	5	0
	76	5 — 81 Intrinsic

Epiglottis	25	2
Arytenoids	10	1
Rt. Arytenoid	5	1
Left	4	0
sinus right	3	0
"    left	3	0
side	3	2
Ary epigl. fold left	3	0
side	16	0
Posterior cold	7	7
Right side of larynx	3	0
Left " "	3	0
Pharynx	2	1
Total Extrinsic	87	14
Site not stated	19	1
	182	20

tients, eighty-one were of the intrinsic type and eighty seven were extrinsic. In nineteen males the site was not stated. In the females, fourteen were of the extrinsic variety, five intrinsic and in one case the exact location is not stated. The location of the lesion as found upon admission to the hospital is shown in the following table. In a number of instances the exact site of the lesion is not stated in the record.

The above table shows that the site of original lesion is extremely variable, although certain parts of the larynx are particularly vulnerable to the disease. Out of seventy six intrinsic cases the cords were the site in sixty three patients. The posterior cold type is especially noticeable in the female patients.

Contrary to the statistical reports published by many laryngologists our records show a predominance of the extrinsic type over the intrinsic, as shown in table 5. This may be explained by the fact that most of the intrinsic operable type were treated at other surgical hospitals and the more advanced extrinsic or mixed type were referred to us. Another explanation is that probably a great number of the extrinsic group began as intrinsic and by extension became extrinsic or a mixed type.

*Cords*—It is of interest to note the frequency of cordal cancer in the intrinsic type. Out of a total of eighty-one intrinsic cases, the cords were involved in sixty three instances. Schmiegelow noted the greater frequency of cordal involvement in intralaryngeal cancer, his series showing thirty-six instances in forty-eight cases. In the females of the five intrinsic cases, four involved the cords. The ventricles were involved once, and the site of the lesion was above the cords once.

*Subglottic Type*—Comparatively speaking this site is less frequently encountered being present in nine cases. In two patients there was subglottic extension from the lesion on the right cord. In one instance there was involvement of the ventricular band from extension of the neoplasm on the left cord. In cases where the cord

is the site of the neoplasm with simultaneous subglottic involvement it is difficult to be certain of the origin of the tumor. It was pointed out by Butlin (quoted by St C Thomson), that in a subglottic type of lesion if the motility of the cord is impaired, although no growth is seen on the cord, it is nevertheless involved and a fissure operation does not cure the patient. This has been our observation in several instances. This type of lesion was not encountered in our female patients.

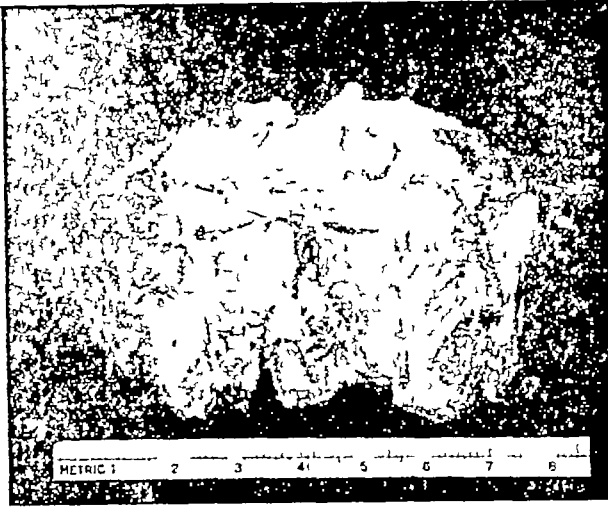


FIG 1. Picture of larynx (Chaney). This shows a typical subglottic type tumor, Case No 178, described in detail below.

#### CASE 178 (Admitted March 28, 1932)

Male, aged fifty-six. Hoarseness of one and one-half years' duration.

**Examination.** Ulcerated mass on the left side of the larynx situated subglottically. Fixation of the left cord. There is marked induration of the entire left half of the larynx and beginning edema of the arytenoid on that side. The right half of the larynx shows some edema with questionable edema of the right ventricle. Breathing space fairly ample. Glands in the neck not felt.

**Diagnosis.** Intrinsic carcinoma of the subglottic type. Pathologist reports Epidermoid Cancer Gr II. March 30, 1932—*Laryngectomy.* One-stage resection of larynx from below upward. The patient made an uneventful recovery. Two weeks later a suspicious, small area on the left side was discovered. Biopsy showed malignancy. The lesion was at the level of the fourth tracheal ring and four gold seeds 1.1 mc were inserted. The patient died September 15, 1932 from metastases and secondary infection.

This illustrates a typical case of subglottic cancer. The one and one-half years' duration before the patient presented himself for treatment gave ample time for metastases so that at the time of operation metastases was already present, but could not be seen or felt. The prognosis in the type (subglottic) is not very favorable especially if more than six months have elapsed since the onset of the lesion. In this type of cancer there is early invasion in the deep nodes about the larynx and trachea. The

subcarinal and peritracheal, as well as the inaccessible posterior groups along the recurrent nerves and those nodes behind the esophagus are also frequently involved. The metastases may be present but cannot be seen or felt. This was particularly so in this case as the subsequent clinical course of this patient showed.

**Extrinsic Form.**—The epiglottis was involved in twenty-five cases in males, two in females. It is a striking observation to note the relative infrequency of the postcarinal type of lesion in the male as compared with the female. Out of a total eighty-seven extrinsic cases in the male only seven were recorded as postcarinal, whereas out of fourteen extrinsic cases in females seven or fifty per cent of the lesion was postcarinal. Involvement of the esophagus was present in this three times in the females, twice in the males. Both arytenoids were noted as the site of the lesion in ten patients, on the right alone five, on the left alone four, in males. In females, both arytenoids were involved also and once the right alone. In males, the pyriform sinus was involved nine times, three on the right, three on the left and in three, side was not stated. In the females, it was noted in two patients. The pharynx was the site of the lesion twice in males and once in females.

**Diagnosis.**—It is not always possible to make an early diagnosis and the following are some of the reasons for this:

- 1 The remote location of the tumor
- 2 The symptoms may be slight, especially in the early stages of the intrinsic type
- 3 Rapidity of the growth which may be very marked in some instances
- 4 Early necrosis and metastases, especially in the extrinsic variety
- 5 Early and rapid invasion of surrounding cartilages

The early diagnosis of cancer of the larynx, especially in the intrinsic type, is of the greatest importance. Contrary to the opinion held by many physicians, the prognosis in this type is good when diagnosed early and treated promptly. Unfortunately our records show that patients do not present themselves for treatment until the disease has become so extensive that operation is out of the question, and the best that can be expected is palliative relief. There are several explanations for the late appearance of the patient, especially the hospital type case. (1) The symptoms at the onset such as slight hoarseness or mild discomfort are not taken seriously by the patient. (2) The apparent well-being of the patient in spite of a very serious condition in the larynx.

In the early stages the diagnosis is not always easy, and mistakes have been made by very competent laryngologists. The first laryngectomy performed by Billroth (1873) for cancer

presumably of the larynx upon examination proved to be a tubercular larynx. Semon<sup>21</sup> states, "Out of thirty three patients on whom thyrotomy was performed presumably for intrinsic malignant growths in eight the diagnosis was either found to have been at fault or remained doubtful."

We endeavor to do a biopsy in every case except in those patients in whom the disease has progressed to such an extent that the physical condition contraindicates even this minor procedure.

**Differential Diagnosis**—In the differential diagnosis of laryngeal cancer, one must consider chronic laryngitis, syphilis, tuberculosis, pachydermia, perichondritis, angiomas, laryngeal polyps and benign growths. Of course in the advanced cases, diagnosis is not so difficult but even here one must constantly keep the other two members of the triad syphilis and tuberculosis, in mind.

**Tuberculosis**—The tubercle shows a predilection for the posterior part of the larynx especially the posterior interarytenoid commissure and depending upon the stage of the disease there may be either infiltration, proliferation or ulceration. Primarily tuberculosis is an ulcerative process and does not have the same tendency to proliferate as cancer. Tuberculosis is usually ingrafted upon an anemic base and the rest of the larynx may show evidence of anemia. At any rate, this is a most common mistake that one is likely to make. It is more probable to mistake tuberculosis for cancer than vice versa. Also, it is practically always secondary to pulmonary tuberculosis. An examination of the chest will help to rule this out. One must always bear in mind that tuberculosis and carcinoma may coexist in the same larynx.

**Syphilis**—Syphilis is usually more widely disseminated in the larynx. The larynx is marked by congested. In counterdistinction to tuberculosis, there is an absence of pallor. Usually there is early fixation of the cords and it occasionally leads to dyspnea. The diagnosis is greatly aided by the history of infection and serological examination.

**Fixation**—Especially in the intrinsic type of cancer, early fixation of the cord on the affected side denotes a considerable progression of the lesion. This is particularly so in the subglottic type, and this fixation must be differentiated from a fixation that may be caused by an arthritis of the crico-arytenoid articulation. A slight limitation of movement is highly significant. This particularly brings to mind a recent case of a patient who had a fixation of a cord which was pronounced to be an arthritis of the crico-arytenoid articulation but subsequently proved to be a fixation due to a malignant infiltration. Experience therefore teaches that a limited movement of the cord in a pa-

tient over forty which cannot be definitely explained should be looked upon as malignant until proved otherwise. Too, palsy of the vocal cord due to lesions of the central nervous system must also be ruled out. From this it must not be construed that in every case of cancer there is fixation and just because there is no fixation one should not rule out malignancy. Because when fixation has occurred it means there is deep extension of the growth or there is infiltration at the arytenoid articulation. Limitation or impaired motion may also be caused by a neoplasm originating in the subglottic region where the growth is very often not seen above the cords. Should there be the slightest doubt, a biopsy should be resorted to. A specimen should be obtained from the most prominent part of the growth and one must be sure that it includes a portion of the neoplasm.

**Pathology**—Most of the cases were of the squamous or epidermoid variety of carcinoma. Case No. 56 was of the basal cell type. Cases Nos. 37, 90 and 136 were of papillary carcinoma. Case No. 77 was reported as fibroma but, clinically, it followed a typical course of carcinoma with metastases and subsequently, reexamination showed Grade II cancer arising in a papilloma. Cases Nos. 79 and 124 were reported polypoid tissue but both were carcinoma, clinically, and pursued a typical course of laryngeal cancer. In eleven patients there is histopathological and clinical evidence that the disease began as a benign papilloma and subsequently transformation to carcinoma occurred. The transition period was very variable, three months in one case and ten years in another. Case No. 78 was that of a male, aged fifty-seven, who complained of hoarseness of ten years' duration. At the onset the growth removed from his vocal cords was reported papilloma. Ten years later he presented himself at our hospital where biopsy showed squamous cell carcinoma. Case 55, very similar to the above, with a history of six or seven years' duration as papilloma, at the end of seven years a specimen removed showed carcinoma. Two patients, cases Nos. 94 and 165 had gone two years as papilloma. The remaining six cases of papilloma had an interval of from five to ten months before transformation took place. It is of interest to note that all the patients in this group were males. In three patients, cases Nos. 67, 70 and 160, the laryngeal cancer was probably of bronchiogenic origin. One case No. 161 began as carcinoma of the thyroglossal duct and invaded the larynx secondarily through the crico-thyroid membrane.

**Grades**—Broders' grading of potential malignancy modified by Gates and Warren, has been employed in our hospital since 1928 and since then thirty-eight cases have been so classified. There were as follows: Grade I, 13, Grade II, 19 and Grade III, 6.

## TREATMENT

*Intrinsic cancer* of the larynx, although insidious in its onset, has the favorable characteristic of remaining localized for a long time, before spreading to the neighboring lymphatics. Just how long it may remain localized, one cannot say with any degree of certainty, but in some probably as long as two or three years. Furthermore, the greater number of these tumors are of low grade, Grades I and II. Therefore, if the patient can be seen early, and if he will consent to have an adequate operation performed, his chances of a permanent cure are very good. In this series, unfortunately, there were only nineteen cases considered at all favorable for operation and two submitted to operation.

The treatment carried out in this series was as follows:

Total laryngectomy	7
Laryngofissures or hemilaryngectomy	12
Partial operation with radium	20
Radium alone	33
X-ray	37
Radium with x-ray	40
Resection of glands with irradiation	6
“ “ “ only	2
Partial operation	2
Tracheotomy alone	17
No treatment	19
Seeds to glands	1
Branchial cleft Op with Ra to neck	1
Treated elsewhere—no data	4

*Laryngectomy*—There were seven patients who had total laryngectomy operations, one of these (case No 175) although first seen at our hospital, was operated on elsewhere. Three are living and well, one approximately four years and the other two, three years each and four are dead. Of those dead, one survived three months, one five months, one four years and one four years and ten months.

The following is a brief detailed description of the patients who had a laryngectomy and no longer living:

(1) Case 136 was a male patient, aged fifty-one, who had a bilateral involvement of the vocal cords in a papillary carcinoma. This is a very malignant form of neoplasm. His chief complaint was hoarseness of eight months' duration. A total laryngectomy was performed, followed by an external radium pack of 550 mc hrs. The patient survived three months and died of pneumonia without any evidence of local recurrence. (2) Case 141 was a man, aged fifty-four, with a tumor mass involving the right vocal band and cord with marked fixation. Although this patient was hoarse only five weeks prior to admission, there was a history of intermittent hoarseness over a period of years. The pathologist's report was Gr I cancer. A laryngectomy was performed and two years la-

ter a small gland in the neck appeared which was removed followed by x-ray treatment. He survived four years and ten months following the laryngectomy and died of pulmonary hemorrhage. (3) Case 175 was a male, aged forty-seven, who had a tumor of the left vocal cord of six months' duration. Biopsy report was Gr I cancer. A laryngectomy was performed elsewhere. This patient survived four years and one month and died of cancer of the stomach with no evidence of local recurrence. (4) Case 178 was of the subglottic type and has already been described in detail.

Of the three surviving patients (1) case No 172 was a patient, aged forty-five, with involvement of the vocal cord (Rt) anterior commissure and epiglottis. The duration of his symptoms prior to admission was two months. The tumor was reported as Grade I from one part and Grade II from another section. The patient has been alive and well almost four years. (2) Case No 176a was a patient, aged fifty-four, with a tumor on the left vocal cord of ten months' duration. The pathological report was epidermoid cancer Grade I. The patient has been alive and well approximately three years. This patient had diabetes of quite marked degree at the time of operation and was given diabetic treatment before and following the operation. He also had Roentgen therapy following the operation. (3) Case No 187 was a patient, aged forty-eight, with a Grade II tumor on the left vocal cord and band of two years' duration. In addition to laryngectomy, he also had some x-ray therapy following the operation. He has been alive and well approximately three years.

All the total laryngectomies were performed by the one stage operation. A combination of the Gluck and Peiner methods were employed, resecting the larynx from below upwards. The prelaryngeal muscles were resected in two cases. There were no operative mortalities in this series.

*Laryngofissures or Hemilaryngectomy*—In this series, there were twelve operations, nine males and three females. Of these, four are living and well, one over fifteen years, one twelve years and one ten years and five years and three months without recurrence. Of the eight dead, one died four years later of carcinoma of the stomach, there being no recurrence of the laryngeal cancer. Another patient, female, the youngest in our group, aged twenty, had a hemilaryngectomy with a bilateral window resection and died three and one-half years following her operation. One case, No 78, had an operation ten years previously, suffered a recurrence and then died thirteen and one-half years after the original operation. Radium was used in addition to the operation in this case. Two sur-

vived one year and two months following the operation. The remaining two survived approximately seven months. There was one operative death in this series. The patient died four days following the operation from pulmonary abscess. Laryngotomy with removal of the right vocal cord and part of the arytenoid was carried out in one case.

In view of our present experience, better results by more radical primary removal should be obtainable, more complete hemilaryngectomy and more frequent total laryngectomy.

The first patient is case No. 60 (H. H. No. 23-1131) a male aged sixty admitted to the Huntington Hospital September 1923 complaining of sore throat and hoarseness of nine months duration. A laryngoscopy was performed and a growth was found involving the false and true vocal cords. A specimen was removed and three radium seeds 2.3 mc and 1.5 mc, were inserted into the growth. The report of the biopsy (Path. No. 23-86) was early epidermoid carcinoma arising in papilloma. Jan. 17 1923—*Laryngoscopy*—Considerable mass removed from region of left true and false cord anterior part, and from the subglottic portion of anterior wall of the trachea. Total mass was considerably greater than appeared under indi-

## RESULTS FROM OPERATIONS—LARYNGOFISSURES AND LARYNGECTOMIES

Duration of Life Following Operation	Type of Operation	Results
15½ years	Laryngofissure with Ra.	L & W
13½ "	Hemilaryngectomy with Ra	Died of recur
12 "		L & W
10 "		L & W
5½ "	Laryngotomy with removal of cord and part of arytenoid.	L & W
4 years 10 months	Laryngect X ray removal of gland	Died of Hem
4 years	Hemilaryngectomy with Ra	Died Ca. of stomach
3½ years	Laryngofissure with bilateral window resect with radium application	Died from ext to esophagus
4 years	Laryngectomy	L & W
4 "	"	Died Ca. of stomach
3 "		L & W
3 "		L & W
1 year 4 months	Hemilaryngectomy with Ra pack	Died of recur
1 year 2 months	Hemilaryngectomy with x ray	Died Ca. uterus.
7 months	Hemilaryngectomy with Ra pack	Died of recur
6 months	Hemilaryngectomy Diath and Ra. pack	Died of recur
6 months	Laryngectomy	Died of extension into trachea
3 months		Died of pneumonia
1 week	Laryngofissure	Died of pulmonary abscess following operation. Op death

*Partial Operation with Irradiation*—There were twenty-one patients in this series and for various reasons a major operation was not carried out. In some of these a more radical operation was either contraindicated because of the location and extent of the lesion or the patient declined operation. The prognosis in many of these patients was bad to start with and no hope of cure could be expected. Palliative relief was the most one could expect and this was obtained in many cases.

The procedure was to remove as much of the growth as possible sometimes with the aid of diathermy and the implantation of radium seeds into the remainder of the growth or the region from which the growth was removed. There were five patients in this group who survived over three years as follows: seven years nine months, six and one-half years, four years three months, and two patients three and one-half years. One of these case 24 had a bilateral Harmer operation plus seed insertions. The first two cases are of interest because of the comparatively long duration of survival and they are therefore, described more in detail.

rect laryngoscopy. Five seed 1.0 mc each were inserted into base of growth at intervals of about 5 mm.

October 22 1930—Patient died at the Pondville Hospital. At autopsy there was a recurrence of the tumor in the larynx with regional metastases. The pathologists report (Path. No. 30-2093) showed epidermoid cancer Gr I.

This patient also had carcinoma of the stomach but this was not the same tumor that was in the larynx and therefore not metastatic from the original lesion.

The patient who survived six and one-half years (case No. 55) was also a male aged sixty-five, who had complained of hoarseness of six or seven years before coming to the hospital. His lesion involved the right vocal cord. The biopsy report was carcinoma. This also began as a papilloma. A tracheotomy was performed followed by partial removal of the growth and radium seed insertion.

The remaining patients in this group although they survived less than three years nevertheless were considerably relieved from their suffering. Here too were patients who very likely would have fared much better with a more

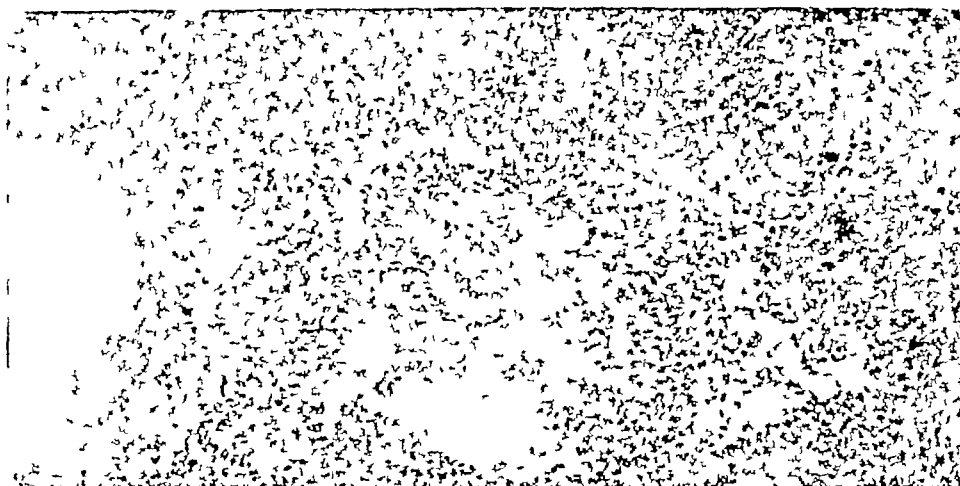


FIG II This is a photomicrograph of pathological section Case No 60 described above It shows a papilloma with typical multiple areas of malignant transformation

radical procedure, particularly in the cordal type of lesion

The following table shows the results of treatment in this series

means of the radium externally or with radium emanation seeds

The results obtained in the past by radium treatment alone are not particularly encourag-

#### RESULTS OF PARTIAL OPERATION WITH IRRADIATION

Site of Lesion	Type of Operation	Duration Following Operation
1 Rt V cord and band	Intralaryngeal remov, seeds implanted	7 years, 9 months
2 Rt V cord	Intralaryng remov, seeds implanted Trach	6½ years
3 Aryepiglot fold	Partial Op 4 years later, seed implant	4 years, 3 months
4 Vocal cords	Trach Part Op Ra Re Op	3½ years
5 Vocal cords	Bilateral Harmer and Ra	3½ years
6 Lt Int Larynx	Part Op Ra	2 years, 3 months
7 Vocal cord	Part Op X-ray seeds	2 years, 3 months
8 Epiglottis	Trach Part Op removal of Epigl with Diath	1 year, 6 months
9 Epiglottis	Diath Seeds Ra bomb 4000 mc hours	1 year, 6 months
10 Vocal cord	Trach Part Op Ra Pack	1 year, 4 months
11 Vocal cord	Op Ra Pack Exter	1 year, 4 months
12 Aryepiglot fold Py Sin	Part removal, seeds implanted	1 year, 3 months
13 ———	Part. Op Ra and X-ray	1 year, 2 months
14 Epiglottis	Part Op seeds Trach	1 year
15 Aryepiglot	Excision with Diath, seeds	11 months
16 Rt Voc cord arytenoid	Trach Part Op Ra	8 months
17 Ary ep fold	Part Op seeds	7 months
18 Ary ep fold	Part Op seeds	6 months
19 Epiglottis	Part removal seeds X ray	3 months
20 ———	Part Laryngectomy, Ra Pack	?
21 Vocal cords	Excision by Ext	4 days foll operation Died of hemorrhage Operative death

There was one operative death in this group This was in a patient who was found to have an extensive lesion involving both cords and originating in what appeared to be a thyroglossal duct carcinoma. He died of hemorrhage four days following a laryngotomy and radium pack

*Treatment with Radium Alone*—There were thirty-four patients, most of whom (twenty-six) were of the extrinsic type Many of these had metastatic glands at the time of admission The remaining seven were of the intrinsic variety, and an operative procedure would no doubt have given better results, but for some special reason, radiation therapy was carried out The patients in the earlier years were treated by

ing It is striking to note that the intrinsic type in this series fared no better, and in many cases not so well as the extrinsic This poor result may be accounted for by several factors (1) radioresistance of the tumor cells, (2) the patients may have been debilitated or alcoholic and such patients rarely show a good resistance to cancers or respond well to treatment, (3) inadequate dosage or improper distribution of

radiation (4) It has been observed that, occasionally, growths may be stimulated to greater activity when the dose employed is too small.

The center of the growth may disappear but the periphery having received insufficient dosage continues to proliferate. The best results in this series were obtained with the first irradiation treatment, when it was adequate. Subsequent treatments were not so effective especially if applied too soon after the primary treatment, because it is known that previous treatments often make a cancer radioresistant. If the irradiation treatment is intensive fear of radionecrosis is great, especially so in the larynx since the cartilages are particularly vulnerable to this complication. Delayed burns have occurred years after treatment (eight years—Chevalier Jackson). Harmer believes it is due "to progressive endarteritis obliterans following irradiation in excess of local tolerance of the tissues." This type occurs more commonly in the larynx than elsewhere.

The best result was obtained in case No. 162 in spite of the fact that the lesion was an extensive one involving the epiglottis, the aryepiglottic fold and the pyriform sinus and the tumor was a Grade II, which is not particularly radiosensitive. The patient was relieved for three years. This may be explained on the basis of the relatively high dosage the patient received.

There were five patients each of whom survived one year and four months following treatment. The remaining patients were relieved approximately six months on the average. A tracheotomy was performed in nineteen patients in most cases preliminary to radiation. In a few cases, it became urgent during or immediately following treatment. There was one death which occurred on the third day following the insertion of seeds.

**Results of Treatment with Radium and X Ray—**There were forty patients in this series, some were of the intrinsic but the greater number were of the extrinsic type. The results obtained here by the combined treatment show a decided improvement over the results of either radium or x ray therapy alone. There were twelve patients in this group who were relieved and survived over one year.

The best result here was in Case 64 (II II 22 1365) in a patient who lived five and one half years following the treatment by irradiation. Unfortunately this was a clinical diagnosis as no specimen was removed but I don't believe that there is any doubt as to this being anything but malignant. This was in a male, aged sixty-six who presented himself at the hospital with the complaint of a "bunch in the throat, and hoarseness." The patient further stated that three years ago he noticed a swelling in the left side of his neck which gave no symptoms except hypersensitiveness when tak-

ing hot foods. Prior to coming to the hospital, the patient consulted Dr. Abbott in Providence who referred the patient to Dr. D. C. Greene who later referred him to our hospital.

**Examination—**Upon the laryngoscopic examination under ether anesthesia, the growth was found to involve the left lateral margin of the epiglottis, the aryepiglottic fold, the arytenoid and the false cord.

**Treatment—**5—15 millicurie seeds were inserted in different portions of the growth less than 1 cm. apart. The patient showed signs of dyspnea and became cyanotic whereupon it became necessary to do a tracheotomy. This was carried out while the patient was still under ether anesthesia. His operation was done on November 8, 1922. In January, 1923 the patient received Roentgen treatment by Dr. Morrison.

The patient remained well and was followed in our clinic until 1928 and on June 10, 1928 a letter was received from the Town Clerk stating that the patient died of carcinoma of the esophagus.

A good result was obtained in Case No. 188. This was a male, aged fifty-six, with a Grade I lesion in the right pyriform sinus. Ten seeds of 1 mc. each were inserted throughout the growth followed by 5100 r. units of Roentgen therapy. This patient has been living and well for three years.

Another (Case 96) survived two years, ten months.

Not unlike the previous group, most of these patients required tracheotomy prior to treatment.

There was one death in this series. This occurred in a male patient of seventy-seven who had seed implantation followed by Roentgen therapy. After the treatment the patient began to have signs of dyspnea, an emergency tracheotomy was performed and he died several days following operation.

**Roentgen Therapy Only—**The patients in this group were the most unfortunate in that the disease had already extended widely and in practically all cases metastases were present.

There were thirty-seven patients in this group of which sixteen required a tracheotomy on admission. Three patients had gland dissections in addition to Roentgen therapy. One received surgical diathermy to the lesion in addition to x ray. One patient had a positive Wassermann and in addition Roentgen therapy was treated with potassium iodide. This patient survived three months dying from hemorrhage due to cancer of the rectum. There were only four patients in this group who survived one year or over. The best result was in the patient (Case No. 184) who lived one year, eleven months following treatment, having received



6000 r units probably one of the largest dosage to date. The average duration of life following treatment in the remaining cases was six months.

**No Treatment**—There were nineteen patients who received no treatment. In twelve of these the duration of life following the first visit is not known. Three of this group lived over one year. One patient, Case No 102, was a man, aged seventy-two, who had an early lesion on the right vocal cord which was still mobile. He refused treatment and survived five and one-half years, finally dying from involvement of the esophagus. This illustrates an early intrinsic type of carcinoma of the larynx, its slow growth and finally the extension of the growth to involve the esophagus. The average life in the remaining cases was five months.

**Complications**—With the exception of cervical metastases, the most frequent complication was involvement of the esophagus. This was present and recorded in seventeen patients of whom thirteen were in males and four in females. The ratio of postcricoid involvement in females is much greater than it is in males and for this reason, the incidence of esophagus complication in females is much higher. Death from hemorrhage occurred in four patients. Pneumonia accounted for two deaths following operation. Mediastinal abscess and abscess of the throat, one each. In two patients, carcinoma of the stomach is recorded as the cause of death, one four years and one six and one-half years following treatment for cancer of the larynx. One patient died of carcinoma of the uterus one year and two months following treatment of the larynx.

I wish to express my sincere gratitude to Dr Edwards W Herman, the chief of the Laryngological Staff, and Dr Shields Warren for their many helpful suggestions in the preparation of this paper.

#### SUMMARY AND CONCLUSIONS

- 1—This series embraces 202 cases, 81 intrinsic and 101 extrinsic cases of cancer of the larynx. In 20 cases, the site was not stated.
- 2—We recognize leukoplakia as a precancerous lesion, and that papilloma not infrequently undergoes malignant transformation.
- 3—The relative infrequency of laryngeal cancer in females compared to males.
- 4—The fifth decade of life shows the greatest incidence of cases.
- 5—The triviality of the symptoms in proportion to the seriousness of the disease.
- 6—The relatively slow course of intrinsic carcinoma and the relatively low-grade malignancy offers ample time for thorough surgical treatment with a good prognosis.

- 7—The early diagnosis offers a patient his best chance of cure.
- 8—It is our opinion that surgical removal of the growth in the early operative intrinsic type offers a good chance of permanent cure.
- 9—In certain types of not entirely operable tumors, which are highly radiosensitive, the combination of surgery and irradiation have produced good results.
- 10—In the far-advanced cases of metastases, we rely entirely on irradiation for temporary relief.
- 11—We feel that the treatment by irradiation, up until very recently, has been inadequate, and our entire conception of this method of treatment is being revised.
- 12—Out of a total of nineteen operative cases of proved cancer, seven are living and well, the longest duration fifteen and one-half years, the shortest three years, to date of publication.
- 13—If it can be shown that radiotherapy can produce as high a percentage of permanent cures as surgery, it will be a safer method of treatment and will be welcomed by the surgeon and a blessing to the patient.

#### REFERENCES

- 1 Berven E G E. Development of technique and results of treatment of tumors of oral and nasal cavities. *Am J Roentgenol* 28:332 (Sept.) 1932.
- 2 Calicelli P. Circumscribed leukokeratosis considered as possible precancerous condition. *Oto Rino laring Ital* 2 p 230.
- 3 Cantl R G and Donaldson M. Effect of radium on mitosis in vitro. *Proc Roy Soc B* 100: 413 1926.
- 4 Cantl R G and Spear T G. Effect of gamma irradiation on cell division in tissue culture in vitro. *Proc. Roy Soc B* 108: 93 (June 4) 1929. Quoted by Harmer.
- 5 Colledge L. Operative treatment of cancer of larynx. *Practitioner* 124: 32 (Jan.) 1930.
- 6 Coutard H. Roentgen therapy of epitheliomas of the tonsillar region, hypopharynx and larynx from 1920 to 1926. *Am J Roent* 28: 313 (Sept.) 1932.
- 7 Coutard H. Principles of x-ray therapy of malignant diseases. *Lancet* 2: 1 (July 7) 1934.
- 8 Crile G and Kearns J E Jr. Branchial carcinoma lateral cervical neoplasm. *Surg Gynec & Obst.* 60: 703 (March) 1935.
- 9 Cutler M. Present status of radiation in treatment of cancer. *Internat J Med & Surg* 47: 167 (March) 1934.
- 10 Delavan D B. History of thyrotomy and laryngectomy. *Laryngoscope* 43: 81 (Feb.) 1933.
- 11 Dominici. The relative value of radiotherapy in the treatment of cancers of the upper air passages. Quoted by Harmer W G. *St Barth Hospital reports* 65: 17 1932.
- 12 Ewing James. *Neoplastic Diseases*. Philadelphia W B Saunders Co. Third Edition p 902.
- 13 Finzi N S. The use of radium in combination with x-rays and surgery. *Brit J Radiol* 30: 430 1925.
- 14 Forsell G. Radiotherapy of malignant tumours in Sweden. *Brit J Radiol* 3: 198 1930.
- 15 Gates O and Warren S. The grading of epidermoid carcinoma. *Surg Gynec & Obst.* 58: 962 (June) 1934.
- 16 Grunwald L. *Lehrbuch der Kehlkopfkrankheiten und Atlas der Laryngoskopie*. Third Edition. Munich.
- 17 Habershon S H. The treatment of laryngeal tuberculosis. *J Laryngol* 20: 637 1905.
- 18 Harmer W D. Relative value of radiotherapy in treatment of cancers of upper air passages. *Semon lecture St Barth Hosp Rep* 65: 17 1932.
- 19 Herman A L. Double branchial cysts complicated by carcinoma of the larynx. *Minnesota Med* 14: 555 (June) 1931.
- 20 Jackson C and others. Precancerous conditions of the larynx. *J Laryngol & Otol* 46: 118 (Feb.) 1931.
- 21 Krainz W and Kumer L. Zur Technik der endolaryngealen Radiumbestrahlung. *Monatsschr F Ohrenh* 65: 1479 (Dec.) 1931.
- 22 Lacazeagne A. *Arch d L Inst du Radium* Paris 1928.

- 22 Lake R. Laryngeal Phthisis of the Throat. Quoted by St. C. Thomson. Philadelphia P. Blakist & Son & Co 1901, p 15
- 23 Ledoux. L'examen du sinus piriforme dans le cancer du larynx. *Cancer* 7: 11. 1930
- 24 Ledoux. Les cancers épithéliaux de l'isthme du gosier. *Acta oto laryng.* 18: 341 1931
- 25 Lewis, F. O. Laryngeal cancer: statistical report on 5 year cures. *Surg. Gynec. & Obst.* 56: 465 (Feb.) 1932
- 26 Mackenty J. E. Cancer of the larynx. Private Publication pp 8 11.
- 27 Ombredanne M. Technique du Pharyngoscopy type A. *Hautant. Ann. d. laryng.* (Dec.) 1931 p 161
- 28 Orton, H. B. Diagnosis and treatment of malignant conditions of laryngopharynx. *J. A. M. A.* 85: 90 (Jan. 3) 1932
- 29 Schmiegrow E. The results of operation (Laryngoscopy) for intrinsic cancer of the larynx. *Ann. Otol.* 23: 53 (Sept.) 1914
- 30 Simon F. Die Frage des Uebertrages gutartiger Kehlkopfgeschwülste in bösartige speziellich an h. int. laryng. Operationen. *Int. Centralbl. f. Laryngologie Rhinologie* etc. Jahrg. V u VI 1928 1929 81: 59 1929 Berlin Verlag von August Hirschwald
- 31 Sandriak, J. Development of laryngology and rhinology among different nationalities. Jubilee contribution to the history of laryngology and rhinology. *Internat. J. Gen. Traub. f. Laryngol.* 24: 163 1908
- 32 Spitzer F. Zur krebigen Entartung der Pachydermia laryngica. *Ztschr. f. Hals-, Nasen u. Ohrenh.* 30: 391 1932
- 33 Spear F. G. Effect of spaced radiation on tissue cultures in vitro. *Proc. Roy. Soc. 110: 224 (March) 1932*
- 34 Straznowsky, T. S. L. and Candi R. G. Living cell in vitro as shown by dark ground illumination and changes induced in such cells by fixing reagents. *Quart. J. Micro.* 80: 71: 1 (May) 1932
- 35 Thomson, St. C. Cancer of the Larynx. Macmillan Company 1919
- 36 Ibid. Diagnosis of cancer of larynx. *J. Laryng. & Otol.* 46: 31 (Jan.) 1931
- 37 Ibid. History of the laryngoscope. *Laryngoscope* 15: 131 1905
- 38 Ibid. Diseases of the Nose and Throat. Second Edition. New York D. Appleton and Company 1917
- 39 Ibid. Intrinsic Cancer of the Larynx. London.
- 40 Tucker G. Early intrinsic cancer of larynx: diagnosis and treatment: observations on laryngoscopy as method of treatment in series of cases. *Ann. Otol. Rhin. & Laryng.* 41: 36 (Oct. feb) 1932

## GIANT DIVERTICULA OR REDUPLICATIONS OF THE INTESTINAL TRACT\*

### Report of Three Cases

BY HENRY W HUDSON, JR., M.D.†

**C**ONGENITAL cysts and diverticula (other than Meckel's) and partial reduplications of the intestinal tract are unusual congenital anomalies. They may be of clinical importance because of the symptoms produced and the possibility of surgical relief. We have found eight such reduplications or giant diverticula reported to which we may add three

#### CASE 1

A. C. S., No 153126 a male infant of three months was admitted to the surgical service of the Boston Children's Hospital on September 16 1931. The family and birth histories were not important. He had developed normally and been well until one week before admission when he developed a greenish watery diarrhea. For three days he had from five to seven defecations. The stools then decreased in number and size and for the five days preceding admission had been soft and black in color. He had vomited once three hours before admission the vomitus consisting of part of a recent feeding. He had not appeared ill until twelve hours before admission when he developed periods of pallor during which he appeared to have abdominal pain cried and drew his legs upward toward the abdomen. There had been no medication. There was no history of pica or of purpura. The physical examination was normal except for pallor and the local abdominal examination. There was slight generalized abdominal muscle spasm with tenderness more marked on the right. An ill-defined mass was felt just above and to the right of the umbilicus.

Intussusception was considered a probable diagnosis. Hemochol purpura was also considered. Bleeding and clotting times were normal.

Abdominal exploration was made soon after admission.

**First operation.** September 16 under ether anesthesia a right rectus muscle splitting incision was

made. There was no free fluid within the peritoneal cavity. A search for an intussusception or evidence of reduced intussusception revealed neither. Throughout the base of the mesentery of the small intestine were numerous petechial hemorrhages and there was enlargement of the mesenteric lymph nodes. About eighteen inches above the ileocecal valve and within the leaves of the mesentery of the ileum a walnut sized mass was encountered. In this mass, and adjacent to the ileum a small perforation about 2 mm. in diameter was noted. Through this perforation clotted blood was extruded. The perforation was incised thus exposing the inner men of the mass which presented a mucosa similar to that of the ileum but it did not appear to communicate with the ileum. It was filled with blood clot which was removed. There was one small bleeding point which was easily controlled. The infant's condition was unsatisfactory and it appeared unwise to remove tissue for examination. The cystic mass was sutured and the abdominal wall closed in layers. The infant was returned to bed in fair condition with diagnosis undetermined.

**COURSE.** The infant was transfused and parenteral fluids were administered with improvement. For six days after operation there was a decreasing amount of blood in the stools. He was afebrile. The wound healed well and he was discharged October 3 1931 in apparently good condition.

**Laboratory data.** Urine negative at five examinations except for acetonuria at the time of admission. Red blood cells 2 900 000 and hemoglobin 45 per cent on admission 1 400 000 and 63 per cent on September 22. White blood cells 11 400 and 8 200 with normal differential. Bleeding and clotting time normal. Platelets 250 000. Stools guaiac positive from September 18 to 28 and guaiac negative on October 1 and 2.

**Interval note.** The infant did very well gained four pounds apparently had no pain and his color improved. There were one or two stools daily apparently normal.

**Second admission.** December 31 1931 at six months of age. Thirty six hours before admission he had a greenish watery stool. Twenty-four hours before admission and the day of admission there were similar stools. He was admitted for observation

From the Surgical Service of the Children's Hospital.

From the practice of the author.

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Except for the healed abdominal scar, the physical examination was normal. The stools were found to contain blood. He was observed from December 31 to January 6, 1932 during which all stools contained blood and his red blood cells fell from 4,500,000 to 2,790,000. He was transfused on January 5.

**Second operation** January 6, 1932 under ether anesthesia. An incision was made over the right rectus muscle parallel to the previous operative wound and the muscle belly was retracted laterally. The peritoneum was incised and a mobile cecum with primitive mesentery presented. The ileocecal valve was identified and the ileum inspected. The mesentery was of the primitive type. About two feet above the ileocecal valve a diverticulum running in the leaves of the mesentery was identified. The mesentery was split and the diverticulum found to be about the caliber of the ileum for perhaps two inches, then to constrict to a cordlike structure which disappeared in the root of the mesentery. This diverticulum was resected from the root of the mesentery up to the reflection of the mesentery over the ileum and it was then noted that the diverticulum curved to run distally, parallel to the ileum and within the leaves of the mesentery, toward the ileocecal valve for about sixteen inches. No point of communication with the ileum was demonstrated. The operation had occupied nearly an hour and to complete the resection would have extended the procedure unduly and would have required partial resection of the ileum as well. For this reason the diverticulum was closed. The wound was closed in layers without drainage and the infant returned to bed in good condition but with the expectation that at some future time the remainder of the diverticulum would be excised, possibly with resection of the ileum.

**Histologic report** S326 GROSS DESCRIPTION. The specimen has the appearance of a part of the intestinal tract. It is definitely in four sections. The whole length is 95 cm. Part A is 1 cm in length and was described at operation as being lost in the root of the mesentery. This has the appearance of a cord about 4 mm in thickness. On cutting it open it is found to contain a small lumen and in the resection this lumen has been cut across. Adjacent to this is Part B which measures 2 cm x 2 cm when opened. Part C is 15 cm in length and 3 cm in width when opened. It has a similar appearance to Part A except that it is a little more hemorrhagic. The fourth section, Part D being the largest, is 5 cm in length and when opened out is 2 to 2.5 cm in width. The lumen which is patent throughout the specimen is lined with a mucous membrane. The mucosa of the largest section is folded in fairly normal looking rugae which run across the specimen for the distal 15 cm and in folds generally along the length of the specimen for the next 2.5 cm. At approximately the junctions of these two portions distinguished by the configuration of the rugae, there is a small punched out ulcer with raised and undermined borders 2 mm in width, the base of which is quite hemorrhagic. The serosal surface outside this ulcer is definitely thickened. The mucosa of Part B is paler and the rugae are arranged in less definite folds of a more or less circular configuration. When opened at operation, there was no fecal material seen within the lumen.

**MICROSCOPIC** There are six sections taken for microscopic study. These sections are taken as indicated in the diagram No 1 from Part A, No 2 and No 3 from Part B, No 4 from Part C, No 5 through the ulcer, and No 6 through Part D.

Section No 1. This section is cut across the unopened lumen of Part A. The mucosa is in a gen-

eral way characteristic of the small intestine. It is thrown up into numerous villi and lined with a simple columnar epithelium. There are a moderate number of goblet cells which give evidence of mucous secretion. The muscularis is composed mostly of circular muscle fibers with only a few longitudinal bundles. There is no evidence of inflammation or hemorrhage in this section.

Section No 2 is cut across the point where the small lumen of Part A opens into the larger second portion. At this point there is a transition from the mucosa described above to a mucosa resembling gastric mucosa. This is characterized by the appearance of rather typical gastric glands. The mucosa is thrown into numerous folds. Scattered through the tunica propria are abundant eosinophiles. The submucosa and muscularis are not unusual. A second section (No 3) farther along in this portion shows the same type of mucosa. In addition there are a few small, highly cellular lymph follicles.

A section (No 4) through the thin connecting portion (Part C) shows a reversion to the type of mucosa found in Part A. The mucosa here is thinned out and less well preserved.

The large portion (Part D) shows again a fairly typical gastric mucosa similar to Part B. Here again there is abundant eosinophilic infiltration such as is frequently found in adult gastric mucosa. There is a greater number of lymph follicles here than are seen in the previous sections, and the propria is somewhat more dense and cellular, containing a larger number of lymphocytes. One section transects the ulcer which was described grossly. The ulceration has entirely destroyed the mucosa and extends through the submucosa involving part of the muscularis. There is a dense fibroblastic reaction at the base of the ulcer and a serosal proliferation of fibroblasts. Numerous pyknotic nuclei and polymorphonuclear leucocytes are scattered through the regions just below the base of the ulcer. There is considerable hemorrhage into the underlying serosa. No blood vessels can be seen to be eroded by the ulcer. One neighboring vessel is partially occluded by an organizing thrombus.

**SUMMARY** This specimen consists of an anomalous diverticulum which shows a transition in the type of its mucosa from that of the small intestine to that of the stomach. The latter contains a small ulcer.

**Course** Blood transfusion was performed immediately after operation. There was a postoperative rise in temperature to 103.4° which subsided within thirty-six hours and thereafter remained normal. His condition was good at the time of discharge on January 19.

**Laboratory data** Urine normal at the examinations. Red blood cells 4,650,000 on admission, hemoglobin 70 per cent, on January 4, 2,790,000 and 46 per cent, on January 6 (after transfusion) 5,750,000 and 70 per cent. Stools gualac positive from January 1 to January 13 and gualac negative on January 16, 18 and 19.

**Interval history** The infant did well, gained in weight and there was no melena. On March 23, 1932 he developed a respiratory infection. He was readmitted March 27, 1932 and discharged March 30, 1932 to the Infants' Hospital with bronchopneumonia. There he ran an uneventful course and was discharged relieved on April 12, 1932.

**Interval note** The infant was well, weight and development normal. His appetite was good, the bowels regular.

Fourth admission June 15, 1933 at two years of age. The day before admission he passed a black stool. He was admitted for observation. The physical examination was not noteworthy. He was observed until June 23. His stools always con-

tained blood. His red blood cells fell from 4 000 000 on admission to 3 750 000 and the hemoglobin from 60 per cent to 40 per cent. Marked achromia developed.

**Third operation.** June 22 1933 under avertin and ether anesthesia an incision was made between the two scars of earlier operation and developed through the rectus sheath. With some difficulty the muscle was retracted. The peritoneum was opened without incident, except for the escape of an excess of clear fluid (culture negative). The terminal ileum and its reduplicated portion were demonstrated. It was evident that removal was possible only by resection of a part of the ileum. The ileum in its duplex segment was resected for about fifteen inches. Following resection and just as an anastomosis was begun the infant ceased breathing and became pulseless. The change was sudden and a minute or two earlier the anesthetist had reported a pulse rate of 132 and general condition satisfactory. Various methods of resuscitation were unsuccessful. There had been practically no bleeding and although the operation had occupied an hour and might be considered to have caused shock, there was no warning of this fatal accident. Whether or not there was embolism was a matter of conjecture.

**Histologic report.** S-33 298 and S-33-125 GROSS DESCRIPTION. The specimen consists of a portion of resected ileum measuring 33 cm. in length. It averages 3.2 to 3.5 cm. in width when lying flat. Within the mesenteric attachment throughout 35 mm. of its length there is a secondary portion of bowel which communicates with the main ileum by two small openings 3 mm. in diameter through which there may be expressed small amounts of clear mucinous fluid containing white flocculent material. The mucosa of the ileum contains occasional petechial hemorrhages and localized areas of congestion. The mucosa is in general pinkish yellow to pinkish brown in color and possesses a slightly edematous pale gray mucosa with circular rugae. In the proximal end of the blind pouch there is a black silk suture put in at the time of the previous operation. At the distal end of the blind segment there is an ulcerated area 1.8 x 1 cm. in its various diameters. Within the mid portion of the blind segment there is a rather sharply demarcated segment of mucosa 3 cm. in length in the center of which are two small punched-out ulcerated areas 4 mm. in diameter one of which communicates with the ileum. Throughout the remainder of the mucosa of the blind segment there are occasional petechial hemorrhages.

**MICROSCOPIC.** Seven sections including four of the diverticulum two of the ileum and one of the communication between the two structures show a diverticulum with gastric mucosa showing chronic ulceration and slight acute ulceration. The ulceration occurs at the communication between the ileum and the diverticulum. At this site the mucosa of the diverticulum is ulcerated and the mucosa infiltrated by lymphocytes and eosinophiles. There is slight secondary lymphoid nodule formation. There is one small area of acute ulceration right at the junction between the two structures resulting in intense polymorphonuclear leucocytic infiltration of the submucosal stroma. The other four sections of the diverticulum show intact gastric mucosa. This is composed of typical large mucous crypts at the base of which are numerous small typical gastric glands containing acid and chief cells. The mucosal stroma is somewhat edematous and lightly infiltrated by eosinophiles. There are a few areas of lymphocytic infiltration around the base of the gland. The two sections of ileum are essentially

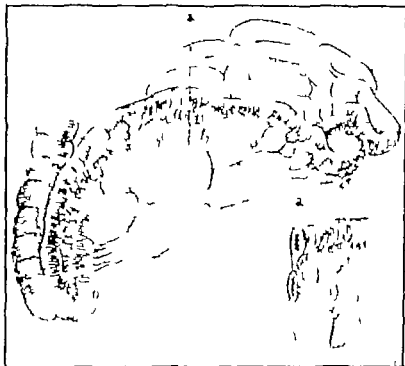


ILLUSTRATION NO. 1

Drawing to demonstrate the anomaly in case No. 1. The segment between the root of the mesentery and point "a" was successfully resected at the second operation. Reproduced by courtesy of the Rhode Island Medical Journal (2:22 [Feb.] 1933).

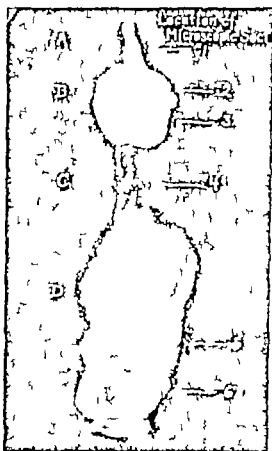


ILLUSTRATION NO. 2

The specimen removed at the second operation in case No. 1. The microscopic details are given in the case report. This illustration previously appeared in this Journal (208:533 [Mar. 9] 1932).



ILLUSTRATION NO. 3

The reduplicated ileum removed at the third operation in case No. 1.

negative with typical ileal mucosa, the stroma of which contains moderately hyperplastic lymphoid tissue with a few secondary lymphoid nodules

## CASE 2

L A No 168771 a white female infant of six months was admitted to the surgical service of the Boston Children's Hospital on February 15, 1933. The family, birth, and developmental histories were not unusual. Two months before admission she was ill with cough and fever and a diagnosis of bronchitis was made. She grew irritable and slept poorly. Two weeks before admission she began to vomit occasionally between feedings. The abdomen enlarged and vomiting increased. There was loss of weight. The stools became infrequent and enemas were administered with good returns. No blood was recognized in the stool except for one "speck" two days before admission. The stools were green and contained mucus. Several days before admission the vomitus was bile stained. There was intermittent fever for several days preceding admission.

Examination on admission revealed a well developed and fairly well nourished infant appearing chronically ill. The rectal temperature was 99°. The general examination was essentially negative. Local examination. The abdomen was markedly distended and splinted. A firm nontender mass occupied the right lower quadrant. This mass was palpable through the rectum.

**Laboratory data** Two examinations of the urine were not abnormal. Red blood cells 5,050,000. Hemoglobin 80 per cent. White blood cells 12,000. Differential normal for age. Wassermann and Hinton negative. Tuberculin 1:1000 negative. Nonprotein nitrogen 14 mg per cent. Phenolsulphonphthalein excretion 60 per cent in two hours and ten minutes.

**X-ray examinations** February 15, 1933. "The lung fields are essentially clear. A film of the abdomen shows considerable distention which is due not so much to gas in the intestines as to fluid in the peritoneal cavity. There is also some free air under the liver in the right upper portion, evidently the result of a ruptured viscus." February 16. "Re-examination of the abdomen. There is more distention due to the peritoneal fluid. I can no longer make out definite free air."

**Operation** February 16, 1933. Ether anesthesia. By means of a right rectus muscle-splitting incision the peritoneal cavity was exposed and found to contain a large amount of bloody fluid. A large mass presented in the right lower quadrant. When delivered it appeared to consist of over a foot of greatly distended small intestine with markedly enlarged lymph nodes in its mesentery. There were also within the mesentery several cysts which apparently did not communicate with the intestine. Both the intestine and cysts were deep purple in color and in several areas there was a yellow fibrinous exudate. A resection of the affected intestine and mesentery was made and a "double-barreled" enterostomy performed. The infant was returned to bed in poor condition.

**Course** The infant's condition was poor for the first three days after operation. Parenteral fluids were administered and by February 20 her condition had improved. There had been great fluid loss through the proximal stoma of the enterostomy. On February 21 a clamp was applied opposing the proximal and distal loops (Mikulicz procedure). One week after operation the wound edges separated allowing eventration of a part of the small intestine. The wound was resutured and at this time

there was evidence of peritonitis. Twelve hours later the infant died.

An autopsy was performed A33 39. The anatomic diagnoses were

Jejunum duplex  
Enterostomy  
Peritonitis, organizing  
Bronchopneumonia.  
Splinitis and perisplinitis  
Esophagitis  
Lymphadenitis, mesenteric and mediastinal.  
Decubitus ulcer, occipital  
Extracortical adenoma of adrenal glands  
Persistence of "Jackson's veil" and of anterior mesentery

The resected specimen is described. **GROSS DESCRIPTION** The specimen consists of a segment of jejunum and a portion of its attached mesentery opened in the operating room. The segment of bowel measures 45 cm in length and the mesentery varies from 2 to 5 cm in width. The serosa is extremely congested, slightly dulled and shows irregular areas of ecchymosis. The mucosal surface of the jejunum is of normal pinkish to brownish gray in color, soft and shows the usual prominent plicae circulares. At approximately 15 cm from one end there is an irregular depression in the mucosal surface which is rather smooth and measures 2 x 1.3 cm. Lying within the leaves of the mesentery is an extremely thick-walled cystic mass of irregular form but shaped much like a pancreas in that there is dilated portion at one end 6 cm in diameter tapering off at the other end to an average diameter of 2.5 cm. The whole structure is 22 cm in length possessing a thick double muscular wall varying from 7 to 8 mm. The lining is generally smooth and shiny although extremely hemorrhagic in some areas and varies from pale yellowish gray to pinkish gray. The most hemorrhagic portion of the lining is associated with the large dilated end. At the opposite (tapered) end there are two constricted areas 1.5 cm in length, the lumen of which is 3 mm in diameter. Between them there are two dilatations of this elongated cystic structure measuring 1 cm in diameter. In the mid portion 8.5 cm from one end near the portion of the structure adherent to the jejunum there is an irregular mucosal ulceration, the serosa and wall over which is less than 1 mm in thickness. There is no perforation in this region. The serosa overlying the entire specimen is extremely congested and in places there are small accumulations of yellowish brown, fibrinopurulent exudate. Another area of acute ulceration exists within the large, dilated portion 1 cm in diameter, the serosa over which is dulled, congested and brownish gray. The wall at this point is approximately 1 mm thick but there is no perforation.

**MICROSCOPIC** Seven sections show a chronic ulceration and gastric mucosa in the wall of a diverticulum. The mucosa of the typical gastric type showing large open crypts at the bases of which there are branching gastric glands containing acid and chief cells. The stroma is markedly congested and hemorrhagic especially between the openings of the crypts. There are variable numbers of infiltrating polymorphonuclear leucocytes throughout. Two areas of chronic ulceration are devoid of mucosa. The surface contains a small amount of fibrinous exudate, while the underlying wall is markedly fibrosed and infiltrated with variable numbers of mononuclear phagocytes, polymorphonuclear leucocytes and lymphocytes. A portion of the wall taken from the extreme tip shows a mucosa somewhat different from the rest, in that

there are no active secreting cells. The crypts and glands are of mucous type although the general form and arrangement of the gland is similar to that seen in gastric portion. The submucosa in the non-ulcerated portion shows mild congestion, but beneath the ulcerated portions it is more or less scarred. The muscularis is of two layers with areas of diagonally running smooth muscle fibers in addition. The serosa is edematous congested and infiltrated by a variable number of lymphocytes polymorphonuclear leucocytes and mononuclears. There is no evidence of fibrinopurulent exudate upon the serosal surface. Several lymph glands included within the loose edematous serosa and from the mesentery show a mild hyperplasia with occasional infiltrating mononuclear phagocytes in the follicles. The medullary cords of the nodes are densely packed with small mature lymphocytes.

**DIAGNOSIS** Jejunum duplex type with gastric mucosa showing acute and chronic ulceration.

**NOTE** There is no communication between the jejunum and the diverticulum. Sections through the dimpled areas where the two structures are adjacent show a double muscular wall with a slight amount of intervening fibrous tissue.

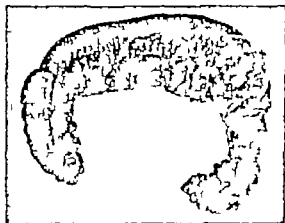


ILLUSTRATION NO. 4  
Jejunum duplex. Description in case report No.

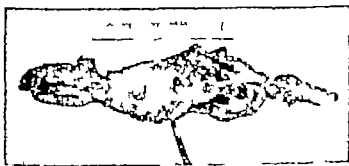


ILLUSTRATION NO. 5  
Jejunum duplex, opened. Case No.

#### CASE 3

D. M. a white female of twelve years was admitted to the Peterborough Hospital at 8:30 A.M. March 2, 1935. The family and birth histories were not unusual. From infancy she had failed to gain normally, was undernourished and was considered "sickly." As an infant she cried for hours at a time apparently from abdominal distress. At two years she was said to have had "Bright's disease" characterized by hematuria for two months. From the age of three years she had frequent attacks of cramp-like abdominal pain referred to the umbilicus and lasting from a few minutes to several hours. These were usually accompanied by nausea and vomiting. During some attacks relief was obtained from a carminative and eructations occurred. During the attacks the child usually flexed her thighs on the abdomen or if seated would bend forward and place her head on her knees. She could not be

induced to change position until the attack was over. At times she would fall asleep in this position.

In November 1934 she was observed for a two-week period by the pediatric service of the Children's Hospital. During this time she had several attacks of pain which were not severe. A gastrointestinal series pyelography by the intravenous method and various examinations of the blood gave negative results and she was discharged undiagnosed. The attacks continued and during the two months preceding admission had become more frequent and severe. Hardly a day passed without some discomfort.

At 3 A.M. March 1, 1935 twenty-nine hours before admission she awakened from sound sleep with severe cramp-like abdominal pain located in the umbilical region. The paroxysms lasted two to three minutes, gradually diminished and the child would doze to be awakened in five to ten minutes by more pain. This colic lasted from 3 A.M. to 4 P.M. and was accompanied by nausea and vomiting. The vomitus consisted of the fluids that she had taken eagerly. She was very thirsty. At 3 P.M. her physician administered 1/8 gr. of morphine and she rested comfortably without pain or vomiting for about five or six hours. She had passed flatus and there was a defecation of fecal material following an enema at 8 A.M. When the mother tried to rub the child's abdomen, she complained it was too tender to be touched.

During the twelve hours preceding admission there was pain of the character described. She vomited frequently until fluids were denied her several hours before admission. During the automobile ride to the hospital the pain became more steady and severe and the child cried continually with pain. She begged for water.

On admission examination disclosed a very pale undernourished and underdeveloped child in great distress. The mouth temperature was 100.6, the pulse rate 160 and the respiratory rate 44. Her breathing was difficult, and irregular and she grunted frequently. She lay in bed with the knees flexed and her hands were held in the region of the umbilicus. She cried continuously and begged for water. The skin and mucous membranes were pale. She appeared dehydrated. The abdomen was moderately distended, there was voluntary generalized muscle spasm and diffuse tenderness. An indefinite tender mass occupied the entire hypogastrium. Two physicians considered her moribund.

The white blood cells were 20,000 with 74 per cent neutrophils and the red cells were 3,820,000. The hemoglobin was 64 (Sahli). The urine showed slightest possible trace of albumin, a trace of sugar and the sediment a few hyaline casts and a rare white blood cell.

By infusion 200 cc. of normal salt solution and 250 cc. of citrated blood were administered and 600 cc. of salt solution was introduced beneath the skin. One-twelfth gr. of morphine was administered at 8:30 A.M., 10:30 A.M. and 1 P.M. Her general appearance and color improved.

It was felt that intestinal obstruction, cause unknown was the probable diagnosis and operation was elected.

**Operation** March 4, 1935 3 P.M. Peterborough Hospital.

With novocaine infiltration a right rectus incision with mesial retraction of the muscle belly was made. When the peritoneum was incised sanguinous fluid escaped in large amounts. Ether anesthesia was induced and the wound enlarged to about eight inches. The peritoneal cavity was filled with old liquid blood and great masses of clotted blood. No fresh blood was apparent. The blood

clots were most numerous over the mesentery of the small intestine adjacent to the umbilicus. A mass which proved to be a volvulus of the terminal ileum was delivered. The volvulus involved about four feet of the lower ileum, and had rotated clockwise for about 80 degrees. The ileum was edematous but not greatly distended. Within the mesentery, parallel and intimately opposed to the mesenteric edge of the ileum, was a reduplication of the bowel for a distance of about four feet. Near its proximal end was a large perforation about one and a half inches in diameter from which a small amount of bright blood escaped. There was no evidence of intestinal contents escaping, nor was the peritoneum inflamed. Through the perforation a mucosa thrown into rugae was clearly visible and within the folds of mucous membrane a small ulcer was seen from which there was a steady ooze of fresh blood. The volvulus having been reduced there was no apparent obstruction. The child's condition was poor and it seemed unlikely that she could survive resection. Accordingly the bleeding area was cauterized and the ruptured area sutured. The intestine was returned to the abdomen and the abdominal wound closed. The child returned to bed in poor condition.

*Course* Following operation, the child was white and even more colorless than before. Radial pulse could be obtained, but not counted. However, she improved gradually and nine hours later she was talking and seemed very comfortable. Her after-care consisted of Levine tube, morphine sulphate, gr 1/12 every three or four hours as necessary, sips of clear liquid by mouth, Fowler's position.

March 3, 1935 9 A.M. Patient had a reasonably good night, sleeping in naps. Complained of nausea once, but there was no vomiting. Temp 103.6° rectally, pulse 140/160. Very pale. Passing no gas per rectum. Abdomen shows moderate high distention for first time. Levine tube is clear. RBC 3,400,000, Sahli 42 per cent. WBC 5,850, Polys 59 per cent. Catheterized and four ounces of urine obtained which showed the slightest possible trace of sugar, few hyaline casts, few granular casts, rare red and white cells.

12 25 P.M. The patient has suddenly become very restless and very pale. Has severe air hunger and has pulled Levine tube from her nose. Given one ampule of adrenalin chloride and oxygen inhalations. She has quieted down and is resting comfortably.

1 30 P.M. Upper abdomen seems much more distended. Swathe loosened. Levine tube is clear. It is impossible to get a radial pulse and respirations are becoming labored.

2 45 P.M. Has vomited a small amount of dark brown fluid. Died a few minutes later.

#### DISCUSSION

The anatomic relations and the gross and microscopic structure of these three reduplications or giant diverticula place them in the category of developmental anomalies of the gastrointestinal tract. These are to be differentiated from the lymphatic or chylous cysts, urogenital cysts, and the dermoids and teratoids which occur within the peritoneal cavity.

The anomalies of gastrointestinal origin form a rather well-defined group (Ewing<sup>1</sup>) characterized by a smooth musculature arranged in layers as in the tract proper. A well-defined mucosa is often demonstrable which may resemble closely the mucosa of any part of the nor-

mal tract. This mucosa is not infrequently altered or disrupted by inflammation, heterotopia, intracystic pressure and, perhaps, by digestion from the secretions produced. A well-defined submucosa is usually present. There is wide variation in size, form, histologic arrangement and in position with reference to the several segments of the digestive tract. Thus they occur at any part of the tract including the mediastinum. Their distribution in 102 cases is shown in table 1. They may communicate

TABLE 1

DISTRIBUTION IN 102 REPORTED CASES OF CONGENITAL ENTERIC CYSTS, DIVERTICULA AND REDUPLICATIONS

Mediastinal or Esophageal Cysts.....	10
Associated with Abdominal Cysts.....	6
Gastric .....	6
Duodenal .....	8
Biliary .....	1
Jejunum .....	12
Ileum (not including Meckel's).....	47
Ileocecal .....	26
Appendix .....	1
Colon .....	2
Rectum .....	3
Reduplications .....	18
	108

with or be separated from the lumen of the digestive tube. At times they may be intimately attached to the wall of the intestine and present as cysts within its lumen, or within its wall in either submucous, intermuscular, or subserous positions. They occur between the leaves of the mesentery and in retroperitoneal positions. They may be single or multiple large or small and may or may not be associated with other congenital anomalies. There are six theories to explain their development.

(1) Atavism. Reversion to an earlier phylogenetic form based on the occurrence of blind ceca in certain fowl and multiple diverticula in certain fish.

(2) Twinning in which case "the stimulation to reduplication, although acting at an early stage of cell division has affected a certain section only of the embryo" (Edwards<sup>2</sup>). This theory is applicable to the reduplications of segments of the intestinal tract but less clearly to the cysts and diverticula.

(3) Through the development of a median septum. The support for this belief is a specimen in the Museum of the Royal College of Surgeons of the small intestine of an ox. To one side of the intestine is a long tubular cyst of the same calibre as the intestine itself. There is no communication with the intestine and the mucosa of the cyst and intestine are dissimilar.

(4) Sequestration of a segment of the intestinal tube. For this theory evidence is adduced by the arrangement of a collected series of cysts (by Evans<sup>3</sup>) which shows successive steps in the hypothetical passage of a cyst from the

lumen of the intestine through its wall and into the mesentery. This presupposes a segment to be sequestered, however, and as Evans points out the most likely explanation is that of the epithelial buds described by Lewis and Thyng.<sup>1</sup>

(5) Persistence and alterations of the vitelline duct or Meckel's diverticula in their several forms. The persistence of a normal fetal structure, the vitelline duct, accounts for many cysts and diverticula. However only those which occur in relation to the distal portion of the ileum may be so classified and the presence of multiple cysts or diverticula precludes such an explanation in certain cases as two diverticula of Meckel never occur in the same individual. In many reports any enterogenous cyst or diverticulum occurring in relation to the ileum, and particularly in the ileocecal region has been classified as Meckel's in type. This may be true or false and other interpretations are possible as some of these examples are similar to cysts and diverticula found in relation to jejunum, duodenum, stomach, or esophagus. Heterotopia of the lining mucous membrane is common in Meckel's diverticula (67 per cent Hudson<sup>2</sup>) but also in other anomalies. Heterotopia is also observed following the healing of an inflammatory lesion in the otherwise normal intestinal tract.

(6) The nodules of Lewis and Thyng.<sup>1</sup> These investigators found very regularly in pig, rabbit, and human embryos nodules of epithelial cells occurring along the course of the esophagus, stomach, and intestine which become vacuolated and may be separated from or be in continuity with the lumen of the intestinal tract. Normally these disappear or coalesce to form a part of the lumen of the digestive tube but they may persist. Evans<sup>3</sup> has represented diagrammatically their translation from positions adjacent to the lumen, through the wall and into the mesentery. Evidence in support of this origin is found in Evans' collected cases some of which have an anatomic similarity to the embryologic structures pictured by Lewis and Thyng. Additional evidence for this belief is found in a consideration of those mediastinal cysts which are enteric in type since the nodules are present at a period of embryonal development consistent with their inclusion within the thorax. It is stated also (by Poncher and Milles<sup>4</sup>) that mediastinal cysts and abdominal cysts of enteric origin occur in the same individual but that no combination of mediastinal cyst and typical Meckel's diverticulum has been reported.

The evidence then, favors the belief that the nodules of Lewis and Thyng are the antecedents of those cysts and diverticula of enteric type which are not typical of those described by Meckel. This view is held by Evans,<sup>3</sup> Drennen,<sup>5</sup> and Poncher and Milles.<sup>4</sup> Edwards<sup>6</sup> favors the explanation by twinning for the giant diverticula and reduplications.

Anomalies of this type do not necessarily cause symptoms and in some instances have been incidental findings at the autopsy of an individual dead of an unrelated cause. Frequently they are responsible for serious symptoms and death of the individual. The symptoms produced by those located within the abdomen may be broadly grouped as, (a) intermittent abdominal distress or pain (as in No 2 and No 3 of our cases), (b) intestinal obstruction (as in No 2 and No 3), (c) hemorrhage into the intestinal tract or peritoneal cavity or both as in No 1 and No 3 and, (d) a palpable abdominal tumor as in No 2 and No 3. These symptoms are readily understood since obstruction partial or complete may be produced by encroachment of a cyst or diverticulum on the lumen of the intestine, and by the production of volvulus and of intussusception. These explanations are in accord with the observations made in the reported cases. Hemorrhage, which may be of serious degree as in No 1 and No 3 of our cases, is best explained by the formation of ulcers in the mucosa adjacent to heterotopic gastric mucosa. This is a relatively frequent occurrence in Meckel's diverticula (31 per cent Hudson<sup>2</sup>) and in a few instances the presence of a secretion chemically similar to gastric juice has been demonstrated.

A correct diagnosis previous to operation is nearly always impossible but it is a wise rule in infancy and childhood to consider a congenital anomaly as a possible cause of obstruction of melena or of a confusing clinical picture. Thus in sixty seven of the reported cases where the patient's age is stated there were fifty under twenty years of age. Thirty two were two years of age or younger. As might be anticipated the sex incidence is essentially equal, eighteen male and twenty two female in forty reported cases.

In the eighteen instances of reduplication or giant diverticulum which we have found in the literature only five were demonstrated at operation.

The anomaly in Fairland's<sup>7</sup> patient was similar to that in our case No 2. He performed an enterostomy for imperforate anus. The infant died and autopsy revealed a diverticulum, thirteen inches long, which arose from the duodenum "about 1½ inches" below the pylorus.

Fitz<sup>8</sup> described a specimen from the Warren Museum. It is from an infant about ten months old who had been under the care of Dr. Joseph Stedman of Jamaica Plain who reported that the infant died with symptoms of intestinal obstruction. It would be presumptuous indeed to alter Fitz's description which accompanies illustration No 6. The specimen is similar to the anomalies found in our cases No 1 and No 3.

Garnett Wright<sup>10</sup> demonstrated, at operation, a diverticulum thirty seven inches long commencing at the upper end of the sigmoid colon and running obliquely downward between the



leaves of the mesosigmoid loop and passing behind the posterior parietal peritoneum. The blood supply in Fitz's case (qv), Wright's case, and in our three were similar in that the vessels supplying the normal intestine were peripheral to or branches of those supplying the diverticulum or reduplication. Technical-

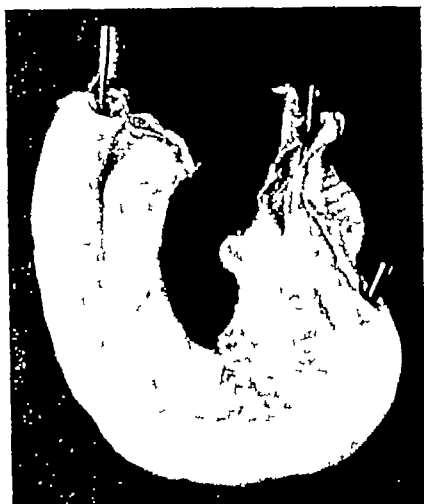


ILLUSTRATION NO 6

The specimen described by Fitz (From the Warren Museum)

Two more or less parallel intestinal tubes cut transversely across in their continuity are continued within a single mesentery. The blood vessels of the latter terminate in the wall of the outermost tube first supplying branches to the inner tube. The diameter of the outer tube is relatively uniform throughout while that of the inner in general somewhat narrower becomes dilated in the immediate vicinity of an opening through which the canals of the tubes communicate with each other. The contiguous portions of the walls of the two tubes are in close proximity to each other throughout the greater part of their course and are fused near the common opening.

The walls are composed of mucous muscular and peritoneal coats. The mucous membrane of the outer tube shows slightly projecting transverse folds in the vicinity of the opening while that of the inner tube is relatively smooth. Villi and crypts are present in both.

The opening between the tubes is rounded sharply defined one third of an inch in diameter and appears to be covered with mucous membrane. The canal of the inner tube is contracted in the immediate vicinity of the opening and its wall at this point is thickened and fibrous.



ILLUSTRATION NO 7

Warren Museum specimen 7732 transilluminated. Transillumination is suggested as a useful procedure during operation as the relations are difficult to demonstrate.

ly this is of importance as resection of the reduplication necessitates resection of the adjacent intestine whose blood supply is sacrificed by the resection of the reduplication. Drennen<sup>7</sup> has stressed this point in connection with the ileocecal cysts not Meckel's in type.

A second important technical consideration is the requirement of meticulous palpation and inspection of the entire intestinal tract and its mesentery. It is difficult to demonstrate these anomalies at operation. The suggestion is made that transillumination of the mesentery will be helpful. In our case No 1 the anomaly was not recognized completely at the initial operation but was at the second. At this time the operator quite easily followed the intramesenteric course of the diverticulum but nearby spectators could see it indistinctly. In case No 2 the character of the anomaly was not recognized at operation but in No 3 it was recognized at once probably because of the operator's experience in case No 1. Wright<sup>10</sup> recognized his case at operation. It was in relation with the colon.

Consideration of these three cases adds weight to the opinion expressed in connection with a study of experience with Meckel's diverticulum<sup>6</sup>, i.e., that infants and children presenting a long history of symptoms referable to the abdomen are entitled to and should receive a gentle but meticulously thorough exploration of the abdominal viscera when other diagnostic methods prove inconclusive. This is all the more true if melena is a symptom. There is every reason to believe that resection of such anomalies is feasible and will relieve symptoms if an opportunity is afforded to perform a deliberate laparotomy at a time when the patient is in good condition.

#### SUMMARY

Three additional instances of giant diverticulum or reduplication of a segment of the intestinal tract are reported.

The theories explaining the development of these anomalies are summarized.

The technical problems involved because of the blood supply and the difficulty of demonstrating the anomaly are discussed.

The three cases reported confirm our belief that exploratory laparotomy, at a time when the patient is in good condition, is indicated for those infants and children who present a long history of undiagnosed abdominal symptoms.

A bibliography of enteric cysts, diverticula, and reduplications of the intestinal tract is offered.

- 1 Ewing James. Neoplastic Diseases. Second Edition. W B Saunders Company.
- 2 Edwards H. Congenital diverticula of the intestine. Brit J Surg 17: 7 (July) 1929.
- 3 Evans A. Developmental enterogenous cysts and diverticula. Brit J Surg 17: 34 (July) 1929.
- 4 Lewis F J and Thyng F W. The regular occurrence of intestinal diverticula in embryos of the pig rabbit, and man. Am J Anat 7: 505 1907 08.
- 5 Hudson H W Jr. Meckel's diverticulum in children. New Eng J Med 208: 525 (March 9) 1933.
- 6 Poncher H G and Miles G. Cysts and diverticula of intestinal origin. Am J Dis Child 45: 1064 (May) 1933.
- 7 Drennen E. Ileocecal cysts. Arch Surg 22: 106 1931.
- 8 Fairland E. Congenital malformation of bowel. Amussat's operation. Brit M J 1: 851 (June) 1879.

- 9 Fitz, R. H.: Persistent omphalo-mesenteric remains. *Am. J. Med. Sci.* 68: 30 1884  
10 Wright, G.: Congenital diverticulum of the colon. *Proc. Roy. Soc. Med.* 13: 119 (Surg.) 1919 10

## REFERENCES

## MESENTERIAL OR ESOPHAGEAL

- Milner and Clifford. *Ann. Surg.* 80: 714 1929  
Poncher and Millies: *Am. J. Dis. Child.* 45: 1064 1922  
Wysa: *Virchows Arch. f. path. Anat.* 51: 112 1870  
Meckel: *Tab. Anat. Path. Fasc. III* 18 5  
Haberthorn: *Pathological and Practical Observations on Diseases of the Alimentary Canal.* 1859  
Roth: *Virchows Arch. f. path. Anat.* 85: 371 1881  
Rosenfeld: Cited by Roth  
Hennig: *Centralbl. f. Gynäk.* 4: 338 1880  
Schmucke: *Virchows f. path. Anat.* 227: 1., 1919 29

## STOMACH

- Sinclair: *Brit. J. Surg.* 17: 18 1909  
Gardiner: *J. A. M. A.* 49: 1888 1907  
Pritchard: *J. Path. & Bact.* 23: 1908  
Ahrens: *Arch. f. klin. Chir.* 84: 4 6 1901

## DUODENUM

- Springer: *Brit. J. Surg.* 8: 18 1920  
Jackson: *J. Anat. & Physiol.* 42: 19 1907-08  
Wauson: *Surg. Gynec. & Obst.* 73: 785 19 2  
Sänger and Klopp: *Arch. f. Gynäk.* 16: 416 1880  
Caldwell: *Medical Essays.* Edinburgh 173..  
Fairland: *Brit. M. J.* 1: 851 1879

## BILEARY

- Sänger and Klopp: *Arch. f. Gynäk.* 16: 413 1880

## JEJUNUM

- Majo: *Lancet* 1: 362 1889-90  
Halszstein: *Surg. Gynec. & Obst.* 37: 1 1933  
Klebs: *Handb. f. el. path. Anat.* 1: 1889  
Braithwaite: *Brit. J. Surg.* 11: 7 1923  
Benz: *Lancet* 19 7  
Duchwald: *Deutsche med. Wchnsch.* 13: 1837  
Hilster: *Brit. M. J.* 4: 800 19 10  
Miller: *Bull. Johns Hopkins Hosp.* 84: 216 1912  
Moore: *Trans. Path. Soc. London* 35: 02 1834  
Wachsmann: *Deutsche Ztsch. f. Chir.* 72: 102 1904  
Buzzi: *Virchows Arch. f. path. Anat.* 100: 287 1885  
Frohlich: *Inaug. Diss. Halle.* 1891

## ILEUM

- Roth: *Virchows Arch. f. path. Anat.* 85: 371 1881.  
van der Bogert: Cited by Miller  
Hennig: *Centralbl. f. Gynäk.* 4: 338 1880  
Shallow: *Ann. Surg.* 81: 798 19 5  
Strode and Poppel: *Surg. Gynec. & Obst.* 37: 781, 19 3  
Eve: *Med.-Chir. Tr.* 81: 51, 1897  
Wallmann: *Virch. w. Arch. f. path. Anat.* 1458  
Stursemard: *Hospitaltidende* 1891  
Terrie and Leckne: *Rev. f. chir.* 29: 161, 1904  
Greller: *Deutsche Ztsch. f. Chir.* 85: 230 1909  
Frankel: *Virch. w. Arch. f. path. Anat.* 87: 75 1882  
Seligman: *Jahr Handbuch. Sta. tschank.* 1890  
Dietrich: *Zeits. f. Heilk.* 6: 277 1885  
Kulenkampff: *Centralbl. f. Chir.* 104: 617 1882  
Naase: *Langenbeck Arch. f. klin. Chir.* 45: 858 1882  
Quensel: *Nord. Med. A. K.* 8: 1 1893  
Hedinger: *Virchow f. path. Anat.* 167: 29 190

## COLON

- F. an Jacksonian Prize Essay 1813  
Fainbury: *Tr. Path. Soc.* 31: 12 1887  
Aye: *Am. J. M. Sc.* 131: 89 1906  
Huster: *Beiz. f. path. Anat. u. z. allg. Path.* 29: 251 1896  
Springel: *Verhandl. d. deutsch. Gesellsch. f. Chir.* 29: 637 1900

- Fehleisen: *Progress in Medicine* 1899  
Blackader: *Tr. Am. Pediat. Soc.* 25: 36 1913  
Nemper: *Centralbl. f. Chir.* 37: 712 1910  
Turner and Tipping: *Proc. Roy. Soc. Med.* 7: 99 1912 14  
Ball: *Brit. J. Dis. Child.* 11: 769 1914  
Lathewen: *Deutsche Ztsch. f. Chir.* 179: 291 19 3  
Bazin: *Canad. M. A. J.* 25: 120 19 5  
Edwards: *Clin. J.* 47: 612 19 5  
Drennon: *Arch. Surg.* 22: 106 1931  
Prænkell: *Virchows f. path. Anat.* 87: 376 1882  
Hedinger: *Virchows f. path. Anat.* 167: 29 1902  
Krogius: *Ztsch. f. klin. Med.* 49: 1903  
Baldwin: *M. Rec.* 81: 881 1912  
Bolton and Lawrence: *Brit. M. J.* 2: 48 1916  
Bookman: *Ann. Surg.* 90: 1097 19 9  
Yates: *Brit. J. Surg.* 17: 466 19 9 30

## APPENDIX

- Pratt: *Am. J. Dis. Child.* 48: 1 63 1932

## COLON

- Wright: *Proc. Roy. Soc. Med.* 13: 119 1919 9  
Lockwood: *Brit. M. J.* 1979

## RECTUM

- Petit de la Villéon: *Bull. et mém. Soc. de Méd. et Chir. de Bordeaux.* 1915  
McLannahan and Stone: *Surg. Gynec. & Obst.* 58: 19 7 1934

## GIANT DIVERTICULA AND REDUPLICATIONS

- Wright: *Proc. Roy. Soc. Med.* 13: 119 1919 9  
Fairland: *Brit. M. J.* 1: 861 1879  
Lockwood: *Brit. M. J.* 2: 814 1882  
Meckel: *Tab. Anat. Path. Fasc. III* 182  
Fitz: *Am. J. Med. Sci.* 88: 39 1884  
Ahrens: *Arch. f. klin. Chir.* 64: 4 6 1901  
Andrill: *Treatise on Pathol. Anat.* 1621  
Schliöser: *Ge. teratologische med. Ja buch* 1 187  
Caldwell: *Medical Essays.* Edinburgh, 1732  
Pratt: *Am. J. Dis. Child.* 45: 1 63 1932  
Moll: *Brit. J. Surg.* 14: 176 1926-7  
Pollard: *Trans. Pathol. Soc. Lond.* 47: 47 1906  
Aiken: *Glasgow M. J.* 78: 115 1881  
Gravitt: *Virchows f. path. Anat.* 68: 506 1874  
Haberthorn: *Pathological and Practical Observations on Diseases of the Alimentary Canal.* 1859  
Barth and Davis: *Casop. lek. česk.* 68: 19-9

Since this paper was prepared, Dr D E Robert son of Toronto has operated on a similar case. I am indebted to him for permission to quote from his letter.

Yesterday I examined a girl, twelve years of age who has a large intestine which has two lumens. I do not know where the two lumens begin at the central end but suspect they begin in the caecum. They are separated throughout from the splenic flexure to the distal end at all events. The one opens through a normal anus and functions normally the other opens with a minute opening in the vagina and this was the cause of an impaction of faeces which occurred in it and made a large mass which extended half way up the ascending colon. I did an anastomosis just inside the anus between the two recta, and they each had a normal musculature and muscle coat. I was very disappointed to find that this case did not have two appendices as it seemed to me to have two caeca."

## DIABETES INSIPIDUS\*

## Treatment With Posterior Lobe Pituitary Powder Intranasally

BY ALEXANDER MARBLE M.D.

ALTHOUGH diabetes insipidus is an uncommon condition, the usual effectiveness of treatment with posterior lobe pituitary extract is universally recognized. Since Blumgart's studies, the convenient intranasal route of ad-

ministration has been widely used to supplant subcutaneous injections. Most clinicians, however, in using this method have employed liquid pituitary preparations either as a spray or on cotton pledgets inserted into the nose, pituitary jelly has also been used. It has not been generally appreciated that the intranasal insufflation of pituitary powder is equally if not more, convenient and effective and is far less expen-

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sive than other forms of therapy Recent reports on this subject have been made by Smith<sup>3</sup> (whose paper stimulated us to use pituitary powder), by Canelo and Lasser<sup>4</sup> and by Adlersberg<sup>5</sup> The purpose of the present note is to record briefly our own experience

Our series includes four cases In three of these the condition is idiopathic in type, in the fourth a brain tumor (glioma of the optic chiasm) was demonstrated at operation in December, 1927

CASE 1—Miss R S, was first seen on September 13, 1933 at the age of eight years She had always been a nervous child She had had no illnesses except pertussis at the age of five and an attack of tonsillitis in the spring of 1933 Polyuria and polydipsia had been noted since about August 1, 1933 Physical examination showed her to be pale and undernourished, the tonsils were moderately enlarged and scarred Upon examination of the urine a specific gravity of 1.001 was noted, the tests for albumin, sugar, bile, and diacetic acid were negative Examination of the blood showed slight anemia, the fasting blood sugar was 0.07 per cent, nonprotein nitrogen, 25 mgm per cent and plasma cholesterol, 197 mg per cent Ophthalmoscopic examination and roentgenograms of the skull gave normal findings

At the New England Deaconess Hospital in September 1933, the antidiuretic effectiveness of pituitary extract given subcutaneously was quickly demonstrated and treatment by the nasal route attempted The liquid extract was introduced into the nostrils on small cotton pledgets, but in our patient this procedure caused considerable discomfort and irritation Consequently administration by means of a nasal spray was used with good results The parents were instructed to use at home the nasal spray supplemented by subcutaneous injections when nasal irritation or nose colds made the intranasal route unsatisfactory

Treatment with posterior lobe powder was begun during a two-day hospital stay in February, 1935 Unfortunately the time was too short to permit desirable studies During the first day no specific medication was given, during the second, approximately 200 mgm of pituitary powder was blown into the nose in four doses Despite the short period of observation and despite a coryza with nasal discharge, the urinary volume during the second twenty-four hour period was kept down to 3090 cc. as compared with an output of 5310 cc in the previous twenty-four hour period when no medication was given The comparative results are shown in table 1

TABLE 1  
EFFECT OF POSTERIOR LOBE PITUITARY POWDER  
INTRANASALLY

Case No 1, Miss R S		Urine Output cc	Specific Medication
1935	Fluid Intake cc		
February 1-2	4590	5310	None
2-3	3450	3090	Approximately 200 mgm Pituitary powder intranasally in 4 doses

Letters received from the parents since hospital discharge indicate that treatment by insufflation of powder has been much more convenient, though perhaps not quite so effective, than by subcutaneous injection They find that the effectiveness is definitely reduced in the presence of a head cold with nasal discharge During the two months from June 19 to August 20, 1935, the cost of treatment with pituitary powder has averaged less than five cents a day

CASE 2—Mr D D, was sixteen years of age when he first came for treatment on January 5, 1934 Thirst and polyuria had been present since August, 1933 the onset of symptoms had apparently been gradual On the advice of his home physician, pituitary extract had been taken with a good antidiuretic effect both subcutaneously and intranasally in the form of a spray For three weeks, however, he had suffered so much from irritation of the nasal mucosa that he dreaded to use the pituitrin Roentgenograms of the skull taken elsewhere on November 20, 1933 had shown a normal sella turcica Blood and urine studies showed no abnormalities other than the low urinary concentration (specific gravity 1.004) Examination, including ophthalmoscopic study, showed him to be in good general physical condition

The patient was not admitted to the hospital He was advised to try a nasal jelly containing the pituitary principle and to use subcutaneous injections of liquid pituitary extract at such times as intranasal medication was uncomfortable

When seen on November 2, 1934 he was found to be in good general physical condition He had soon given up the nasal jelly since he could not secure satisfactory results with its use He had come to rely chiefly on the intranasal spraying of posterior pituitary extract with at least five applications a day

Following this visit we suggested that he try the intranasal insufflation of posterior lobe powder On January 21, 1935 he wrote, "I started using the powder you had sent to me from the Deaconess Hospital Dec 1st and it lasted me until Jan 10th, taking it four times a day I have found it much more effective than the liquid and would much rather use it. There were only two or three days out of this time that I did not use it as I had a very bad head cold and it did not seem to have any effect. There is certainly a great difference in the price between the powder and the liquid, which is fortunate for us"

Again on April 4, 1935 his mother wrote "The bottle of powder that we got from our local drug gist lasted from January 10th to March 1st

Mornings it will last about three to four hours, afternoons from four to five hours He takes about one sniff up each nostril four times a day, that is, mornings, noon, after supper and on going to bed The powder seems much more effective than the liquid and, of course, there is a decided difference in the cost For convenience there does not seem to be much difference"

A four gram bottle of powder then lasts this patient from forty to fifty days Such a bottle is sold at retail from \$3.75 to \$4.00 Hence the medication in this form costs him less than ten cents a day as opposed to thirty-five to seventy cents a day using the liquid preparation as a spray or subcutaneously

CASE 3—Mrs L H, forty-four years of age, was first seen on March 25, 1935 For twelve years she had suffered from excessive thirst and polyuria Except for measles, mumps, and whooping cough in childhood and jaundice at the age of seventeen, she had had no noteworthy illnesses She had five sons living and well. Eleven years before she had

been studied at the Massachusetts General Hospital where treatment with pituitary extract (intranasal spray) had been used with success. The patient had had difficulty in getting the drug in her home town, however so that for the most of the ten years she had received no medication nor had she sought medical advice. She stated that at times she had voided as much as four gallons of urine a day. Although now she awakened only once or twice a night to urinate in the past she had at times arisen as many as twelve times. She regularly was drinking two quarts of water during the night.

Physical examination showed her to be in good condition except for acne rosacea, slightly enlarged tonsils, hyperactive patellar reflexes and varicose veins of the lower legs. Studies of the blood and urine together with a roentgenogram of the skull gave essentially normal findings except for the large volume and low specific gravity of the urine. The basal metabolic rate was —3.

Following a control period during which no specific medication was given pituitary extract was administered by intranasal insufflation. The results are shown in table 2.

TABLE 2

EFFECT OF POSTERIOR LOBE PITUITARY POWDER  
INTRANASALLY

Case No 3 Mrs L H.			
Date	Fluid In	Urine	Remarks
1935	take	nary Volume	
March 26-27	3960	4380	No specific medication
27-28	4200	3630	"
28-29	3030	3660	"
29-30	2190	1230	Pituitary powder approximately 200 mgm intranasally in 4 doses
30-31	930	1080	

The patient was allowed to go home on a varied low-salt diet and instructed to use the pituitary powder as often as necessary to control her symptoms. On April 28 1935 she wrote "I am getting along fine with three doses a day and one capsule (200 mgm.) will go three days. When I feel that I must have more I take it. I never have to get up nights and I feel better in every way."

Again on August 13 1935 she wrote "I cannot begin to tell you how much more comfortable I have been this summer. Even the hottest days I did not care for as much water as others. I have not had to get up at night more than three times since I came home (a period of 4½ months). I only have to take the powder 3 times a day." She further stated that the first bottle of four grams lasted from April 1 to July 10 or one hundred days thus the actual cost was about four cents a day.

CASE 4—Miss H. E. L. was ten years of age when first seen on June 7 1935. The diagnosis of diabetes insipidus had been made a year before in the Canal Zone because of extreme polydipsia and polyuria, with the urinary volume ranging between 3,500 and 5,500 cc per twenty-four hours and a urinary specific gravity as low as 1.001. Pituitary extract had been given subcutaneously.

In Boston in 1936 the findings were essentially the same. Ophthalmoscopic examination and roentgenograms of the skull gave no evidence of brain tumor nor was this diagnosis thought likely by neurological consultants. She was not seen again until November 1937 when she was brought back for

observation because of total blindness which was said to have come on in the course of a few days. Ophthalmoscopic examination then showed bilateral optic atrophy. She was transferred to the Peter Bent Brigham Hospital where on December 12 1937 a right transfrontal exploration was carried out by Dr. Harvey Cushing and a biopsy of a tumor (glioma of the chiasm) performed. Following this four irradiations of the skull were given at intervals up to March, 1938.

The operation and x-ray treatments had relatively little immediate effect upon the polyuria and polydipsia. At the Peter Bent Brigham Hospital in December 1937 the urinary output on three successive days had been 4100 3000 and 3300 cc. with fluid intakes of 6100 4000 and 4800 cc. respectively. During a second stay in the hospital in March, 1938 the urinary output was 4200 and 5000 cc. on two successive days with fluid intakes of 5400 and 4200 cc. respectively. In late years however there has seemed to be some lessening of the severity of symptoms and except for the blindness she has been well. Physical examination has been essentially negative except as regards the eyes.

At periodic office visits made since December 1931 the specific gravity of the urine has varied from 1.002 to 1.005 and the volumes of a single specimen has been as great as 940 1000 and 1,225 cc. Since December 1931 until recently the patient had not taken pituitary extract subcutaneously because the total blindness made self-medication difficult and because she had adjusted herself to the polydipsia and polyuria. She regularly got up two or three times a night to void large quantities of urine.

In April 1935 the use of pituitary powder intranasally was suggested. The patient has used it more or less regularly since, giving it to herself at bedtime (none during the day) by intranasal insufflation. At first she found the powder irritating to the nose and complained of a choking sensation after its use but this no longer bothers her. On August 12 1935 her mother stated that with the single dose at bedtime the patient was able to sleep through the night (until 6 A.M.) comfortably without arising because of thirst or desire to void.

## COMMENTS

Results with the intranasal use of posterior lobe powder in the above cases have obviously been highly satisfactory. In the first place, the mode of administration is much more convenient and less painful than the injection of pituitary extract subcutaneously. It is possibly less irritating than liquid pituitary extract applied on cotton pledgets and just as convenient as the administration of the liquid by intranasal spray. Secondly, there is a great saving in expense over other forms of treatment. The cost of pituitary powder averages from four to ten cents a day as compared with at least thirty-five to seventy cents a day for liquid pituitary extract (in preparations ordinarily available) given intranasally or subcutaneously.

One of our patients has tried with success the use of the powder as snuff as was also used by the patient of Canelo and Lasser. Case 2 Mr. D. D., takes a pinch of the powder between the thumb and forefinger, inserts it into one of the nostrils and by sniffing draws the powder into the upper part of the nose.

As aids in treatment it is helpful to advise

patients to limit the amount of salt in their diet, to avoid stimulants as tea and coffee and to restrict fluids after 6 or 8 P M in order to help insure a comfortable night. We have not used amidopyrine (pyramidon)

#### SUMMARY

In four cases of diabetes insipidus the intranasal insufflation of posterior lobe pituitary powder has been used with success. The convenience and lower cost of this mode of administration are emphasized.

#### REFERENCES

- 1 Blumgart H L. The antidiuretic effect of pituitary extract applied intranasally in a case of diabetes insipidus. *Arch Int. Med* 29: 508 (April) 1922
- 2 Choay André and Choay Lucie. Traitement du diabète insipide par des inhalations d'extrait de lobe postérieur d'hypophyse. *Rev. neurol* 40: 267 (Feb 7) 1924. Traitement du diabète insipide par des prises nasales de poudre de lobe postérieur d'hypophyse. *Presse méd.* 38: 1165 (Sept 12) 1928
- 3 Smith F M. Diabetes insipidus. Treatment by intranasal insufflation of posterior lobe pituitary powder. *J. A. M. A.* 102: 660 (March 3) 1934
- 4 Canelo C K and Lissner H. A case of diabetes insipidus controlled with powdered pituitary posterior lobe extract applied intranasally as a snuff. *California and West. Med.* 42: 178 (March) 1935
- 5 Adlersberg D. Dauertherapie des Diabetes insipidus. *Ztschr. f. klin. Med.* 128: 598 (Sept 12) 1935

## A DEPLORABLE DEVELOPMENT IN THE ECONOMICS OF RADIATION THERAPY

BY FRANK EDWARD WHEATLEY, M D \*

THIS paper was inspired by the rather insistent request of a physician that I treat a superficial growth on his patient's ear by deep therapy. As this was not the first indication I have had that there is a general misunderstanding in regard to the value of various types of x-radiation, I believe there is need for a general reconsideration of this subject. The reason for the confusion is easy to understand when we consider the recent developments in radiation technique. Up to about thirteen years ago, the radiologist's armamentarium consisted of radium, and x-rays produced by voltages below 140,000. Radiation therapy was an accepted method of treatment in a large number of pathological conditions, but our early hopes that radiation would prove a cure for internal malignancies were disappointed.

About that time rumors came from Germany that they had developed x-ray tubes and apparatus operating at 200,000 or more volts and consequently capable of delivering more penetrating x-rays. Soon our medical literature was flooded with dramatic case reports of patients apparently hopelessly infected with cancer who had been "cured" by massive doses of penetrating x-rays. American radiologists were not slow to follow this lead and American manufacturers developed the necessary apparatus. Medical literature was further enriched by sanguine statements of the men who were pioneers in this work. The magic term "Deep Therapy" was evolved and we had high hopes that science had at last discovered a most formidable weapon against the cancer scourge. Soon, however, reports from Germany indicated that many of the early cases treated by massive doses of deep therapy were dead, not from the disease but from the effects of the radiation. As time went on it was realized that while deep therapy was a decided advance in the treatment of internal cancer, it was capable of producing very serious consequences, so that gradually the practice of

applying massive doses was discarded and smaller doses were adopted.

Recently, following the method of Contard in the relatively successful treatment of laryngeal carcinoma, some radiologists are using a large number (20-40) of small doses of penetrating rays in the treatment of many other unrelated conditions. The total dosage given is much greater than heretofore thought safe. It may be that the method will prove to be an answer to the problem of the treatment of malignancy, but the returns are not in, and time will be the final arbiter. Meanwhile, the economic aspect of the method would tend to limit its use in all except the more desperate cases.

Laboratory and clinical experience have shown that the beneficial effect of radiation is due to that portion of the beam that is absorbed in the tissue under treatment, so that extreme penetration is probably of advantage only for the purpose of reaching a deep seated lesion. In addition, it is believed by most authorities that the therapeutic action of radiation is not a function of its wave length, so that there is no particular difference between the effect of deep therapy or short-wave x-rays, and that of x-rays produced at moderate voltages, provided only that the intensity of the ray in the tissue under treatment is the same.

At this point it may be well to explain that when we speak of deep therapy, we are speaking of x-rays produced by voltages of 200,000 or more and having a wave length of about 15 or less angstrom units, and when we speak of moderate voltage x-rays we are speaking of those produced by voltages up to 140,000 and having wave lengths of 23 to 30 angstrom units. These wave lengths are those that emerge from suitable filters. When we come to treat a patient with the short-wave therapy, a term which I will substitute for the term "deep therapy", we find that at depths of four inches the dosage, depending on the portal, may be about 35 per cent of that at the skin surface. In contrast to this is the fact that the dosage with moderate-wave length with the same por-

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tal at four inches depth is approximately 20 to 25 per cent that at the skin surface. The significance of these facts is that with short wave therapy we get about 1/3, and with moderate wave therapy about 1/5 of our incident beam, to reach the depth of four inches. If the depth of the disease is less, the difference is less and with lesions in or near the skin great penetration is not desirable. By suitable cross firing we can accomplish practically the same result with either wave length but, of course the short wave therapy accomplishes the result more satisfactorily in the deeper lesions.

As a practical matter, however, a large percentage of lesions requiring radiation therapy do not call for intensive doses of penetrating rays, and can be handled equally well by moderate-wave therapy. As a proof of this statement, it is interesting to review the early literature of x ray therapy. Dr F. H. Williams of Boston, in his book "The Roentgen Rays in Medicine and Surgery," 1901, reviews the current literature. Freund in 1897, two years after the discovery by Roentgen, treated hypertrichosis successfully with twenty hours of exposure, producing no other skin reaction. The length of exposure shows the feeble ray available at that time. Schiff treated lupus successfully in the same year. Kummel in 1898 treated lupus with two treatments of fifteen minutes each per day for two months, when the lesions were healed. Williams in 1900 was enthusiastic about the use of x rays in eczema, syphilis, favus, and acne. In 1901 he reported success in treating epidermoid cancer of the lip (biopsy done by Dr Mallory) with submaxillary gland involvement, using in all about two hours exposure. He relates several other successful cases all of which were studied microscopically by Drs Mallory, Wright, and Councilman. Dr Mallory noted, in a biopsy made after treatment, that "the reaction on the part of the normal tissue was surprisingly slight" and Dr Williams stated, "It would seem that the x rays have a selecting action." He sums up his experience in the use of x rays in external new growths as follows:

- 1 Treatment is adapted to external new growths which have not great depth though they may cover much surface
- 2 The treatment causes no pain.
- 3 No delay because of operation
- 4 Pain and odor are relieved
- 5 Healing follows without causing burn
- 6 Cosmetic results excellent
- 7 Treatment carried on without patient giving up work
- 8 Operation may be done on larger growths, followed by x rays

He classified new growth cases coming to the Boston City Hospital for several years and found out of a total of 635, 318 were internal

while 317 were external and amenable to x ray. Certainly, if Williams in 1901 with the inadequate apparatus then available, was getting good results, and believed from his experience that about one half the cancer cases at the Boston City Hospital could be helped with x ray, it is certain that with even the poorest equipment we now have, we can do considerably better.

The literature up to the advent of short wave apparatus abounded with reports of successful treatment of all sorts of lesions with low or moderate voltage radiation. Modern literature, which is based upon experiences both with short wave therapy and moderate-wave therapy, has many references in which moderate wave therapy is preferred to short wave therapy, although some authors believe that short wave therapy is superior.

For example Ledy<sup>1</sup> of the Mayo Clinic, "One purpose of this paper is to validate the exclusion of high voltage in inoperable carcinoma of the breast." He advocates the use of 130,000 volts maximum in inoperable carcinoma of the breast where no deep metastases, or bone metastases exist. Lauritsen of the Institute of California<sup>2</sup>, "It is reasonable then to conclude as Meyer does that there is no advantage and probably even harm in using hard (short wave) roentgen rays or radium rays for superficial and intermedially located lesions." Portmann<sup>3</sup>, Cleveland Clinic, Cleveland Ohio says, "Therefore, I am of the opinion that in the postoperative treatment of mammary carcinoma, the radiation should, so far as possible be limited to the chest wall by a low voltage technique (140,000 volts maximum). Dosage over the chest wall should be modified to prevent damage to the organs of the chest and the elements of the blood." Grier<sup>4</sup> of Pittsburgh states, "I believe that the effect on cancer cells produced by Roentgen rays of different wave lengths (produced by different voltages) is not greatly different for the same dosage." Pfahler<sup>5</sup> uses 130,000 volts maximum in treatment of cervical adenitis. Groover and Christie<sup>6</sup> in a paper on roentgen treatment of hyperthyroidism use 140,000 maximum. Hirsch and Holzknecht<sup>7</sup> advise the use of deep therapy only in internal carcinoma, glioma, inoperable sarcoma, medullary tumor, cerebral tumors, hypophyseal tumors, hypernephroma, and syringomyelia, on all other lesions amenable to radiation including carcinoma of the skin, they advocate voltages less than 150,000 maximum. Widmann<sup>8</sup>, Philadelphia General Hospital discussing carcinoma of the lip states, "The effects of different qualities of radium and Roentgen rays have been observed to be equally good."

The apparatus necessary for the shorter wave length x ray is highly expensive, the maintenance cost is great, and the exposure time is often several times that used with moderate wave

length x-rays due to the heavy filtration necessary. All these factors add to the expense.

A limitation of all x-ray therapy is that resulting from radiation sickness, so that it is impossible to utilize full dosages without producing serious discomfort to the patient. In many institutions using short-wave therapy, divided doses are given, the maximum being twenty-five per cent of a full dose, partly to avoid radiation sickness. It is my observation that this untoward reaction to radiation is considerably more likely to occur when short-wave rays are used than when equal doses of moderate-wave rays are employed, especially when the treatment is directed to the abdomen. This complication results in the necessity of giving a series of small doses and when this is done the short-wave apparatus costs mount accordingly.

As an illustration of this point, I recently treated, with moderate-voltage, a patient for menorrhagia, completing in one dose a series given elsewhere by deep therapy. She had received six treatments at a cost she could ill afford, and was agreeably surprised to learn that the proportionate cost of moderate voltage therapy was considerably lower. In my experience, the average menorrhagia case can be handled equally well with moderate-wave therapy at an expense of about one-half that of deep therapy.

I do not wish this paper to be interpreted as antagonistic to short-wave therapy which has a distinct field, and is a great advance over previ-

ous radiation in certain limited conditions. I do, however, want to impress the fact that there is a misconception in the minds of many physicians who believe that short-wave therapy is superior to any other radiation in every case—a misunderstanding that results in the deplorable situation that an unnecessary economic burden is placed upon the unfortunate patient. I believe that in these days where the "high cost of medical care" is a public issue, the physician should not prescribe short-wave or "deep" therapy, but should refer his patient to the radiologist, and let him determine the type of treatment that should be given, taking into account, not only the pathological condition, but also all other factors which should influence the choice of the type of treatment to be given.

#### REFERENCES

1. Luddy E. T. The Roentgen ray treatment of inoperable carcinoma of the breast by the method of multiple converging beams. *Radiology* January 1934.
2. Lauritsen, C. C. On relation between Roentgen and erythema dose. *Am J Roentgenol* 33: 235 (Feb.) 1935.
3. Portmann U. V. Roentgen irradiation in treatment of mammary carcinoma. *Am J Roentgenol* 31: 46 (Jan) 1934.
4. Grier G. W. Radiation therapy of cancer of skin. *Am J Roentgenol* 32: 206 (Aug) 1934.
5. Pfahler, G. E. and Kapo P. J. Roentgen treatment of cervical adenitis: review of 333 consecutive cases. *Am J Roentgenol* 32: 293 (Sept) 1934.
6. Groover, T. A., and Christie A. C. Roentgen treatment of hyperthyroidism. 22: 275 (March) 1934.
7. Hirsch I. S. Principles and Practice of Roentgen Therapy. New York: American X-Ray Publishing Co., 1925.
8. Widmann B. P. Carcinoma of lip: results of Roentgen and radium treatment. *Am J Roentgenol* 32: 211 (Aug) 1934.

## NEW ENGLAND SURGICAL SOCIETY

### RECONSTRUCTION OF THE VAGINA FROM A PORTION OF THE SIGMOID\*

#### Report of a Case

BY HERMAN C. PITTS, M.D.†

MRS. J. C., twenty-nine years old, was sent to me September, 1930 by Dr. Sullivan of Newport complaining that "water comes away all the time." Her story was that she had been delivered by forceps of a dead baby four years before while still living in the Cape de Verde Islands. Since then she had had another pregnancy terminated successfully by Caesarian section.

Examination showed a deep healed laceration of the tissues to the right of the urethra and involving the urethra to a considerable extent. The perineum was badly lacerated. The caliber of the vagina was small—would admit the little finger only as far as the cervix. This contraction was due to masses of scar tissue, evidently following trauma from forceps.

I felt that her incontinence could be helped by some plastic work on the urethra and that at the

same time the caliber of the vagina could be enlarged.

The operation was done October 7, 1930. The result on the urethra was excellent. The patient reported in May, 1931, that she had good control. The vagina, however, was not so satisfactory. Sexual intercourse was impossible. So on May 12, 1931 I tried again—this time turning in a flap from the side of the vulva on the right. The result, as before, was very disappointing. In October, 1933, the vagina was little better than a cord of scar tissue. Both she and her husband were very insistent that something be done—the condition present was ruining their family life.

I talked to them at that time about making a new vagina from the bowel but did not encourage the undertaking.

Nothing more was heard from the patient until June, 1934, when she came in declaring she was ready to do anything to end the present uncomfortable situation.

June 13, 1934. Operation. Rhode Island Hospital.

\*Read by title at the Annual Meeting of the New England Surgical Society at Manchester N. H. September 28, 1935.

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Under ether anesthesia the vaginal mucosa including all scar tissue was removed from the introitus to the cervix. The abdomen was opened—a complete hysterectomy done and the left tube and ovary removed. An attempt was made to find a loop of ileum long enough to serve the purpose but the mesentery proved too short. Failing this a ten inch segment of sigmoid was isolated and a lateral anastomosis of the cut ends of the bowel done above to restore its continuity. Then the isolated segment was folded on itself and carried down into the prepared vaginal cavity to the introitus. The peritoneum was drawn over the operative site above, the abdomen closed and patient again changed to the lithotomy position. The folded end of the bowel presenting at the introitus was opened and the edges stitched to the raw edges of the vaginal entrance. This left a double-barreled passage extending upward about five inches. The two canals were packed with iodoform gauze.

The patient made a satisfactory recovery. When I saw her July 10 1934 there was some discharge and the entrance to the new vagina had contracted a little. The median septum was very apparent and acted as an obstruction.

In October 1934 she was sent to the hospital again and clamps were applied to the septum in the new vagina. The pressure of course caused sloughing as far as the clamps reached so that when she left the hospital there was a single canal for about four inches. At the time the clamps were put on the constricting band surrounding the vaginal entrance was cut with a tenotomy knife.

I saw this patient last, May 24 1935 not quite a year after the new vagina had been made. Inter course was still painful. The tube was well open and certainly seemed perfectly capable of fulfilling the function for which it was intended. The remains of the septum high up should be gotten rid of and I mean to do something for this at a later date. At the time of this last examination the lining of the vagina was still soft and velvety like that of newly opened intestine. I had hoped it would become tougher and more like vaginal mucosa.

In reviewing this case I have regretted that I used a loop of sigmoid and not a single section, but at the time the bowel was so contracted that I thought a single tube would not be large enough.

## DR WILLIAM BEAUMONT\*

BY WALTER F. STENER, M.D.†

ON June 1st of this year, the citizens of the town of Lebanon, Connecticut, united with the Beaumont Medical Club to dedicate at Lebanon, the Beaumont Memorial Highway. At that time the memorial address, with Professor Russell H. Chittenden presiding was given by Dr. Harvey Cushing of New Haven. His lucidity of expression and charm of style will cause that address to be long remembered. On that occasion also our Governor the Honorable Wilbur L. Cross and Lieutenant Colonel Robert H. Duenner of the United States Army spoke upon Beaumont. The wealth of material then exhibited upon him naturally causes me some embarrassment and would force me to decline this honor, were it not for the fact that I have in previous years spoken upon him in Plattsburgh, Chicago, Philadelphia and New Haven so that I hope I may be able to gather together now some references to him which had not been mentioned, for lack of time, one month ago. Especially would I like to dwell somewhat upon the letters which he wrote home to his family here in Lebanon.

He was born in Lebanon on November 21 1785, being the son of Samuel and Lucretia (Abel) Beaumont. He was a farmer's boy was fifth in descent from William Beaumont who came to Massachusetts in 1635 and migrated with John Winthrop, Jr., to Connecticut, where he appears at Saybrook in 1640. Courage was one of Beaumont's prominent characteristics which caused him at one time, on a

dare to stand nearer a cannon that was being fired than any of his playmates. It probably was an important factor in the permanent defective hearing which later developed. After being educated at the village school he stayed home to help his father till the fields of their farm until he had arrived at man's estate, when seeking adventure, he set out from home journeying northward with a horse a cutter, a barrel of hard cider and \$100 of hard earned money. Reaching Champlain in the spring of 1807 he found favor in the eyes of the people there, was given the job of school teacher, tended store, and in his spare time whenever there was any, began the study of medicine, borrowing books from the library of Dr. Seth Pomroy of Burlington. In one of his letters home on December 29, 1807, we learn he is now upon the last half of the quarter term and his school consisted of sixty and odd scholars who were daily increasing. He thought the prospects there "more encouraging than they were in Connecticut", and wished to remain there unless his return would contribute to his parents' "ease, happiness and satisfaction". Later we learn on March 8, 1808 he was in his fifth quarter in teaching school. An uncle living in Champlain, being a strong Federalist called him on account of his Jeffersonian principles, "the ump of his father". These strong Democratic tendencies are exhibited in a number of letters in one of which he writes "Since the election (or Freeman's meetings as they are called in Connecticut) the Feds stand aghast, their eyes distended with wrath and indignation, their countenances disfigured with mingled

An address delivered at Village Hill on July 1 1935 at the opening of the Beaumont Highway. Village Hill is situated on the Beaumont Highway half way between Williamstown and Lebanon.

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expressions of shame, chagrin and disappointment" Later he thus responds to a taunt of Luther Newcomb of Lebanon that he had become a Federalist "Sooner might they move the everlasting hills than to bribe my integrity waver my faith, shake my belief or divert my course from the polar star of Republicanism while reason holds her empire over the province of my intellect"

He seems to have gone to Lebanon in the summer of 1808, but had returned to Champlain by the fall In January of the following year we learn from another letter that he had between sixty-five and seventy scholars to look after so he was "in constant employment with scarce time to unbend his mind at night" In a letter to his brother Abel at this time he writes him the following advice in the high flown language of that period "let virtue, truth and honesty be your planetary guide, temperance, justice, fortitude and prudence your cardinal points, faith, hope and charity your horizon, philanthropy, benevolence, friendship and philosophy your atmosphere and the elements of life will be smooth, transparent and pleasant, gently gliding over your imagination like the eastern morning breeze across the swelling field of wheat" In another letter on April 3, 1810, we are informed that he had closed his pedagogical career and was then pursuing the study of medicine under Dr Benjamin Chandler at St Albans After two years spent thus, he was granted a license to practise medicine by the Third Medical Society of the State of Vermont and some months later entered the Army as Surgeon's-Mate In the War of 1812 he was at the capture of York and finally in the battle of Plattsburgh, where he was highly complimented for his bravery under fire

Soon after the War he resigned from the Army and commenced the practice of his profession in Plattsburgh, keeping a store at the same time along with two physicians successively until he reentered the Army as Post-Surgeon in 1819 when his practice was left to his cousin, Samuel Beaumont During this period of his practice in Plattsburgh, the following amusing advertisement appeared in the Republican, which was the town's newspaper

"The person who took a small glass Sand Box from the office of Doct Beaumont is requested to return it, and save their reputation as it is well ascertained who the offender is"

Unfortunately, we are not subsequently informed if the thief saved his reputation

Three years later a great opportunity came to him at Fort Mackinac, for a young French Canadian, Alexis St Martin, was shot in the stomach at close range in the store of the American Fur Company Beaumont was called to attend him, and, fortunately, under Beaumont's unremitting care, the patient was saved, but

recovered with a permanent hole in his stomach Through this hole in St Martin's stomach, Beaumont was able to make four series of experiments upon the physiology of digestion, but these were only accomplished under considerable difficulty for the patient was an elusive, drunken old reprobate Finally, in 1833, Beaumont published the results of these four series of experiments in a book entitled, "Experiments and Observations on the Gastric Juice and the Physiology of Digestion" It was published by Frederick P Allen of Plattsburgh and reissued the following year by Lilly Wait and Company in Boston Fourteen years later his cousin, Samuel Beaumont, edited a second edition of this book which consisted merely of many minor corrections Later an English and German edition appeared, and still later, when the International Congress of Physiologists met in Boston in 1929, it was again republished by the American committee as they considered it represented America's foremost contribution to physiology A copy at that time was given to each of the delegates along with a medal on which the profile of Beaumont was depicted The book in its first edition was sold at \$2 00 a copy, but now has increased in value so that it is worth from \$50 00 upwards The closest research of modern times has added only a little to the work done by him as represented in this book

Finally, in 1839, Beaumont resigned from the Army and entered into private practice in St. Louis, where in his last thirteen years he enjoyed a most extensive and lucrative private practice His letters home, which still survive, are addressed mostly to his parents or specifically to his father They all show an intense devotion to his family In 1814, he writes a tender letter of sympathy to his mother on account of his father's death, and advises his brother Abel to look after the farm, thinking with a little more experience, the advice of others and good health he should be competent to look after it He seems to have been teaching school at that time In 1815 he writes to his brother Abel "Should I get my pay soon and conclude not to remain in service I shall be in Connecticut before many months" In a letter he wrote Abel in regard to quitting his teaching to superintend and carry on the old farm in Lebanon he writes "I am convinced that I shall, before many years, exchange my present profession of physics and surgery for that of agriculture which I am very fond of and grow more and more so as I advance in life" Subsequently, Abel seems to have studied medicine and to have gone to New York to practice, where he died a few years later On April 22, 1835, Beaumont writes to his brothers and sisters from Plattsburgh that he expects to be permanently located in St Louis at least for several years, and adds "if you and the girls

should feel a mutual migratory spirit and your circumstances and situations will warrant a removal from your native soil to be transplanted in the far west, I will be looking out for you." In March, 1853 he fell on some ice-covered stone steps when returning home from a professional call, and, although his injuries at the time seemed slight, he never entirely recovered from them. Later he developed a carbuncle on his neck, and died on April 25 1853. His remains rest in the beautiful Bellefontaine Cemetery in St. Louis beside those of his wife whom he married as a widow—Mrs. Deborah Green—in 1821. She survived him seventeen years.

Dr. Samuel D. Gross, a distinguished surgeon in Philadelphia, has given us the following sketch of Beaumont in his reminiscences: "I found Dr. Beaumont an agreeable gentleman, suave and interesting in conversation with great enthusiasm for his profession, and admiration for its successful cultivators. The only thing that marred the pleasure of this and other interviews was his deafness, which compelled him to use an ear trumpet, and the listener to raise his voice to a fatiguing pitch. Dr. Beaumont

was a man of small stature and delicate frame, with a darkish, sallow complexion, imparting to him a somewhat unhealthy appearance. He was at the time fifty-seven years of age, and looked old. An active life, attended with the many exposures incident to an army career, had made serious inroads upon a constitution never strong and robust."

Beaumont's genius surmounted his lack of a college education, his lack of a medical school training, his lack of a hospital experience, and gave to the world a name which will be long remembered in medical annals, for he blazed a path in the physiology of digestion which has now become a broad highway. He really belongs to the world, for his fame from these achievements in the physiology of digestion has made him a world known figure, but we in Connecticut more especially claim him as this is the land of his birth. You have set at naught the old adage that a prophet is not without honor save in his own country, by perpetuating Beaumont's memory in this highway. It will cause his name to be made known here even to coming generations.

#### HEALTH PROTECTION EXPENDITURE

Health protection for the public of the United States is disposed of with the expenditure of only 50 cents annually per person in tax money compared with the annual average expenditure of \$4.52 per person for police protection and \$3.32 per person for fire protection.

This is but one item in a pamphlet "Health Facts" just off the press published by The National Health Council as part of the material for the Health Today and Tomorrow campaign recently launched and planned for the winter and spring months. Already more than 400 cities have enlisted in the campaign through their state or city health officers who are taking the initiative in most of those localities. The climax of the campaign is to be in general an open Town Meeting held after a thorough community wide health inquiry has been made to discover public health needs in that locality.

Most of the statistics contained in "Health Facts" furnish a basis of comparison of local health conditions with immediately attainable health goals. Among other striking statements made in this pamphlet the following are a few which show the need for greater appropriations for community health work from both public and private sources.

We are graduating as many persons from the community into nervous and mental hospitals as we are sending out into the community each year from our colleges and universities. More than fifty per cent of all hospital cases in this country are those of some form of mental illness. The present annual average of mental cases recovered or improved is about forty per cent.

Another statement: Relief funds make little ap-

preciable addition to health services for the needy. Social Security Act appropriations when they become available for public health work, will not be large enough to make up for the depression shrinkage in regular health department appropriations since 1929.

Under the heading "What Voluntary Health Agencies Do" we read in this pamphlet that voluntary hospitals with about half as many beds as government hospitals accommodate about seventy per cent of the admissions in any one year.

Through health education campaigns financed privately the diphtheria case rate (in one urban campaign) was reduced from 19, for every 100,000 population to twenty-four.

Forty-eight per cent of the nurses available for community services are paid from private funds. On the other hand the public health nursing service is the largest single item among public health expenditures—about one-third to one-half of the tax funds for public health goes to pay for public health nurses. Yet the total number of nurses now serving the country amounts to only one-third of the number needed in communities. Public health nursing organizations have suffered a ten per cent reduction in income while the volume of free service has had to be increased.

"Health Can Be Measured" and "Health Can Be Purchased" are headings of two other sections of the pamphlet. This is a limited edition, and it is already apparent that a second printing will be necessary. To cover the cost, a nominal charge is made of twenty cents for a single copy and fifteen cents a copy in lots of 100 or more ordered from The National Health Council, 50 West 50th Street, New York City.

# CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

## CASE 21491

### PRESENTATION OF CASE

A sixty year old unmarried white American female was admitted complaining of shortness of breath and a lump in the neck.

About ten months prior to admission the patient first noted that activities which she had previously carried on without difficulty now produced shortness of breath and fatigue. This gradually increased in severity so that climbing two flights of stairs forced her to rest because of breathlessness. When excited she had always had some fluttering palpitation, which had not increased during the present illness. Seven months before entry she noticed that her memory was becoming poor. She had occasional dizziness while standing and looking upward. Three months before admission she first noticed a swelling in her neck which became progressively larger. Shortly afterward her friends noticed that her voice was becoming hoarse, and when she swallowed food it "did not go down straight." Occasionally deglutition was accompanied by a tight dry feeling in her throat. There had been no weight loss.

One sister died of carcinoma, another of tuberculosis. One brother died of a probable general paresis. Her father died of cirrhosis of the liver, her mother of carcinoma of the skin.

Physical examination showed a well-developed and nourished elderly woman who appeared to be quite comfortable. The skin was warm and moist. The eyes were symmetrically prominent and there was definite lid lag. There was an asymmetrical nodular enlargement of the thyroid and a bruit was audible over the gland. There was slight tremor of the extended fingers. The heart was enlarged to the left. The sounds were regular and of good quality but there was a split first sound at the apex which was heard faintly at the aortic area. The systolic blood pressure vacillated between 170 and 205 but the diastolic remained constantly at about 110. The lungs were clear.

The temperature was 99.8°, the pulse 88. The respirations were 20.

Examination of the urine was negative except for 6 to 8 white blood cells per high power field. A urinary concentration test showed a specific gravity between 1.012 and 1.015. The blood showed a red cell count of 4,800,000, with a hemoglobin of 70 per cent. The white cell count was 5,500, 72 per cent polymorphonuclears. Stool examinations were negative. The nonprotein nitrogen of the blood was 32 milligrams per 100 cubic centimeters. An intravenous phenolsulphonephthalein test showed 40 per cent excretion of the dye in one hour. An initial basal metabolic rate was plus one. Subsequent tests ranged between minus 5 and minus 14, with a single reading of minus 22.

X-ray examination showed that the lung fields were clear. The diaphragm and heart shadows were normal. There was no substernal thyroid or tracheal compression.

Eight days after admission operation was performed.

### DIFFERENTIAL DIAGNOSIS

DR. JACOB LERMAN: The first two symptoms, shortness of breath and a lump in the neck, immediately suggest a diagnosis. A person with a lump in his neck who is short of breath is more often than not thyrotoxic.

However, I do not see any mention here of any other toxic symptoms, i.e., their presence or absence, except weight loss. We must assume that they were sought and found to be absent. The prominent symptoms apparently were those of pressure,—difficulty in swallowing, and tight sensation in her throat.

There are, apparently, two members of the family who have had carcinoma. That would suggest a possibility that the lump in the neck might be malignant.

We place a good deal of emphasis on a warm moist skin in a differential diagnosis. In general a cold clammy skin will practically rule out hyperthyroidism from a clinical standpoint. A warm moist skin can only be said to be consistent with hyperthyroidism.

There are two very important physical findings suggesting the diagnosis of thyrotoxicosis. We have a goiter plus eye signs. No mention is made here of a stare. I feel that a stare is a very important eye sign, certainly as important as prominence or lid lag.

I should like to see more description of the thyroid. All we know is that it was a lumpy goiter but no mention is made of the consistency or the character of the gland. Consistency is very important in differential diagnosis and also gives one a clue as to the possibility of treatment. If this gland were particularly hard, we would suspect that she had had iodine medication previously. This would help us in diagnosis. A bruit is also very important in differential diagnosis here. In general one may say that almost ninety per cent of hyperthyroid

patients have a bruit. In some instances where the diagnosis of hyperthyroidism is not made in spite of a bruit, the gland is found to be hyperplastic. Consequently we pay a good deal of attention to a bruit in a thyroid gland.

"The heart was enlarged to the left." That does not mean hypertrophy because percussion is not infrequently erroneous in toxic goiter. It is common for the examiner to overpercuss perhaps by two centimeters when the heart is overactive. I should not be surprised if the heart were found to be of normal size by x-ray.

Obviously there is some fixation of the specific gravity and that is consistent with an arteriosclerotic kidney.

"An intravenous phenolsulphonphthalein test showed 40 per cent excretion of the dye in one hour." Thus the assumption that we are dealing with an arteriosclerotic kidney is probably correct.

The initial basal metabolic rate was plus one. I am assuming that the examiner did not find any history of iodine treatment because that would change the entire picture. Up to the point where the metabolic rate is introduced the history and physical examination seem to represent a clear cut picture of toxic goiter with some symptoms of pressure. A metabolism of plus one could be consistent with hyperthyroidism. We have seen several patients who have had metabolisms ranging between zero and plus ten with very few symptoms and signs except goiter who nevertheless made a characteristic response to iodine, proving that they had hyperthyroidism. I assume no iodine was given here. The unusual feature here is the spontaneous reduction of the metabolism to a low level. Even so I am forced to make a diagnosis of hyperthyroidism in the past in a patient whose thyroid probably underwent spontaneous involution. One might speak of it as an exhaustion phenomenon and thus account for the low metabolism.

In the presence of a bruit I shall predict that the surgeon found hyperplastic tissue. This has occurred on several occasions when we did not suspect it and the bruit was the only clue to it. I remember one patient in particular, a young girl who had a metabolism of minus twenty. We thought she had simple colloid goiter but the surgeon at operation found an obviously hyperplastic gland. The metabolism after operation varied little from the one before operation. It is possible for a hyperthyroid gland to undergo involutionary changes to the point of complete atrophy and exhaustion and produce myxedema. Recently we saw a case of this sort and Dr. Hurxthal believes he has seen six or eight cases of myxedema following hyperthyroidism. Consequently, we may suspect that this patient is on the road to myxedema.

## X-RAY INTERPRETATION

DR. GEORGE W. HOLMES. These films are taken at seven foot distance, not during quiet breathing but at full inspiration and the heart shadow is somewhat smaller than during quiet breathing. I think it is fair to say it is within normal limits. There is nothing unusual in the lung fields. We might wish that the exposure was a little greater so that we could see the trachea in the anteroposterior view. In the lateral we see it more distinctly and certainly it is not narrowed unless we interpret this small indentation as narrowing. We can see the tumor mass in front of the trachea and there is some increase in the distance between the spine and the trachea suggesting that the tumor extends completely around the trachea. In these films the tumor seems to be rather small and homogeneous, certainly one would not suspect it to be a particularly nodular tumor. The spine shows hypertrophic changes which are very common and have no bearing on the diagnosis.

DR. J. H. MEANS. Would you say the distance between the posterior wall of the trachea and the posterior wall of the spine is about twice the normal thickness? I was looking at one on the ward this morning that looked about half the width of that.

DR. HOLMES. There must be considerable variation in the normal and it may be increased by rotation. I think it would be safer to say that it is greater than normal.

## DIFFERENTIAL DIAGNOSIS CONTINUED

DR. LERMAN. I think the clinical diagnosis is that of goiter, probably toxic in the past, without any clear cut toxicity at present. We may say it is a gland undergoing involution. But I shall predict that the pathologist will find hyperplasia in spite of that, merely on the basis of the presence of a bruit. There is hypertension and probably moderate arteriosclerotic heart and kidney disease.

## CLINICAL DISCUSSION

DR. MEANS. I think when Dr. Mallory produces a case that seems to be somewhat obvious there is usually a joker in it somewhere. I think we have a right to know whether she did or did not get iodine because the reaction to it is important in diagnosis as Dr. Lerman brought out. If she had had for instance a metabolic rate of minus five and got iodine and it dropped to minus twenty two, I should say that was good evidence she probably had thyrotoxicosis. If the fall happened spontaneously it would put a different complexion on the problem.

DR. TRACY B. MALLORY. We certainly had no intention of being mysterious about it. She had none.

DR. MEANS. That means that twenty two is

a natural basal level and it is hard, therefore, to say she was thyrotoxic. I think Dr Lerman is correct in saying she may have been in the past and now is on the road to myxedema. That would be a logical interpretation.

I have been trying to guess why the operation was done. Was it done because of pressure symptoms or because she was thyrotoxic? Was it done because they thought it would be good for her heart? Or because they believed the lesion was malignant? The chances are very strongly against its being malignant if she had truly had Graves' disease, because they do not go together for some mysterious reason that we do not understand. I should think there was no strong indication for operation here on the basis of existing thyrotoxicosis. If that is the reason I think they were rather radical because an old woman of this sort might be carried on iodine the rest of her life and not have to submit to surgical treatment. Pressure may have been a perfectly good indication. Whether one should operate for pressure would depend on the severity of the symptoms and how they were progressing. The fear of malignancy would be another good ground. I fancy they may have operated for pressure.

DR MALLORY: Dr Cope, will you explain the indication for operation?

DR OLIVER COPE: We did operate largely for the pressure symptoms. Dr Lerman has come more or less to the same diagnosis that I think Dr Hertz and I did. There is one thing that is not quite fair about the description of the goiter, often the descriptions in the records are somewhat erroneous. The goiter was symmetrical and not nodular. At operation it certainly was bilaterally symmetrical. Perhaps it would be best for me to describe what I found at operation. The goiter was symmetrical and it was not in the least adherent to the surrounding tissues. Except for the color it had the granular uneven lobular appearance of a hyperplastic gland which had been given iodine. The cut surface was similarly granular. On gross appearance it was typical of an iodinated hyperplastic gland except for one important exception, it had not the pinkish color of a true hyperplasia but was very obviously white. The gland contained very little blood and the cut surface exuded a large and unusual amount of lymph and serum. The enlargement was sufficient to have given definite pressure symptoms. We did think of it as a gland that had been previously hyperplastic with hyperthyroidism that had gradually become exhausted. Hypertension and toxicity were not the indications for operation. The indications were mechanical.

#### PREOPERATIVE DIAGNOSIS

Toxic nodular goiter

#### DR JACOB LERMAN'S DIAGNOSES

Nodular goiter—toxic in the past  
Involution and hyperplasia  
Hypertension  
Arteriosclerosis, cardiac and renal

#### PATHOLOGIC DIAGNOSIS

Chronic thyroiditis, Hashimoto's struma

#### PATHOLOGIC DISCUSSION

DR MALLORY: The gross appearance of the resected part of the gland has already been described very well by Dr Cope, and the microscopic appearance explains its peculiarities. It was a typical Hashimoto's struma, one of these peculiar cases of chronic thyroiditis in which the entire thyroid gland is filled with lymphocytes which are arranged in the form of hyperplastic follicles. In a thyroid lesion of this type perhaps three quarters of the entire gland will be made up of lymph follicles.

The origin of this type of thyroiditis and even its outcome are, I think, still complete mysteries. No single individual has ever seen very many cases and consequently it is difficult to piece together the whole clinical picture. I think this case is a very interesting one in that it presents, as Dr Lerman has brought out very clearly, so many suggestions of a preceding hyperthyroidism. In the average case of exophthalmic goiter a very considerable amount of lymphoid infiltration is always present and it would seem possible from the histologic point of view to interpret these lesions as an extreme grade of the same type of pathology that one sees in exophthalmic goiter. We were not able to find any hyperplasia in the persisting remnants of thyroid tissue, however, nor have I ever been able to prove persisting hyperplasia in any of the other cases of Hashimoto's struma I have seen.

DR MEANS: Were there any follicles left?

DR MALLORY: You mean acini of thyroid tissue? Yes, a moderate number.

DR MEANS: What kind of cells?

DR MALLORY: Low cuboidal.

DR MEANS: With a good deal of colloid?

DR MALLORY: A fair amount, yes.

DR MEANS: Hashimoto's form of thyroiditis rarely can be diagnosed clinically. It may present pressure symptoms or myxedema. I remember a case years ago that Dr Brewster did two operations on that histologically was fairly typical of Hashimoto's struma. We did not know about Hashimoto's work at that time but it was later decided that that was what it was. There was no history of hyperthyroidism prior to the development of myxedema symptoms in that case.

Dr Mallory has suggested that Hashimoto's struma may be the end result of the lymph-hyperplasia that is a part of the histologic

picture in thyrotoxicosis that phase of the picture which Dr Warthin has stressed as being very important. I find it difficult to accept the theory because there has not been any antecedent story suggesting Graves' disease in most of our cases of Hashimoto's struma.

Dr. MALLORY I should agree.

Dr. HOLMES From the histology of these tumors you would expect it to disappear under radiation.

Dr. HAMPTON I had a patient, Dr Holmes, with such a tumor that was treated by x-ray and it did disappear promptly but it left a fibrous band around the trachea that produced marked dyspnea and cyanosis. I wonder if the trachea was actually inflamed in this case, whether there is a tracheitis with this.

Dr. MALLORY I do not know.

Dr. COPE The interesting thing was that inflammation of the surrounding tissues was conspicuous by its absence.

### CASE 21492

#### PRESENTATION OF CASE

A forty-four year old divorced American woman entered complaining of right lower quadrant pain.

Six months before entry the patient felt a sharp pain in the right lower quadrant just medial to the anterior superior spine. This pain lasted about five minutes and slowly went away leaving a dull nagging ache. Since the onset of this illness she had at least a dozen similar attacks of pain in the same region radiating upward and also down toward the vagina. The attacks of pain increased in length and a physician told her that they were due to a kidney stone. At about this same time she noticed some vaginal bleeding between her periods, which was very slight but enough to require the wearing of a pad. It occurred several times and did not bear any relation to the menstrual cycle.

Twenty years before entry she had an attack of right lower quadrant pain and was told that she had appendicitis. Operation was advised but she refused. Another similar incident occurred twelve years before entry.

Her family history is non-contributory.

She had been married nineteen years before entry and had separated from her husband eleven years later. Her husband and three children were living and well. Eight months ago she had a thyroid operation.

Physical examination showed a well-developed obese woman in no acute distress. The heart and lungs were negative. The abdomen was obese. There was slight tenderness in the right lower quadrant. No masses were felt. Pelvic examination showed a lacerated and relaxed perineum. There was a moderate yellow

ish white, vaginal discharge. The cervix was large, boggy, lacerated, eroded and showed a large os with numerous nabothian cysts. The body of the uterus was moderately enlarged, irregular and showed prominence of the right anterior wall. The fundus was moderately retroverted. A rectal examination confirmed the above findings.

The temperature was 98.2°, the pulse 72. The respirations were 18.

Examination of the urine was negative. Examination of the blood showed a white cell count of 6,200 and a hemoglobin of 80 per cent.

On the day following admission operation was performed. The convalescence was uneventful and she was discharged on the sixteenth post-operative day.

#### DIFFERENTIAL DIAGNOSIS

Dr. LANGDON PARSONS "Six months before entry the patient felt a sharp pain in the right lower quadrant just medial to the anterior superior spine. This pain lasted about five minutes and slowly went away leaving a dull nagging ache. Since the onset of this illness she had at least a dozen similar attacks of pain in the same region radiating upward and also down toward the vagina." The fact that twelve attacks had occurred in the past six months would tend to rule out the possibility of a ruptured follicle or corpora hemorrhagica which on occasion give rise to sudden sharp abdominal pain. The attacks together with the radiation of the pain suggest uterine stone as they did to the physician who sent her to the hospital. In terminal hydronephrosis is a possibility.

"The attacks of pain increased in length and at about the same time she noticed some vaginal bleeding between her periods which was very slight but enough to require the wearing of a pad. It occurred several times and did not bear any relation to the menstrual cycle." This is a very significant fact and cannot readily be overlooked for intermenstrual bleeding cannot be ignored. Some people have a slight pink staining at about the mid interval of the cycle at the time of ovulation due to hyperemia of the endometrium but the continuous bleeding in this instance seemed to have no relation to the period. Through repeated trauma, either postcoital or douching, bleeding might occur from an endometrial polyp, eroded or cancerous cervix.

Cancer of the fundus or adenocarcinoma of the body of the uterus occurring before the menopause is not uncommon and manifests itself chiefly as bleeding rather than discharge. Usually there is an increased amount of bleeding at the time of the regular periods which are usually not otherwise altered. Menorrhagia is frequently accompanied by a slight blood trickling between the periods. Pain however is commonly a late manifestation of the disease.

Cancer of the fundus is so frequently regarded as a post-menopausal disease that it is well to consider that it may occur during the normal menstrual life. An attempt to treat such a patient as a functional bleeding problem without a diagnostic curettage may result in disaster. This pitfall is further enhanced by the failure to find much in the way of gross pathology on physical examination. Not enough information is offered in the history to suggest a possible endocrine disorder. Therefore it must be assumed that we are dealing with an organic lesion. Moreover, the majority of symptoms tend to point to the uterus or adnexa as the source of the pathology. Arbitrarily then disease of the urinary tract or appendix has been excluded despite the fact that similar attacks of pain were noted twelve and twenty years ago with operation advised then.

"Eight months ago she had a thyroid operation." Myxedema will produce menorrhagia but we have no information about her periods other than the factor of intermenstrual bleeding.

Pelvic examination showed a lacerated and relaxed perineum consistent with the trauma of repeated childbirth.

There was a moderate yellowish white vaginal discharge appearing from a large, boggy, lacerated and eroded cervix full of numerous nabothian cysts, which is the typical picture of a chronic endocervicitis showing cystic dilatation of the glands on cut section and rarely the site of a carcinoma of the cervix.

"Examination of the urine was negative. Examination of the blood showed a white cell count of 6,200 and a hemoglobin of 80 per cent." Certainly there is little to suggest an acute inflammatory process and we may definitely rule out disease of the appendix or urinary tract.

Let us consider the pelvic findings in view of the history of six months of intermittent right lower quadrant pain gradually increasing in length associated with intermenstrual "spotting."

The presence of nabothian cysts in a chronically infected cervix together with its appearance would seem to rule out cancer of the cervix as a cause of bleeding. The entire description of the feeling of the pelvis would be consistent with pelvic inflammation associated with a fibroid uterus. The uterus is enlarged and irregular as well as retroverted. There is right lower quadrant abdominal tenderness as well as a prominence of the right anterior wall of the uterus consistent with an enlarged hydrosalpinx or tubo-ovarian mass. The pain might readily be explained on a twisting of such a hydrosalpinx. The retroversion of the uterus would be consistent. Pelvic inflammation of long standing later giving rise to symptoms may be present with little in the way of a systemic

reaction. Carcinoma of the tube seems unlikely and the character of the discharge is usually watery or bloody in gushes.

A fibroid uterus alone might explain the symptoms. The uterus is enlarged and irregular. The leiomyomata may then be regarded as diffuse. A partial twist of a pedunculated fibroid would explain the pain, while the bleeding may well be due either to a polyp or submucous fibroid. There appears a definite relationship of a fibroid uterus to endometrial hyperplasia which is to be expected if both are considered as the end result of estrin activity.

Though no adnexal tumor can be palpated, a twisted ovarian cyst is a possibility. Torsion which relieved itself would explain the intermittent character of the pain as well as its gradual progression. Slight bleeding accompanies ovarian irritation. Little is noted in the systemic reaction and we must assume that the torsion never was severe enough to interfere with the blood supply.

Diffuse adenomyoma or endometrioma of the uterus would be consistent with the physical examination. More information concerning the amount of bleeding at the time of the period would be helpful. The uterus is diffusely enlarged particularly on the right anterior wall. This may be due to an endometrioma at the cornual junction or may be in the wall itself. The association with fibroids is not uncommon. Frequently a uterus with diffuse endometrioma is mistaken for a fibroid uterus. In most instances some degree of retroversion is present. No suggestion of cysts is found in the broad ligaments. My feeling is that we are dealing with the diffuse nodular type of endometrioma rather than the more common chocolate cyst variety.

#### PREOPERATIVE DIAGNOSIS

Fibroid uterus

#### DR. LANGDON PARSONS' DIAGNOSES

Diffuse endometrioma of the uterus

Torsion in hydrosalpinx?

Carcinoma or adenoacanthoma of the fundus?

#### PATHOLOGIC DIAGNOSES

Endometriosis of the uterus

Chronic endocervicitis

Healed appendix

#### PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY. The preoperative diagnosis of the surgeon who operated on this patient was that of multiple fibroids of the uterus. Under ether the vaginal examination confirmed the previous findings. The curettage showed apparently normal endometrium. The cervix was very large and boggy and the vaginal wall was so short that he felt that a complete

hysterectomy from above would be difficult. He therefore, amputated the cervix from below, then went in above and removed the remainder of it along with the tubes and ovaries. An incidental finding was that the gallbladder contained stones.

Examination of the uterus in the pathology laboratory showed only slight enlargement, but on the posterior surface were some small soft hemispherical projections about one centimeter in diameter. On section these appeared honey combed with minute cavities. There was, however, no hemorrhage or tarry discoloration. The tubes and ovaries were negative.

Microscopic examination showed the presence

of the endometrial type of glands and characteristic endometrial stroma deep in the wall of the uterus and particularly in the localized nodules. Uterine endometriosis of this type is not uncommon and in my experience is much less apt to show the typical tarry appearance that one expects to find in the ovarian lesions or in peritoneal implants. Whether the menstrual reaction and hemorrhage fails to take place in them or whether the hemorrhage occurs but is effectively disposed of is not yet clear. Probably the most important feature in the diagnosis of endometriosis is that the surgeon should constantly bear it in mind as a possibility in any pelvic lesion.



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## PROGRESS IN MEDICINE

IF one raises the question as to the progress of medicine, say in the past hundred years, or in the past thousand years, one is met with a vast array of facts as to cause and course of disease, the structure and the function of the human body, the influence of heredity and environment, the interrelations of the body and the mind. Then too there is the increase in the average length of life, the practical elimination of certain diseases, the justifiable hope that certain other diseases may be caused to disappear from civilized communities. It requires libraries to house the books which tell us of new knowledge and from this point of view the progress has been almost marvelous.

There are other tests of progress, however, and other points of view from which we may regard medicine. Does it rank higher as a profession than formerly? Does the physician realize more fully than ever the high ideals of his art? Is he held in higher honor and regard? Does he deserve to be? Is the physician more than ever a highly respected member of the community? Perhaps to these questions a pre-

cise answer cannot be given. The highest ideals of the profession seem to be no higher and no lower than they were at the early times of which we have records. There is the same devotion to the welfare of the patient, the same consecration to the relief of suffering. Also, apparently from early times until now there have been unworthy physicians.

If we ask for some more nearly absolute test of progress we are appalled at the magnitude of the patent medicine business, and the prosperity of those who prey upon human weakness and credulity in matters of health and disease. To the physician it seems that people are more gullible in matters of health than in anything else, and no less gullible now than in the Middle Ages. Today is a day of scientific nomenclature: electrons sell big.

That idea of buying and selling is picturesque. Though often inaccurate and inadequate as used in common parlance, it is sometimes devastating. "The doctor sold himself" is distressingly true, on occasion. But in another slightly different sense is it not true that the doctors have not sold themselves to the people? The profession has not sold itself to the public.

We may reject this crude phrasing of an unpalatable idea. We do not like to think that it is a true indication of the way in which the medical profession is regarded. However, actions speak louder than words and the historian of medicine, weighing carefully what he says and estimating the progress of medicine, declares "the reader must not forget, however, that only a minority of the sick seek the aid of a physician"<sup>1</sup>. Only a minority of the sick seek the aid of a physician! What a challenge to the medical profession!

## REFERENCE

- 1 Henry Sigerist. *The Great Doctors*. P. 28

## PEDIATRIC PSYCHIATRY

THE practitioner of medicine, and particularly the pediatrician, seems in need of some defence against an idea gaining in prevalence that the pediatrician should be his own psychiatrist. The newer psychology and the possibilities of mental hygiene have been gaining on us by leaps and bounds, and it is time that certain limits be defined before the child's doctor, who has, after all, certain important functions to perform, gets bogged down in a quagmire of behavioristic difficulties.

No one will admit more readily than the psychiatrist, that burly little brother in the medical family, the difficulties of his specialty and the arduous training which a proficiency in it requires. There has been an unfortunate tend-

ency, however on the part of psychiatry, to criticize pediatrics for failing in those very functions which psychiatry has earmarked for its own and to forget that pediatrics has its own very definite obligations to discharge

Breunemann a few years ago, in his tolerant way, directed attention to the menace of psychiatry in pediatrics and perhaps at that time fired a shot which is still heard around the psychiatric world and may be responsible for the animadversions on pediatrics which are occasionally heard today. As a matter of fact he was not implying that the pediatrician should embrace psychiatry, nor poach upon the preserves of the psychiatrist, but that common sense might at times be less dangerous than a meddlesome psychiatry untempered by this ameliorating influence. Any well trained psychiatrist will agree with this statement.

The pediatrician who wishes to do his own job well, and who wishes to be left alone to do it has found an able supporter in Crothers. According to his expressed belief, "The present situation in regard to mental hygiene activities of pediatricians is thoroughly absurd. A great deal of the difficulty is that there is a general assumption that there is a 'whole child' or rather a series of such children for whom the pediatrician is responsible. Every one seems to think in controversial moments, that the whole child should be supervised by some single expert. In ordinary life no sane person makes any such assumption. The distribution of the control of the child between different persons and the abolition of control by adults for a great share of the time are the routine procedure of all sensible parents.

"The simpler method is to try to find out ways in which one can develop a specific pediatric art of medicine. I think that all pediatricians have accepted the idea of growth and development and they have also accepted responsibility for the supervision of well children. In addition, they have undertaken to give prompt and adequate service to sick children. Nothing can be safely added to pediatrics which renders the practitioner unavailable for the care of sick children no matter how desirable the new technique or procedure may be."

The fact is that the organization of an active pediatric practice precludes the possibility of mixing a formal psychiatric practice with it. As Crothers further says, "The meticulous keeping of the time-consuming appointments is one of the difficult things to arrange. For this reason alone the prolonged interviews of the conventional psychoanalytic schools are almost impossible."

A common sense psychology the pediatrician should be able to employ in his daily work and he should be able to recognize those difficulties for which outside help is needed. Psy-

chiatry, to do its part, must supply a personnel capable of assuming its share of the mutual burden without adding financial run to the patient's other disabilities.

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

GARFIN, SAMUEL W. D.M.D., M.D. Boston University School of Medicine 1922 Assistant Laryngologist, Collis P. Huntington Memorial Hospital and Beth Israel Hospital. Assistant Surgeon, Aural Service, Boston City Hospital. His subject is "Cancer of the Larynx. A Study of Two Hundred and Two Cases with End Results." Page 1109. Address 485 Commonwealth Avenue, Boston.

HUDSON, HENRY W., JR. M.D. Harvard University Medical School 1925 F.A.C.S. Associate Surgeon, Children's Hospital, Boston. Assistant in Surgery, Harvard University Medical School. His subject is "Giant Diverticula or Reduplications of the Intestinal Tract. Report of Three Cases." Page 1123. Address 1101 Beacon Street, Brookline, Mass.

MARBLE, ALEXANDER A.B., A.M., M.D. Harvard University Medical School 1927 Assistant in Medicine Harvard University Medical School Physician New England Deaconess Hospital Boston. His subject is "Diabetes Insipidus. Treatment with Posterior Lobe Pituitary Powder Intranasally." Page 1131. Address 81 Bay State Road Boston.

WHEATLEY, FRANK EDWARD A.B., M.D. Tufts College Medical School 1914 Roentgenologist Goddard Hospital Brockton and Milton Hospital, Milton. Director of X-Ray Therapy Waltham Hospital Waltham, Mass. Instructor Harvard Dental School. His subject is "A Deplorable Development in the Economics of Radiation Therapy." Page 1134. Address 520 Beacon Street, Boston.

PITTS, HERMAN C. M.D. Yale University School of Medicine 1900 F.A.C.S. Surgeon, Gynecological Department Rhode Island Hospital, Providence. His subject is "Reconstruction of the Vagina from a Portion of the Sigmoid. Report of a Case." Page 1136. Address 68 Brown Street Providence, Rhode Island.

STEINER, WALTER R. A.B., L.H.D., M.D. Johns Hopkins Medical School 1898 Consulting Physician at Hartford Hospital Torrington Bristol New Britain Manchester Memorial

Meriden and Middlesex (Middletown) Hospitals His subject is "Dr William Beaumont" Page 1137 Address 646 Asylum Avenue, Hartford, Conn

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#### POSTPARTUM PULMONARY COMPLICATIONS

The most important pulmonary complications following childbirth are insufflation of gastric contents, pneumonia, embolism, and atelectasis

Intratracheal insufflation of gastric contents either during labor under hypnotic drugs or more commonly during delivery under anesthesia is a serious complication which may lead to immediate death or provide the cause for pneumonia or lung abscess Frequently food is consumed before the onset of labor and due to the retarded emptying time of the stomach during labor a large proportion of the gastric contents may be retained In some hospitals patients are allowed solid or semi-solid food during labor Therefore, the average obstetric patient differs markedly in her preparation for anesthesia from that of the average surgical case Obstetrical anesthesia is all too often administered by an inexperienced anesthetist who is unable to cope with the vomiting patient properly

The medical attendant cannot prevent the patient from taking food at home but he can advise her against this once labor begins and can see to it that she does not have food during labor, especially if he anticipates using analgesic drugs or anesthesia If the patient has had food shortly before delivery is anticipated and inhalation anesthesia is necessary, gastric lavage is a feasible method of preventing this complication The writer knows of two deaths on the delivery table from aspiration of gastric contents which have occurred in one large institution during a two-year period Tracheotomy, inverting the patient, or mechanical intratracheal aspiration was of no avail On autopsy in each instance, the trachea, bronchi and bronchioles were filled with aspirated gastric material It is obvious why the various methods of resuscitation failed In less dramatic instances where smaller amounts of material are aspirated we find the principal causes of various degrees of atelectasis, pneumonia,

and occasionally lung abscess The most effective treatment is prophylactic and consists in preparing the patient for anesthesia in so far as we are able and in securing the most expert administration of anesthetics

Pneumonia in the puerperium is not a common complication It may be present or incipient during labor and later be recognized A fairly large proportion of cases follow operative deliveries with difficult anesthesia This type especially is likely to show the characteristics of bronchopneumonia but the process may be localized to one or more definite lobes Symptoms are complicated by the patient's reaction to the delivery and the signs in the early stages are not clear cut The clinical signs with the aid of portable x-ray are generally adequate for diagnosis Immediate sputum typing is important In the Type I group the immediate administration of serum frequently gives excellent results Otherwise the treatment is supportive with sedation and oxygen therapy as needed

*Pulmonary embolism* is the most common cause of sudden death in the parturient and puerperal patient It occasionally occurs in pregnancy During or immediately following delivery, embolism is most commonly associated with rheumatic heart disease, difficult vaginal deliveries, vaginal manipulation in placenta praevia, difficult anesthesia and cesarian section Embolism in this group usually occurs during the delivery or in the first six hours postpartum All degrees occur from those in which the only clinical evidence is a few localized râles in the chest with slight sudden elevation of pulse and respiration to those in which the patient suddenly becomes cyanotic and expires in a few minutes The prognosis is in direct proportion to the severity of the case The mortality in massive puerperal embolism is quoted by various authors at seventy per cent.

Later in the puerperium the chief source of pulmonary embolism is pelvic thrombosis and thrombophlebitis Many of these patients show no clinical evidence of the thrombosis and the occurrence of embolism is unpredictable In those instances in which thrombophlebitis is known to exist, our best prophylaxis consists in keeping the patient in bed for at least one week after the temperature and pulse have reached normal levels

The treatment consists in sedation by morphia and, in the serious group, the use of the oxygen tent Pulmonary embolectomy is still in the experimental stage and is available in few large institutions To date it has carried a high mortality

Postpartum pulmonary atelectasis either of slight or massive variety undoubtedly occurs more frequently than is generally considered It plays a rôle preliminary to the occurrence of pneumonia in many instances In the massive variety the extensive involvement of the affected

\*A series of short selected articles by members of the Section is being published weekly  
Comments and questions by subscribers are solicited and will be discussed by members of the Section

lung and the retraction of the heart to the affected side are pathognomonic. If uncomplicated the prognosis in this condition is excellent. From the standpoint of differential diagnosis its recognition is important. The treatment consists of  $O_2$  inhalations or in turning the patient from side to side several times during the day until re-inflation is established.

### THIRD ANNUAL POSTGRADUATE MEDICAL EXTENSION COURSE

The following sessions have been arranged by the Committee for the week beginning December 8

#### Barnstable

Sunday December 8 at 4 00 P.M., at the Cape Cod Hospital Hyannis. Subject Kidney and Bladder Diseases, B (Surgical) Prostatism and Related Diseases Cystitis and Pyelitis Instructor S. B. Kelley J. I. B. Vall Chairman

#### Bristol South (Fall River Section)

Monday December 9 at 4 00 P.M., at the Stevens Clinic of the Union Hospital Fall River Subject Diseases of the Liver Hepatitis and Painless Jaundice Problems in Diagnosis and Treatment. Instructors C. M. Jones and L. S. McKittick Eugene A. McCarthy Sub-Chairman.

#### Essex North

Friday December 13 at 4 00 P.M., at the Hotel Bartlett, 95 Main Street, Haverhill. Subject Pediatrics The Neonatal State and Its Diseases Medical and Surgical Aspects Instructors L. W. Hill and T. H. Lanman. Francis W. Anthony Chairman.

#### Essex South

Tuesday December 10 at 4 00 P.M., in the Nurses Home of the Salem Hospital Salem Subject Pediatrics Abdominal Disease in Childhood Medical and Surgical Aspects Instructors S. H. Clifford and J. W. Chamberlain. Walter G. Philpen, Chairman

#### Hampden

Thursday December 12 at 4 00 P. M., at the Academy of Medicine Professional Building 20 Maple Street, Springfield and at 8 00 P.M., at the Holyoke City Hospital Holyoke Subject Dermatology Ten Common Skin Diseases—Diagnosis and Treatment. (1) Impetigo Contagiosa (2) Scabies (3) Acne Vulgaris (4) Psoriasis and Seborrheic Dermatitis, (5) Epidermophytosis (6) Herpes Simplex and Zoster (7) Eczema (8) Erythema Multiforme (9) Verruca Vulgaris and (10) Dermatitis Medicamentosa and Dermatitis Venenata. Instructor E. L. Oliver George L. Schadt and George D. Henderson Chairmen

#### Hampshire

Wednesday December 11 at 4 15 P.M. in the Nurses' Home of the Cooley Dickinson Hospital Northampton. Subject Kidney and Bladder Diseases B (Medical) Chronic Nephritis. Cardiorenal Disease The Use of Diuretics Instructor W. R. Ohler Robert B. Brigham Chairman.

#### Middlesex South

Tuesday December 10 at 4 15 P.M. at the Cambridge Hospital, Cambridge Subject Ophthalmology and Otolaryngology (a) The Major Hazards in Diagnosis of Diseases of the Eye Ear Nose and Throat as Seen in General Practice (b) Special Treatment in Acute Medical and Traumatic Diseases of Eye Emergencies Arising in the Treatment of the Ear Nose and Throat. Instructors P. A. Chandler and C. T. Porter Edmund H. Robbins, Chairman.

#### Norfolk South

Monday December 9 at 8 30 P.M., at the Quincy City Hospital, Quincy Subject Kidney and Bladder Diseases, A (Surgical) Hematuria Its Significance in Surgical Diseases of Kidney and Bladder Instructor Richard Chute. David L. Belding Chairman

#### Plymouth

Tuesday December 10 at 4 00 P.M., at the Brockton Hospital, Brockton. Subject Review of the Principle of Dietetics Instructors W. P. Murphy and John Talbot. W. H. Pulsifer Chairman.

#### Worcester North

Friday December 13 at 4 00 P.M., at the Burbank Hospital, Fitchburg Subject Lung Diseases (a) Significance of Symptoms and Signs in Chronic Lung Disease Tuberculosis Bronchiectasis etc. (b) The Value of Surgery in Above Disease Problems Instructors T. L. Badger and R. H. Overholt. Edward A. Adams Chairman.

### BOSTON MEDICAL LIBRARY

HENRY BENEC JONES, M.D., F.R.S 1813 1873

HENRY BENEC JONES is probably best known to clinicians as the discoverer of a variety of protein, occurring in the urine, which is commonly designated as 'Bence-Jones Bodies'. This was but one of several important discoveries of a chemical nature which he made, for he may be accounted a pioneer among physicians of the nineteenth century in bringing to bear the results of chemical research upon the clinical aspects of disease. He was born at Thornton Hall, England, on the 31st of December 1813. When he was twelve he was entered at Harrow where he received a classical training, and at eighteen was matriculated at Trinity

College, Cambridge From this university he received, in succession, an A.B., in 1836, an A.M. in 1842, an M.B. in 1845 and an M.D. in 1849. He "walked the wards" of St. Georges Hospital as a part of his medical training. During that time he was carrying on special work in chemistry with Thomas Graham at University College. In 1841 he visited Giessen where he continued his chemical studies under Liebig. He became a licentiate in 1842 and a fellow in 1849 of the Royal College of Physicians, and subsequently was for several years its senior Censor. In 1846 he was elected to the Royal Society and from 1860 to nearly the end of his life he was secretary of the Royal Institute.

From 1846 until 1860 he was Assistant Surgeon, and later surgeon, to St. Georges Hospital. His celebrity as a physician is indicated by the names of some of the distinguished men of England to whom he ministered in that capacity, viz., Thomas Huxley, Herbert Spencer and Charles Darwin, to mention only three.

In the catalogue of the Royal Society are recorded the titles of thirty-four articles from his pen. That he utilized his chemical researches in a practical way may be inferred from the titles of some of his papers, viz., "Gravel, Calculus and Gout, the Application of Liebig's Physiology to these Diseases," 1842; "On Animal Electricity, An Abstract of the Discoveries of Du-Bois Raymond," 1852; "Animal Chemistry in its Application to Stomach and Renal Diseases," 1850; "Lectures Upon Some of the Applications of Chemistry and Mechanics to Pathology and Therapeutics," 1867; "Croonian Lectures on Matter and Force," 1868. Michael Faraday was a close friend of his and a two volume Life of Faraday, written by Jones, attests the great admiration he entertained for him.

His death took place in London, April 30, 1873. His wife, who was a cousin, and a daughter of the second Earl of Gosford, and a large family survived him.

There are few recorded instances of men who have achieved distinction in the clinical field whose success there seems so definitely grounded upon their own achievements in the realms of pure science. This is the more striking in Jones' case because his practice and research were carried on simultaneously and it was only when compelled by physical warnings of a serious cardiac lesion that he curtailed his clinical work, he was able to continue his scientific studies almost to the end. There is scarcely one of his published communications that does not indicate a desire to correlate scientific truth with diagnostic and therapeutic usage, in a practical way. He enjoyed a large acquaintance among the pure scientists, notably with Latham, Graham, Fownes, Liebig, Tyndal, Huxley, Du-Bois Raymond, Kühne, Brücke, Ludwig, Faraday, Helmholtz and Grove.

Among the distinguished practitioners of his day he was not quite so widely recognized. He was honored by membership in numerous scientific and philanthropic societies. His temperament was one that made friends and provoked enmities. His enthusiasm for his work made him a stimulating and inspiring teacher, adored by youth, to whom he was always kindly disposed and helpful, but his intolerance of authority and opposition brought him into conflict with fellow-workers at times, though he was never unwilling to acknowledge that he was in the wrong when it could be demonstrated. The later years of his life were occupied to a considerable extent by his duties as secretary of the Royal Institute where he was the one responsible for selecting outstanding lectures, both in science and literature. He also devoted a good deal of time to devising, while he was a member of a Royal Commission, measures to control a serious epidemic among cattle that had appeared in England in 1865.

It would be difficult to find a better demonstration of the value of a scientific training in physics and chemistry to the practical requirements of a physician than is exemplified in the life of Henry Bence Jones.

#### REFERENCES

London Lancet 1: 614 (Apr. 26) 1873  
Medical Times and Gazette 1: 505 1873  
Annals of Medical History 2: 262 1919

### MISCELLANY

#### VISITING OFFICIALS OF THE AMERICAN MEDICAL ASSOCIATION

Dr. James S. McLester, President, and Dr. J. Tate Mason, President-Elect of the American Medical Association, made a flying visit to Boston, November 27, as arranged in the program to visit the several constituent medical societies of the National Association.

Dr. Roger I. Lee, a Trustee of the American Medical Association, entertained the visitors at a Somerset Club luncheon, and Dr. Mongan, President, and Dr. Begg, Secretary of the Massachusetts Medical Society, arranged a reception and banquet at the Harvard Club, to which the officers of the State Society, and the District Societies and coordinated medical interests were invited. Both Dr. McLester and Dr. Mason entertained the assembly until a late hour by recitals covering the history of the American Medical Association with full descriptions of all its activities as carried on by the large number of bureaus, heads of departments, and the scientific sections.

These eminent leaders of the profession held the interest of the audience by the clear presentation of facts and the compelling logic of the principles of the national body.

After the address of Dr. McLester, a film was run off which made it possible for the company to visualize the work of each department with reproduc-

tions of photographs of the founders of the Association and many of the present officials.

The most urgent appeal in the addresses was for coordination of the whole medical profession in promoting the best possible care of the illnesses of the people and the maintenance of the sacred functions of the doctor in his relation to his patient.

It was clearly explained that the recent concentration of attention of certain Federal plans on the problems of the medical profession brought us to the brink of a disaster which although dispelled for the time being demands of the profession concentration on the plans and purposes of certain government officials and in order to prevent lay control of medical service there must be developed unanimity of purpose and action by the medical profession.

The speakers made it plain that the House of Delegates intends to carry out the will of the profession but that there must be shown to this representative body exactly the character of these common sentiments. To that end each component society must concentrate on the medical problems before the country and send well informed delegates to the executive body of the Association.

The speakers urged those in attendance to go back to their local societies and instruct the individual members in the important medical problems before the nation.

Dr Charles E Mongan President of the Massachusetts Medical Society presided and gracefully introduced the speakers

#### A FAREWELL DINNER FOR MR. FRANK KIERNAN

On the evening of November 25 the friends of Mr Frank Kiernan assembled at the Hotel Statler to express their appreciation of the work done by him in Massachusetts for the past ten years and to wish him success in the new position which he is about to assume as Director of the New York Tuberculosis and Health Association

Mr Kiernan came to Massachusetts in 1925 to serve the Massachusetts League as its Executive Secretary. His remarkable energy and interest in public health work led to responsible positions with other organizations as shown by his coincident appointment to the position of Secretary of the Massachusetts Society for Social Hygiene Secretary and Treasurer of the Massachusetts Central Health Council and President of the New England Tuberculosis Association. He filled all of these positions with remarkable success and officers of these organizations responded to introductions by the Reverend Walter F Greenman who acted as master of ceremonies and paid cordial tribute to the services rendered by Mr Kiernan. His resignations from these positions were accepted with regret in order to facilitate Mr Kiernan's promotion to a larger field of usefulness.

The especially appropriate addresses were delivered by Dr Frederick T Lord, President of the League. Dr E. Granville Crabtree President of the

Social Hygiene Society. Dr Henry D Chadwick, State Commissioner of Public Health. Dr Charles F Willinsky Deputy Commissioner of Health of Boston and Miss Hazel Newton, representing the publicity division of the Boston Council of Social Agencies.

In his response to the felicitations of the several speakers Mr Kiernan spoke eloquently of the cordial relations which he has enjoyed with the people of Massachusetts during the past ten years and assured the company of his continued interest in the public health policies of Massachusetts.

#### THE REAPPOINTMENT OF DR. DURRETT

Dr J J Durrett of New York has been reappointed Chief of the Drug Division of the Food and Drug Administration. Dr Durrett will take charge of the work early in January.

Dr Durrett returns to his former post after an absence of a little more than four years. During that period he was engaged in commercial work and was associated with E R. Squibb & Sons of New York City. He originally entered the service of the Food and Drug Administration in May 1928 and resigned in August, 1931.

Before entering the service, Dr Durrett had four teen years experience in the practice of medicine as a city health officer, and as a surgeon in the Public Health Service. He holds BS M.S. and Ph.D. (Graduate in Pharmacy) degrees from the University of Alabama and the M.D. degree from Harvard University.

As Chief of the Drug Division Dr Durrett will be in control of the work involved in the enforcement of those provisions of the Federal Food and Drugs Act which apply to drugs, medicines and veterinary preparations.

#### AN HONOR TO DR. ALICE HAMILTON

A luncheon in honor of Dr Alice Hamilton was given at the Women's Educational and Industrial Union, November 21 1935 by the Consumers League of Massachusetts branch of the National Consumers League of which she is vice-president.

Dr Richard Cabot presided and in his address deplored the fact that Harvard had not adequately recognized women leaders in the professions.

Dr Hamilton is the first woman professor at Harvard University and has been recognized as an outstanding authority in industrial hygiene. She has recently been appointed adviser on industrial poisons for the United States Department of Labor.

#### RECOGNITION OF THE TEACHING SERVICE OF DR. J. B. AYER

A dinner was given to Dr James Bourne Ayer on Tuesday November 26 1935 at the Tavern Club Boston to celebrate the first twenty five years of his teaching in the Harvard Medical School. About sixty guests attended the dinner all of whom are members of the Department of Diseases.

of the Nervous System, Harvard Medical School, or of the associated departments of neurosurgery, anatomy, physiology, psychology and medicine Dr C Macfie Campbell acted as toastmaster and brief speeches were made by Drs James H Means, W Jason Mixter, George Walton, Merrill Moore, and Henry R Viets. Amusing skits on the neurology of the past, depicting scenes in the lives of Magendie, Quincke and Gowers, were presented under the direction of Dr Stanley Cobb and Dr Tracy J Putnam. Dr Ayer spoke briefly in regard to the developments in neurology during the last twenty-five years. In this period of time the department has expanded from one with three or four men to a large group, represented by the following men, who were present at the dinner. A few men active in neurology were unable to attend.

Alexander, Leo  
Anthonisen, Niels L  
Ayer, James B  
Barrett, Wm G  
Bloomberg, Wilfred  
Campbell, C Macfie  
Caner, G Colket  
Carmody, J  
Clymer, George  
Cobb, Stanley  
Cole, Edwin M.  
Crone, Neil L  
Davis, Hallowell  
d'Elseaux, Frank B  
Emerson, L Eugene  
Epstein, Samuel H  
Faxon, Nathaniel  
Finesinger, Jacob E  
Fremont-Smith, Frank  
Fremont-Smith, Maurice  
Golden, Louis  
Gregg, Donald  
Hodgson, John S  
Horraz, Gilbert  
Ingraham, F D  
Kaufman, M Ralph  
Kubik, Charles S  
Lennox, Wm G  
Lunt, Lawrence K.  
MacDonald, Charles A.  
McDermott, Wm V

McKenna, John C  
Means, J Howard  
Merritt, H Houston  
Mixter, Wm Jason  
Moore, Merrill  
Munro, Donald  
Peck, Martin W  
Putnam, Tracy J  
Raeder, Oscar J  
Richter, C P  
Rioch, David M  
Schwab, Robert S  
Smithwick, Reginald  
Solomon, Harry C  
Stillman, J Sydney  
Thomas, Jackson M  
Tillotson, Kenneth J  
Trevett, Laurence D  
Viets, Henry R.  
Waite, J Herbert  
Walton, George  
Washburn, Frederic A.  
Waterman, George  
Wells, F Lyman  
White, James C  
Whitehorn, John C  
Whitney, Raymond L  
Wislocki, George  
Wood, W Franklin  
Yakovlev, Paul I.  
Young, David A.

#### TUBERCULOSIS—A CHALLENGE TO YOUTH\*

By LOUISE STRACHAN

*Director Child Health Education,  
National Tuberculosis Association*

"He who has health has hope, and he who has hope has everything," runs an old Arabian proverb. Hope is characteristic of youth, and health has long been regarded as one of youth's prerogatives. Yet for countless ages tuberculosis has been reaping

a rich harvest in the field of youth. That it existed in the days of Egypt's greatness is proved by the evidence found in recently unearthed mummies. Tuthankhamen, whose tomb in the Valley of the Kings was excavated in 1922, and whose age at death was not more than eighteen, appears to have died of tuberculosis. The disease has never been a respecter of persons—prince and pauper, poet and peasant, one and all have suffered its ravages.

Tuberculosis seemed an invincible foe, and in deed it was until the genius of Koch discovered the cause of the disease—a tiny rod shaped germ known as the tubercle bacillus. This happened but half a century ago, in 1882, and since that time, when a real offensive was launched against this ancient enemy of mankind, the number of lives lost because of tuberculosis has steadily decreased. The tubercle bacillus is on the run! We know more about him today than has ever been known before in the history of the world. We know enough to abolish the disease and the question is not "Can we?" but "Will we?"

Here lies the challenge to youth. The fight can not be won without the support of the high school and college students, for in their group, between ages fifteen and twenty-four, tuberculosis still triumphs in its old rôle of "Captain of the Men of Death." Most young people possess courage—it is twin to hope—and will face facts. The cold hard fact of the matter is that tuberculosis causes more deaths among young people, between fifteen and twenty-four, than any other disease. What are they going to do about it? If they do nothing, how can the fight be won?

What can they do about it? First, learn the facts. Tuberculosis is preventable. It is curable. It is not hereditary. It is a communicable disease spread only by close contact with a person whose sputum is filled with tubercle bacilli. Secondly, know the weapons with which the disease is being fought: the tuberculin test, a harmless skin test which reveals the presence of infection, the x-ray, which shows the degree of infection and disease, the sanatorium, and the surgical methods of treatment. Also learn the importance of the practice of good daily health habits, which help prevent the disease from developing. There's a reason for adequate rest, well balanced meals, fresh air, and exercise!

How can this be done? The National Tuberculosis Association and its affiliated associations are hard at work on this problem of youth. The tuberculin testing of high school and college students is spreading rapidly in all sections of the country and the interest and support of high school and college officials in this work is indicative of their recognition of its importance. The first national conference on college hygiene, held at Syracuse University in 1931, laid down specific recommendations for the inauguration and conduct of an adequate tuberculosis program among college students, which includes not only tuberculin testing and x-raying, but also routine instruction in the personal and community aspects of the disease. This conference,

\*Published to promote the success of the Seal Sale for 1935

sponsored by the American Student Health Association and the National Health Council was initiated by the National Tuberculosis Association and its Proceedings were published by the same organization. Now plans are under way for another conference to be held in 1936 to review the recommendations of the Syracuse meeting and strengthen and improve them in the light of five years' experience. The National Tuberculosis Association is closely associated with this undertaking also.

In the high school field much headway is being made. Field trips to local clinics and sanatoria arranged by tuberculosis associations for high school students are being successfully carried on with the whole-hearted support of school authorities. The lively interest shown by the students and the batteries of questions that have been turned upon the leaders of the expeditions prove once again that "youth will face facts and is eager to know the whys and the wherefores of things." Viewing the tubercle bacillus under a microscope is a thrilling experience and the student who has done so is likely to become a missionary in the cause of spreading the facts about tuberculosis. A friendly talk with the superintendent of the local sanatorium and a visit with him to the x-ray room will familiarize the young adolescent with the weapons used in the fight against this preventable disease and dispel any lurking fears he may be harboring. It is indeed curious how many otherwise intelligent adults still possess an unreasoning fear of tuberculosis. It is of course a "hangover" from the old days when a diagnosis of tuberculosis meant tragedy.

Will youth accept this challenge? Will high school and college students lend a hand to speed the fight, win the victory and place tuberculosis in the limbo of ancient and forgotten diseases that have plagued humanity? The campaign is financed by the annual sale of tuberculosis Christmas Seals, a penny each, so everyone may have a share. Buy and use these Christmas Seals. They are messengers of health and hope and happiness. They tell of the courage and faith which has insured the success of the fight thus far. But besides sharing in the purchase of these little stickers learn the facts about tuberculosis and help your local state and national tuberculosis associations in their efforts to spread the truth about this preventable curable communicable disease.

## CORRESPONDENCE

### COMPULSORY SICKNESS INSURANCE

November 26 1935

Editor *New England Journal of Medicine*

Regarding the stand of the State Society against Compulsory Sickness Insurance for low income groups

The principle of insurance is sound. It is better for the cost of illness to be spread over a lifetime than for it all to come when a person is sick and unable to work.

It is stated that physicians give a hundred million dollars worth of service to the clinics, free each year. Besides this there is a vast amount of medical service outside the clinics that is never paid for. Why so bitterly oppose a system of insurance that would pay physicians for these services?

Yours very truly

MILMAN PEARL, M.D.

Brookfield Mass

## A CORRECTION

Editor *New England Journal of Medicine*,

In my paper on "Myxedema Heart: Report of a Case" (*New Eng J Med* 213 918 1935) an error was made in the interpretation of the published electrocardiogram dated December 5 1934. Because of the slight irregularity and the marked artifact in Lead I it was wrongly interpreted as being auricular fibrillation. Because of this the paragraph in the discussion referring to auricular fibrillation does not apply.

Sincerely yours,

JULIAN C GANT

313 Commonwealth Avenue Boston Mass

## THE PROBLEM OF CRACKED NIPPLES

November 22 1935

Editor *New England Journal of Medicine*

Many physicians and nurses and even some obstetricians fail to appreciate the true significance of cracked nipples. Many still adhere to the futile application of mild astringents during pregnancy and to such palliative measures during the puerperium as demulcents, styptic nipple shields, or the breast pump. They assume the cause to be the innate delicacy of the tissue of the nipples or the unusual vigor of the jaws of the nursing infant.

In my personal experience of more than twenty five years the actual cause of such fissures of more than transitory duration has invariably been found to be trauma from suckling due to insufficient or deficient lactal secretion. There has been a concomitant restlessness or excessive crying of the baby with a tendency to lose weight or at least not to gain. Rational therapy obviously should be directed to augmenting the supply of milk with complementary feedings.

Some nipples therefore should be recognized as a cue to the demand for partial or total weaning of the nursing babe.

Yours truly

G W HANCOCK, M.D.

242 Burncoat Street  
Worcester Mass

## VOMITING OF PREGNANCY

Editor *New England Journal of Medicine*

I was much interested in reading the article on "Vomiting of Pregnancy" which appeared in The *New England Journal of Medicine* in a recent issue.



It seems to me that he is on the right track and that his ideas concerning its treatment will eventually be accepted

For the past four years I have been interested in this condition and was led to the same conclusions as regards treatment, but by a different method of approach

For the last ten years I have been experimenting with auscultation of the abdomen and, in a number of functional and pathological conditions, have noted the presence of exaggerated peristalsis such as nervous indigestion, acute alcoholism, cyclic vomiting of children, and the early vomiting of pregnancy. I am not concerned here with vomiting in the later months of pregnancy

There is a normal peristaltic rate and an abnormal. The normal rate varies from five to ten faint tinkles per minute, the truth of which any physician can satisfy himself if he will listen to the abdomens of thirty or forty healthy young adults. The normal rate seems to be remarkably constant.

When there is some abnormal stimulation of the sympathetic nervous system the peristaltic rate increases. The rate varies from fifteen sounds per minute to a continuous gurgle. The quality of the sounds changes also. The normal high pitched tinkle is replaced by a harsh low pitched gurgle. Occasionally the sounds are so loud that it is not necessary to use a stethoscope to hear them.

Occasionally, in cases of acute indigestion, seasickness, and in severe cases of vomiting of pregnancy, spasm is also present and may be so intense as to prohibit peristalsis altogether which temporarily prevents any sounds being heard. In many cases of very acute indigestion the writer has noted this condition, and after the administration of 1/50 of a grain of atropine has noted the presence of active peristalsis. It may prove to be the case that vomiting does not occur until there is a certain amount of spasm. In this condition atropine seems to be more effective than phenobarbital although both are necessary.

During the last four years the writer has collected a series of twenty cases of vomiting in early pregnancy. All but two of them were mild or of moderate severity and all responded quickly to phenobarbital given by mouth. In a few cases where vomiting prohibited its oral administration, sodium luminal was given intramuscularly. In these cases the response to treatment was immediate and surprisingly effective.

About a year ago two severe cases were admitted into the North Country Community Hospital in Glen Cove, Long Island. They entered at nearly the same time. One of them had been able to retain practically nothing in her stomach for a period of three weeks and had lost twenty pounds in weight. The other had been vomiting continuously for about two weeks and had lost fifteen pounds in weight. Both had been under severe mental strain, their husbands being without work. Both had negative physical examinations except for the presence of acetone in the urine and very active peristalsis.

These patients had been in the hospital for several days before I came on service, and had been treated in the usual manner with fluids and glucose which had resulted in very little improvement.

The first day they were given five grains of sodium luminal intramuscularly in divided doses, and three doses of atropine sulphate 1/100 of a grain. The second day they were given four grains of sodium luminal and two doses of atropine. No other treatment was given. In both cases the vomiting ceased within forty-eight hours, and both were able to retain some nourishment on the second day of the treatment. For the next three or four days, phenobarbital (grains ½) was given every four hours. In neither case was there a return of the vomiting. The patients remained in the hospital a few days and in two weeks both had nearly regained their normal weight.

This is only a small series of cases and I am in no position to judge whether the condition of hypermotility and its response to phenobarbital would hold true in a much larger series, but other physicians have told me that they have had success with this treatment.

Very truly yours,

NEIL C STEVENS, M.D.

Walpole, N. H.

#### SUPRARENAL CORTEX IN THE TREATMENT OF VOMITING OF PREGNANCY

Editor, *New England Journal of Medicine*,

In the October 31, 1935 issue of *The New England Journal of Medicine*, under the editorial section of Obstetrics and Gynecology, is a treatise on "The Treatment of Vomiting of Pregnancy."

In the discussion of therapy for this condition many types have been included. Nowhere, however, is there any mention of Suprarenal Cortex (Armour's).

This, I believe, is a serious omission because the condition may lead to therapeutic abortion, which is absolutely forbidden in some religions, or may lead to a profound mental shock to those parents who desire children of their own. Therefore, any form of therapy which has already been shown to be of some value, particularly in preventing abortion, is worthy of trial and certainly worthy of being included in a treatise of this sort.

Suprarenal Cortex (Armour's), given either intravenously or orally (the latter after vomiting has subsided), has already proved to be of marked benefit in some cases in our hands. Our preliminary report (by Dr Joel M. Melick and myself) appeared in the *Journal of Obstetrics and Gynecology*, Volume 29, page 602, April, 1935. Since that time more than fifty cases have been so treated, some being of mild degree, others moderate and still others who would be classed as hyperemesis gravidarum. In the first group there have been three failures and in the latter two groups, in no instances have we had a single failure. The group collected to date is admittedly inadequate for a critical analysis of the results, yet this number is sufficient to bring this therapy out

of the realms of philosophical probabilities. Certainly it should be given a trial when other measures fail. We have had no untoward effects from the suprarenal cortex itself in any of our cases. I am in hearty accord with the discussion that brings to light the possible complications of avitaminosis and dehydration.

It may be well at this time to stress the fact that we have used only Armour's products in this form of therapy. It is a well known fact that the strength and the hormone itself changes depending upon the method of extraction. No two manufacturers extract the whole gland exactly alike. It is therefore suggested at the present time that the Armour product be used exclusively until it is fully determined experimentally whether other manufacturers' products may be used in the same way.

If I did not fully appreciate the extreme importance of any efficacious therapy in this condition I would not ask you to bring this matter to the attention of your readers, but fully believing in this, I hope that you will have the kindness to supplement the treatise already printed with that expressed above.

Sincerely yours

WILLIAM FREEMAN M.D.

P. O. Box 489 Worcester, Mass.

November 14, 1935

#### OFFICIAL ACTION OF THE BOARD OF REGISTRATION IN MEDICINE

State House Boston

*New England Journal of Medicine*

This is to inform you that at a meeting of the Board of Registration in Medicine held November 15, 1935 the Board voted to revoke the license of Dr. John F. Cummings, of Brockton for conviction in court on a charge of abortion.

Yours very truly

STEPHEN RUSHMORE, M.D., Secretary

#### RECENT DEATHS

**SOUTER** — WILLIAM NORWOOD SOUTER, M.D. of Portsmouth (New Castle) New Hampshire died at his home, November 24, 1935 after a long illness.

He was formerly a practitioner in Boston and held positions on the teaching staff of the Harvard Medical School and the Massachusetts Eye and Ear Infirmary.

Dr. Souter was born in Virginia in 1861 and graduated from the University of Maryland School of Medicine and College of Physicians and Surgeons of Baltimore in 1886. His practice had been restricted to ophthalmology.

His widow Mrs. Mary L. (Benton) Souter, a son Louis and a daughter Helen, survive him.

**COY** — SETH WILLARD COY, M.D., of 34 Princeton Street, East Boston, died at the Winthrop Hospital November 28, 1935 the result of being struck by an automobile.

Dr. Coy was born in Boston in 1863 and after being educated in the public schools of this city attended the Boston University Medical School and graduated therefrom in 1889. He was a member of the East Boston Medical Society and the Balbec Masonic Lodge.

His widow Mrs. Grace Coy and two sons Ralph Coy and Edward Coy survive him.

#### NOTICES

##### MEDICAL CLINIC AND STAFF ROUNDS AT THE PETER BENT BRIGHAM HOSPITAL

At 3:30 P.M. on Thursday December 12 in the amphitheater of the Peter Bent Brigham Hospital Dr. Henry A. Christian, Physician-in-Chief, Horsey Professor of the Theory and Practice of Physic in the Harvard Medical School will give a medical clinic. To it are cordially invited practitioners and medical students.

On Saturdays in the wards of the Peter Bent Brigham Hospital from 10 to 12 staff rounds will be conducted by Dr. Christian.

#### REMOVAL

JOSEPH TARTAKOFF, M.D., announces the removal of his office from 79 Warren Street, Roxbury to 371 Commonwealth Avenue, Boston. Telephone Commonwealth 4200.

#### ALPHA OMEGA ALPHA LECTURE

Dr. Warfield T. Longcope, Professor of Medicine, Johns Hopkins University will deliver a lecture under the auspices of the Harvard Chapter of the Alpha Omega Alpha on "Studies in the Natural History of Bright's Disease." Amphitheatre Building, C Harvard Medical School, Thursday, December 12 at 5 o'clock.

Open to members of the medical profession

#### BOSTON DISPENSARY

25 Bennet Street, Boston

Medical Conference Program

9-10 A.M., December 1935

Friday, December 6 Ward Cases—Dr. S. J. Thannhauser

Saturday, December 7 Obesity—Dr. S. J. Thannhauser

Monday, December 9 Diabetic Clinic—Dr. J. Schloss.

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## SUCCESSFUL OPERATIONS IN CHILDREN, AGE - TO FIFTEEN YEARS—UNITED STATES

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5 1921	Goetsch	New York	F	8 yrs	Thoracic	?
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9 1924	Behrend	Pennsylvania	M	7 yrs	Abdominal	Transverse colon, stomach, omentum, 2 operations
10 1925	Sherwood	New York	M	8 yrs	Abdominal	Most of g-i tract, spleen
11 1926	Truesdale	Massachusetts	F	6 yrs	Combined	Transverse colon, omentum
12 1927	Woolsey	California	F	35 days	Abdominal	Most of g-i tract, spleen
13 1928	Truesdale	Massachusetts	F	5 yrs	Thoracic	Most of g-i tract, spleen
14 1929	Carrington	Ohio	M	15 yrs	Combined	Most of g-i tract, spleen
15 1929	Bettman, Hess	Illinois	F	3½ mos	Combined	Intestines, colon
16 1930 (Mar)	Sanders	Tennessee	F	5½ yrs	Combined	Stomach, colon, omentum
17 1930 (Jun)	Truesdale	Massachusetts	F	1 yr	Thoracic	Stomach
18 1930 (Jul)	Truesdale	Massachusetts	F	17 mos	Thoracic	Most of g-i tract, spleen
19 1930 (Oct)	Harrington	(Mayo Clinic)	M	12 yrs	Abdominal	Stomach, colon (congenital short esophagus)
20 1931 (Jan)	Truesdale	Massachusetts	F	12 yrs	Thoracic	Most of g-i tract, spleen, pancreas
21 1931 (Jun)	Donovan	New York	M	4 mos	Abdominal	Most of g-i tract, spleen
22 1931 (Oct)	Robb	Minnesota	M	4 wks	Abdominal	Most of g-i tract, spleen
23 1931 (Nov)	Coryllos	New York	F	13 days	Combined	Most of g-i tract, spleen
24 1932	Johnson, Bower	California	M	41½ hrs	Combined	Most of g-i tract, spleen
25 1935 (Mar)	Truesdale	Massachusetts	F	10 yrs	Thoracic	Most of g-i tract, spleen, edge of liver
26 1935 (Apr)	Truesdale	Massachusetts	M	13 yrs	Thoracic	Intestines, colon, spleen, cecum, appendix
27 1935 (May)	Truesdale	Massachusetts	M	11 yrs	Thoracic	Most of g-i tract, spleen

\*Recurrence.

of the realms of philosophical probabilities. Certainly it should be given a trial when other measures fail. We have had no untoward effects from the suprarenal cortex itself, in any of our cases. I am in hearty accord with the discussion that brings to light the possible complications of avitaminosis and dehydration.

It may be well at this time to stress the fact that we have used only Armour's products in this form of therapy. It is a well known fact that the strength and the hormone itself changes depending upon the method of extraction. No two manufacturers extract the whole gland exactly alike. It is therefore suggested at the present time that the Armour product be used exclusively until it is fully determined, experimentally whether other manufacturers' products may be used in the same way.

If I did not fully appreciate the extreme importance of any efficacious therapy in this condition, I would not ask you to bring this matter to the attention of your readers but fully believing in this, I hope that you will have the kindness to supplement the treatise already printed with that expressed above.

Sincerely yours

WILLIAM FREEMAN M.D.

P O Box 489 Worcester Mass  
November 14 1935

#### OFFICIAL ACTION OF THE BOARD OF REGISTRATION IN MEDICINE

State House Boston

*New England Journal of Medicine,*

This is to inform you that at a meeting of the Board of Registration in Medicine held November 15 1935 the Board voted to revoke the license of Dr John F. Cummings of Brockton for conviction in court on a charge of abortion.

Yours very truly

STEPHEN RUSHMORE, M.D., Secretary

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Saturday December 14 Pituitary Diseases and Case Presentation—Dr S. J. Thannhauser

Monday December 16 Social Service Case Presentation—Miss Edith Cantorbury

Tuesday, December 17, Nephritis — Dr Henry D Stebbins  
 Wednesday, December 18, Ward Cases — Dr S J Thannhauser  
 Thursday, December 19, Uric Acid in the Pathogenesis of Gout—Dr Bernard Jacobson  
 Friday, December 20, Ward Cases—Dr S J Thannhauser  
 Saturday, December 21, Treatment of Diabetes—Dr S J Thannhauser

## REPORT AND NOTICES OF MEETINGS

### THE CAPE COD HEALTH BUREAU ASSOCIATION

At the fall meeting of the Cape Cod Health Bureau Association in Hyannis on November 15, members of the health departments of most of the towns of Barnstable County assembled for a business session and to listen to an address by Dr Joseph E Barrett, Assistant Commissioner of the State Department of Mental Diseases. The President, Dr G E T Ward of Orleans, was in the chair, and the business session included records by the Secretary, Mr C R Bassett of Yarmouth, and a review of health conditions in the county the past six months by Dr A P Goff, County Health Officer.

Dr Barrett first defined the department which he represented, and then outlined some of the principal phases of its work. It is not, as many suppose, a branch of the Department of Public Health, but is independent, with only one other state department exceeding it in magnitude.

In 1863 there was established the State Board of Charity, which in general cared for health matters, hospitals, penal institutions, etc., and charities. Then there was constituted a Board of Health, Lunacy and Charity, later the Board of Health was separated, and still later Lunacy became Mental Diseases. In 1919 the various boards were legally named "departments." Massachusetts was the first state in the Union to establish a Department of Mental Diseases. The Divisions of the Department include those caring for medicine, mental hygiene, statistics and finance. There are sixteen hospitals maintained by the Department, and in addition there is the prison for the criminal insane at Bridgewater, which, when the new hospital for it at Norfolk shall have been established, will be given over to its care.

Dr Barrett stated that of the one million hospital beds in the country more than half are for the mentally ill. In Massachusetts, besides the sixteen State institutions, there are two Federal hospitals and twenty-nine licensed private ones. Of the 29,000 known mental patients in the State, 26,000 are in the hospitals, 21,000 insane and 5,000 feeble minded. The mentally ill number about one in 162 of the population. The cost of the sixteen institutions in 1934 was \$9,700,000, or about \$6.00 per week per person. Of the State dollar expended, about fifteen

cents goes for the mentally ill. In 1934, 6,824 persons were admitted to the hospitals, with the discharges in the same period, about half as many. The death rate is naturally high, for many are physically weak at time of entrance, while there are many elderly individuals. The number of feeble-minded in the State is about 90,000, listed partly through school clinics. So far as the schools are concerned the law requires the town authorities to provide a special school for them if there are as many as ten backward children in a district.

Clinics form a special feature of the program of the Department, and these include outpatient clinics as well as those at the hospitals, and number in all above one hundred. Social workers have the opportunity to discover the feeble-minded, and do good service in this matter. "There are some who think that all such cases should be hospitalized," said Dr Barrett, "but in fact, all do not need this. Early training may be effective, and many are reclaimed through this means." The general problem had best be attacked from the community side, and the clinics are valuable in this. One evidence of their agency is thought to be in the decreasing readmission rate, the statistics of other states showing in general an increase in this rate.

Following the address the gathering became a round table for the intimate discussion of many questions suggested by the address, which had local interest to the assembled health workers.

### NEW ENGLAND DERMATOLOGICAL SOCIETY

The next meeting of the New England Dermatological Society will be held on Wednesday, December 11, 3 P.M., at the Boston City Hospital.

J HARPER BLAISDELL, M.D., *Secretary*

### THE SOUTH END MEDICAL CLUB

The next regular meeting of the South End Medical Club will be held at the office of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, on Tuesday, December 17, 1935, at 12 noon. The speaker will be Arthur K. Paine, M.D., F.A.C.S., Surgeon in Chief, Boston Dispensary, Consulting Obstetrician, Beth Israel Hospital, Chief of Staff, Evangeline Booth Hospital, Professor at Tufts College Medical School, and Assistant Professor at Harvard Medical School. His subject will be "Progress in Obstetrics." The usual luncheon will be served, and all physicians are cordially invited to attend this meeting.

### WILLIAM HARVEY SOCIETY

The next meeting of the William Harvey Society will be held Friday, December 13, in the Auditorium of the Beth Israel Hospital, Boston, at 8.00 P.M.

#### PROGRAM

Speaker Dr Martin H. Dawson, Assistant Professor of Medicine, Columbia University

Subject "Rheumatoid and Osteo-Arthritis"

Chairman Dr Nathan Sidel, Assistant Professor of Medicine, Tufts College Medical School

## NEW ENGLAND PHYSICAL THERAPY SOCIETY

## MEETING AT THE RING SANATORIUM AND HOSPITAL

The New England Physical Therapy Society will meet on Wednesday evening December 18 as guests of the Ring Sanatorium and Hospital Arlington Heights.

The address of the evening will be presented by Clifton T Perkins M.D. Assistant Superintendent of the Worcester State Hospital. The discussion will be opened by Winfred Overholser M.D., Commissioner of the Massachusetts Department of Mental Diseases.

A buffet supper will be served at 6:30. The meeting will open at 8.

## BOSTON FLOATING HOSPITAL

## MONTHLY STAFF MEETING

The next meeting of the Boston Floating Hospital will be held Friday 12 noon to 1 P.M. December 13 in the Board Room Boston Floating Hospital.

## PROGRAM

Presentation of a Clinical Pathological Picture of Chronic Nephritis or Essential Hypertension in a Ten-Year Old Child.

Discussion by Allan Butler M.D., Children's Hospital and Soma Weiss M.D., Boston City Hospital  
ELMER W. BARSON M.D. *Physician in Chief*

## PROGRAM OF THE SPRINGFIELD MEDICAL ASSOCIATION

In connection with the celebration of the three hundredth anniversary of the founding of the city of Springfield Massachusetts in or about May 1936 the Springfield Medical Association has arranged a program of meetings which will cover the important matters of medical history of that city.

Three meetings have already been held. At that of September 30 Dr. George L. Schadt presented a paper on Medical Societies in and about Springfield, 1636-1936. At the meeting on October 28 two papers were presented one by Dr. Robert A. Kilduffe on "High Lights in the History of Hospitals" and the other by Dr. Eugene Walker entitled "A Brief History of Springfield's Hospitals." At the meeting of November 25 Dr. Garry de N. Hough read a paper on Medicine in Springfield 1636-1850.

The rest of the program follows

December 16

Medicine in Springfield 1850-1900 — Dr. Frederick S. Hopkins.

January 27

Medicine in Springfield 1900-1936 — Dr. Laurence D. Chapin.

February 24

Medicine in Massachusetts and New England from Cow Path to State Road — Dr. Reginald Fitz, Boston Mass.

March 30

The Development of Surgical Practice in Springfield — Dr. John M. Birnie

April 27

The Development of Non-Surgical Specialties — Dr. Allen S. Johnson.

The Development of Surgical Specialties — Dr. Eugene W. Beauchamp.

May 18

The Development of Medicine in the United States 1636-1936 — Dr. Henry E. Sigerist, The Johns Hopkins University Institute of the History of Medicine Baltimore Maryland.

The membership of the Springfield Medical Association is limited to fifty physicians. It was organized January 29 1905 and reorganized May 29 1908. The officers are as follows:

President, George L. Schadt Vice-President, Garry de N. Hough Secretary and Treasurer Daniel R. Wheeler Executive Committee F. S. Hopkins F. H. Baehr J. P. Derby

## HARVARD MEDICAL SOCIETY

The next meeting of the Harvard Medical Society will be held in the Peter Bent Brigham Hospital Amphitheatre (Shattuck Street Entrance) Tuesday evening December 10 at 8:15 P.M.

## PROGRAM

Presentation of Cases

Types of Syncope Their Mechanism and Treatment. By Soma Weiss, M.D.

Medical students and physicians are cordially invited to attend.

MARSHALL N. FULTON M.D., *Secretary*

## SOCIETY MEETINGS CONGRESSES AND CONFERENCES

## CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY DECEMBER 9 1935

Monday December 9—

9:10 A.M. Boston Dispensary, 5 Bennet Street Boston, Diabetic Clinic, Dr. J. Schloss

Tuesday December 10—

9:10 A.M. Boston Dispensary, 25 Bennet Street Boston, Infections of Knee Joints, Dr. John D. Adams.

2:30 P.M. Pediatric Ward Visit, Massachusetts Eye and Ear Infirmary

7:45 P.M. Gardner Auditorium, State House Boston, Current Ethical Trends, James J. Walsh M.D.

8:15 P.M. Harvard Medical Society, Peter Bent Brigham Hospital Amphitheatre (Shattuck Street Entrance)

Wednesday December 11—

9:10 A.M. Boston Dispensary, 5 Bennet Street Boston, Ward Cases, Dr. B. J. Thannhauser

11:30 A.M. Clinico Pathological Conference, Children's Hospital

3 P.M. New England Dermatological Society, Boston City Hospital

Thursday December 12—

8:30, 9:30 A.M. Clinic, Surgical Staff of the Peter Bent Brigham Hospital at the Peter Bent Brigham Hospital

9:10 A.M. Boston Dispensary, 25 Bennet Street Boston, Experimental and Clinical Observations of Diuretics, Dr. Marshall Fulton

2:30 P.M. Medical Clinics at the Peter Bent Brigham Hospital

6 P.M. Alpha Omega Alpha Lecture, Harvard Medical School, Amphitheatre Building C.

Friday December 13—

9:10 A.M. Boston Dispensary, 5 Bennet Street Boston, Ward Cases, Dr. B. J. Thannhauser

8 P M William Harvey Society Beth Israel Hospital Auditorium, Boston

12 Noon Boston Floating Hospital, Monthly Staff Meeting

Saturday, December 14—

\*9-10 A M 'Boston Dispensary, 25 Bennet Street, Boston Pituitary Diseases and Case Presentation Dr S J Thannhauser

\*10-12 Staff rounds at the Peter Bent Brigham Hospital

\*Open to the medical profession

†Open to Fellows of the Massachusetts Medical Society

December 5—Faulkner Hospital Clinical Meeting, 5 P M  
December 5 7—National Society for the Prevention of Blindness See page 940, issue of November 7

December 6 21—Boston Dispensary, Medical Conference Program See page 1155

December 10—Harvard Medical Society See page 1157

December 11—New England Dermatological Society See page 1156

December 12—Alpha Omega Alpha Lecture See page 1155

December 12—Medical Clinic at the Peter Bent Brigham Hospital See page 1155

December 13—William Harvey Society See page 1156

December 13—Boston Floating Hospital See page 1157

December 16 - May 18—Program of the Springfield Medical Association See page 1157

December 17—The South End Medical Club See page 1156

December 18—New England Physical Therapy Society See page 1157

## DISTRICT MEDICAL SOCIETIES

### ESSEX SOUTH DISTRICT MEDICAL SOCIETY

January 8—Wednesday Danvers State Hospital, Hathorne Clinic 5 P M Dinner 7 P M Speaker Dr Hoskins Subject To be announced later

February 5—Council Meeting, Boston

February 12—Wednesday Addison Gilbert Hospital, Gloucester Clinic 5 P M Dinner 7 P M Speaker and subject to be announced later

March 4—Wednesday Lynn Hospital Clinic 5 P M Dinner 7 P M Speaker Dr Timothy Leary Subject Arteriosclerosis

April 1—Wednesday Essex Sanatorium, Middleton Clinic 5 P M Dinner 7 P M Speaker Dr Richard H. Overholt of the Lahey Clinic. Subject Chest Surgery

May 7—Thursday Censors' Meeting

May 13—Wednesday Annual Meeting Salem Country Club Dinner at 7 P M Speaker Dr Paul White Subject to be announced later

R. E. STONE, M.D., Secretary

### FRANKLIN DISTRICT MEDICAL SOCIETY

Meetings are held on the second Tuesday of January, March and May at the Weldon Hotel, Greenfield, at 11 A.M.

CHARLES MOLINE, M.D., Secretary

### NORFOLK DISTRICT MEDICAL SOCIETY

January 23, 1936—Hotel Kenmore at 8 P M Subject "Compulsory Sickness Insurance" Speakers to be announced

February 25, 1936—Massachusetts Memorial Hospitals at 8 P M. Papers by the staff

March 31, 1936—Hotel Kenmore, at 8 P M Dr Benedict F. Boland - 'Cauterization of the Cervix Uteri Using Various Electrical Methods' Illustrated with lantern slides

May, 1936—Annual Meeting (Place, date and subject to be announced)

The censors meet for the examination of candidates May 7, 1936 November 5, 1936

FRANK S. CRUICKSHANK, M.D., Secretary

1236 Beacon Street, Brookline, Massachusetts

### PLYMOUTH DISTRICT MEDICAL SOCIETY

January 16—Goddard Hospital Subject and speakers to be announced later

March 19—Plymouth County Sanatorium, South Hanson.

April 16—Brockton Hospital

May 21—Lakeville State Sanatorium

G. A. MOORE, M.D., Secretary

### SUFFOLK DISTRICT MEDICAL SOCIETY

December 11—At 8 15 P M Joint Meeting with the New England Heart Association at the Boston Medical Library "Constrictive Disease of the Pericardium" Dr Charles Sidney Burrill Discussion Dr Edward D. Churchill, Dr Paul D. White and Dr Rolf Lium

January 29, 1936—Joint Meeting with the Boston Medical Library at 8 Fenway "Observations Around the World," Dr Walter B. Cannon

March 18, 1936—Meeting at the Boston Medical Library "The Laboratory and Clinical Story of Fatigue," Dr Arlie V. Bock and Dr David B. Dill Discussion Dr Donald J. MacPherson and Dr Augustus Thorndike, Jr

April 29, 1936—Annual Meeting at the Boston Medical Library "The Treatment of Septicaemia," Dr Champ Lyons "The Pleurality of Scarlatinal Streptococcus Toxin," Dr Sanford B. Hooker Discussion Dr Hans Zinsser

The medical profession is cordially invited to attend all of these meetings

ROBERT L. DeNORMANDIE, M.D., President,

CHARLES C. LUND, M.D., Secretary,

FRANCIS T. HUNTER, M.D.,

Boston Medical Library

### WORCESTER DISTRICT MEDICAL SOCIETY

December 11—Wednesday evening St. Vincent Hospital, Worcester, Mass. Dinner at 6 15 Scientific Program at 7 30 "Genital Prolapse, Dr John M. Fallon "Acute Appendicitis Still a Medical Problem," Dr J. J. Dumphy "Surgical Diseases of the Biliary Tract. Its Management from Viewpoint of Physician and Surgeon, Dr J. C. McCann

January 8, 1936—Wednesday evening Worcester City Hospital, Worcester, Mass. Dinner and scientific program Subjects of program to be announced later

February 12, 1936—Wednesday evening Worcester State Hospital, Worcester, Mass. Dinner and scientific program Subjects of program to be announced later

March 11, 1936—Wednesday evening Memorial Hospital, Worcester, Mass. Dinner and scientific program. Subjects of program to be announced later

April 8, 1936—Wednesday evening Hahnemann Hospital, Worcester, Mass. Dinner and scientific program: Subjects of program to be announced later

May 13, 1936—Wednesday afternoon and evening Annual Meeting of Society Time, place and details of program to be announced in an April issue of the Journal.

ERWIN C. MILLER, M.D., Secretary

## BOOK REVIEW

Free Medical Care (Socialized Medicine) E. C. Buehler 360 pp New York Noble & Noble, Publishers, Inc \$2.00

This book is the second of this author's series of books edited for the purpose of furnishing material for debaters

In the first part it summarizes conditions as they are in regard to medical service and presents some of the problems which exist This is done in a clear and fair manner

There then follows a splendid bibliography of the articles on this subject that have been published from 1929 to the Spring of 1935

The second half of the book consists in a reproduction of an appreciable number of leading articles mentioned in the bibliography These articles include those in favor of and those opposed to socialized medicine

Finally it gives a summary of the various experiments already being tried out in various parts of this country along these lines

At the end the recommendations of the majority and the minority on the Committee on the Costs of Medical Care are added and the recent votes of the American Medical Association, American College of Surgeons and the American Dental Association on these problems

It is an excellent reference book to any one wishing to become familiar with the various points of view on this complicated subject The author does not add any personal opinions

# The New England Journal of Medicine

VOLUME 213

DECEMBER 12, 1935

NUMBER 24

## NEW ENGLAND SURGICAL SOCIETY

### DIAPHRAGMATIC HERNIA IN CHILDREN WITH A REPORT OF THIRTEEN OPERATIVE CASES\*

BY PHILEMON E. TRUESDALE, M.D.†

**O**PERATIONS undertaken for the cure of diaphragmatic hernia occurring in children are rare despite numerous reports to the contrary. A thorough search of the literature emanating from New England has revealed no operative cases other than those published by the author. Perhaps such operations have been done but not reported. We have authentic information about one child in New England who survived and three in New York State who died after operation.

Vannesson in 1912 reported thirty four cases of congenital diaphragmatic hernia in the newborn (all discovered at autopsy) and stated that the prognosis was very grave and treatment nil. In 1914 Broca, Professor of Surgery Faculté de Médecine, Paris, described the condition accurately. He stated that nearly all of the cases were discovered at autopsy. Among the few patients operated upon for intestinal obstruction, strangulation of the bowel was the condition usually found. The mortality associated with operative interference in these cases was ninety per cent. In 1917 Holt described a case of diaphragmatic hernia in a child sixteen months old who died of pneumonia at the age of three and one half years. In conclusion the author stated that the hernia was not amenable to treatment. Many books on pediatrics such as those published by Ehrenfest, 1922, Cutler, 1923, and Haynes, 1928 failed to mention the subject. Hess, 1922, and Lucas, 1927, devoted little space to this topic. In Abt's work on pediatrics, Richter made the statement that congenital large hernias, present from birth offer little opportunity for surgical treatment. In 1926 Morse in a one page discussion of diaphragmatic hernia came to the following conclusion:

"Hernia of the diaphragm is a very uncommon condition. The chance of closing the defect in the diaphragm is very small but there is a chance. Operate and give the baby what chance there is, unless

the defect by x ray is shown to be very large. In any case the chance for life is small."

Griffith and Mitchell in 1927 devoted two paragraphs to the subject with the following comment:

"The condition is uncommon in children. There is no treatment possible except an operative procedure if incarceration occurs, and this is not likely to be of any avail."

Bolling in 1928 made the following statement:

"In 1925 Hedblom was able to find only 22 cases in patients under twelve in whom operation had been carried out. In the non obstructed cases thoracotomy affords greater opportunity for closure of the hernial orifice."

He cited the case of Dr McLean's, a baby one year old treated medically.

In 1929 Kollev expressed the following opinion:

"One should operate only if there are distressing symptoms. The hernia may be inoperable because of the size of the defect. The hernial mass may be too large to fit the thorax. If such is the case and structures become strangulated, the constriction should be relieved and steps taken to prevent recurrence, and no further attempt should be made to reduce or close the hernia opening."

As late as 1934 Trémolières affirmed that the great congenital diaphragmatic hernias were not in the surgical domain. He warned surgeons to attempt only those cases in which the hernial orifice could be easily closed. Often in these congenital cases, he continued, the torn edges of the diaphragm are so thin and friable that suturing is illusory and even with good tissue recurrence is the rule. He believed that treatment should be a palliative therapy except in the traumatic cases and in those in which volvulus, strangulation or perforation exists and demands immediate surgical intervention.

Read by title at the Annual Meeting of the New England Surgical Society at Manchester, N. H. September 7, 1935.  
\*Truesdale, Philemon E.—Burgos. Truesdale Hospital Fall River, Mass. For record and address of a thoracic "This Week's Issue" page 120.—



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12 1927	Woolsey	California	F	35 days	Abdominal	Most of g i tract, spleen
13 1928	Truesdale	Massachusetts	F	5 yrs	Thoracic	Most of g i tract, spleen
14 1929	Carrington	Ohio	M	15 yrs	Combined	Most of g-i tract, spleen
15 1929	Bettman, Hess	Illinois	F	3½ mos	Combined	Intestines, colon
16 1930 (Mar)	Sanders	Tennessee	F	5½ yrs	Combined	Stomach, colon, omentum
17 1930 (Jun)	Truesdale	Massachusetts	F	1 yr	Thoracic	Stomach
18 1930 (Jul)	Truesdale	Massachusetts	F	17 mos	Thoracic	Most of g i tract, spleen
19 1930 (Oct)	Harrington	(Mayo Clinic)	M	12 yrs	Abdominal	Stomach, colon (congenital short esophagus)
20 1931 (Jan)	Truesdale	Massachusetts	F	12 yrs	Thoracic	Most of g-i tract, spleen, pancreas
21 1931 (Jun)	Donovan	New York	M	4 mos	Abdominal	Most of g i tract, spleen
22 1931 (Oct)	Robb	Minnesota	M	4 wks	Abdominal	Most of g i tract, spleen
23 1931 (Nov)	Coryllos	New York	F	13 days	Combined	Most of g-i tract, spleen
24 1932	Johnson, Bower	California	M	41½ hrs	Combined	Most of g i tract, spleen
25 1935 (Mar)	Truesdale	Massachusetts	F	10 yrs	Thoracic	Most of g i tract, spleen, edge of liver
26 1935 (Apr)	Truesdale	Massachusetts	M	13 yrs	Thoracic	Intestines, colon, spleen, cecum, appendix
27 1935 (May)	Truesdale	Massachusetts	M	11 yrs	Thoracic	Most of g i tract, spleen

\*Recurrence

## SUCCESSFUL OPERATIONS—FOREIGN

Date	Author	State	Sex	Age	Approach	Organs Herniated
1 1902	Aue	Germany	M	9 yrs.	Abdominal	Stomach colon spleen
2 1927	Jowers	England	M	7 yrs.	Abdominal	Intestines colon
3 1928	Pouchet, Luquet	France	?	3 yrs.	Combined	?
4 1929	McFadden	England	F	4 yrs.	Thoracic	Intestines, colon spleen
5 1930	Schönbauer Warkany	Germany	?	3 mos	Abdominal	Intestines, colon, spleen
6 1931	Hipaley	Australia	F	10 yrs	Abdominal	Stomach
7 1932	Hiraka and Sano	Japan	?	Infant	?	Most of g l tract
8 1933	Bryce and Gray	England	M	7 yrs	Abdominal	Stomach, colon spleen
9 1934	Courty	France	?	7 yrs.	Abdominal	Colon right chest

## UNSUCCESSFUL OPERATIONS IN THE UNITED STATES

1 1889	O Dwyer	New York	?	3 yrs	Thoracic	Intestines, strangulated
2 1917	McCleave	Chicago	M	3 mos	Abdominal	Intestines
3 1918	DeBuys	Louisiana	F	3 mos	Abdominal	Stomach colon omentum
4 1924	Carman	Mayo Clinic	M	9 yrs	Abdominal	Most of g l tract, spleen
5 1924	Carman	Mayo Clinic	F	5 yrs	Abdominal	Most of g l tract, spleen
6 1927	Torek	New York	M	4 yrs	Abdominal	Most of g l tract, spleen
7 1927	Clark	Illinois	F	3½ yrs	Thoracic	Stomach ruptured abscess
8 1928	Olmsted	Washington	F	6 mos	Abdominal	Intestines, spleen
9 1929	Brown	Pennsylvania	F	5 yrs	Abdominal	Most of the g l tract, spleen
10 1931	Donovan	New York	?	6 wks.	Abdominal	Most of the g l tract, spleen
11 1934	Hedblom	Mayo Clinic	M	4½ yrs	Abdominal	Most of the g l tract, spleen
12 1935	Truesdale	Massachusetts	M	9 yrs.	Thoracic	Most of the g l tract, spleen

## UNSUCCESSFUL OPERATIONS—FOREIGN

1 1896	Maynard	Scotland	?	8 yrs	Abdominal	Colon, strangulated
2 1913	Duval	France	M	13 yrs	Combined	Most of the g l tract spleen
3 1920	Aue (Heidenbath op)	Germany	M	5 yrs	Abdominal	Stomach colon spleen right chest
4 1931	Barnett	England	?	8 mos.	Abdominal	
5 1922	Lepoutre	France	F	3 mos	Combined	Intestines colon, spleen
6 1923	Wiemann	Germany	M	15 yrs	Thoracic	Intestines colon spleen
7 1931	Unshelm	Germany	M	9 mos	Abdominal	Stomach spleen
8 1932	Lanensteln	Germany	M	9 mos	Abdominal	Most of g l tract, spleen
9 1934	Barrett, Wheaton	England	M	4½ mos	Abdominal	Most of g l tract, spleen

Greenwald and Steiner in their report of eighty-two cases of congenital diaphragmatic hernia in children (1912-1928) found that forty-seven cases were diagnosed at autopsy, in four the method was not stated, probably discovered at autopsy. Intravital diagnosis was made in twenty-seven cases, six clinically and twenty-one at routine x-ray examination. In addition to those mentioned by Greenwald and Steiner the following authors have reported cases found at autopsy: Anosoff (2 cases), Barford, Barney and Evans (2 cases), Becker, Benda, Blumenfeld, del Carril, Cautley, Chapman, Crumbie, de Brun, Dérome, Dodds, Dunne, Falcone, Giangioffe, Gilford, (2 cases), Grénet, Guy, Harper (2 cases), Holt, Hume, Jacobs (4 cases), Karl, Kleine, Larson, Liepmann, Longaker, Lull, Massot, McLannahan, Metcalf, von Mikulicz-Radecki, Monks, Newberger, Oliphant, Palliez, Pistocchi, Putschar, Quénu, Rawes, Reichard, Reviglio, Salomon, Sighinolfi, Smith, Stenzel, Vichard, Williams, H. O., Williams, P. F., and Zamorani.

Other reports in which the condition was discovered by routine x-ray examination have appeared by the following authors: Abercrombie, Ager, Bradley, Brown, Brun, Cabitto (2 cases), del Carril, Connors, Conybeare, de Elzalde, Epstein (3 cases), Greenway, Giustinian and Antonelli, Giustinian and Estiu, Haroen, Healy, Jansen, Jenkinson, Kinney, Klebs, Lamarque, Lauenstein (2 cases), Menville, Morrison, Nalbant, Nobécourt, Pancoast, Paterson, Philips, Rivarola, Roberts, Rossi, Schisler, Schonfeld, Sennels, Stimson, de los Terreros, Thursfield, Trémolières, Tuschere, van Gelder, and Viallet. All but seven of these patients, ranging in age from one week to fifteen years, were alive at the time the articles were written. Klebs' patient lived six years with the left diaphragm entirely absent. De Elzalde's patient died at the age of four months. He stated that his patient did not do well from birth, but that even when operation is done under favorable conditions, only forty-one per cent of the patients survive. In Jenkinson's case the condition was found by chance when rib resection was done for empyema.

The following authors report cases in which the condition was diagnosed correctly clinically: Ankerhold-Hellner, Barrett and Wheaton, Bonzanigo, Donovan (3 cases), Fischer, Hunter, Johannsen, LeWald, Peter and Pokorny, Philippi, Trillat and Belly (2 cases). In nine cases the diagnosis was confirmed by autopsy. Ankerhold-Hellner's patient died at the age of five weeks as surgical intervention was being considered. In Hunter's case the infant's heart was kept beating for an hour, the left lung was one fourth the normal size and had two lobes. The right lung had three rudimentary lobes. Only the rudiments of the left half of the diaphragm were present indicating incomplete fusion in embryonic life. The appendix was high

in the epigastrium, the stomach unrotated in the chest and the ascending and transverse colon in the left thorax. Trillat and Belly's two cases were in female infants who died shortly after birth. These two cases were encountered in 2,180 deliveries.

In Philippi's and Fischer's cases the parents would not consent to operation. LeWald interpreted his case as congenital short esophagus and thoracic stomach, no defect was seen in the diaphragm at the time of operation and the stomach could not be returned to the abdomen because of the very short esophagus.

October, 1931, we published a series of twelve operative cases of diaphragmatic hernia from our clinic, nine of which were in children. Each was without a sac, false hernia or *hernia spuria*. Figure 2 shows the usual sites of herniation in

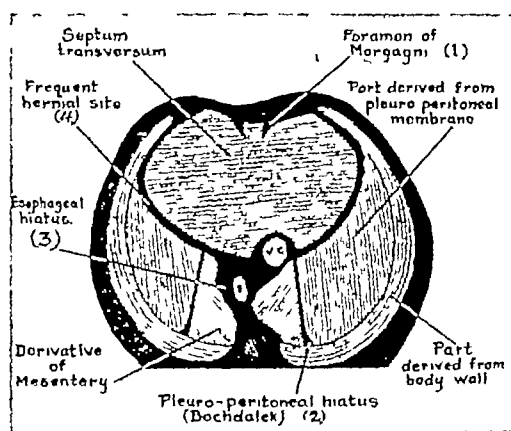


FIG 2

the diaphragm. None of the apertures in children were at the esophageal hiatus, a common site of hernia, site 3. Three were through the foramen of Bochdalek, site 2. In all the rest of the cases operated upon, including the four to be reported, the tear extended laterally to the periphery of the diaphragm in the weak area in the dome corresponding with the point of fusion between the pleuroperitoneal membranes and the septum transversum, site 4. In one of these cases there was a second tear at the foramen of Morgagni, site 1. In the traumatic cases, we have assumed that a congenital origin pre-existed because of the thinness of the diaphragmatic musculature at the site of the tear; the sluggish response to the faradic current indicating trophic disturbance in this area, and the presence of other congenital malformation such as harelip. Thus congenital malformation of the diaphragm was doubtless an antecedent of the traumatic injury. As Quénu remarked in 1920, it is very rare for a normal diaphragm to sustain injury even in cases of serious trauma.

Herewith follow the reports from our clinic of four additional operative cases of congenital diaphragmatic hernia in children.

CASE X. A. J. McH., No 33626. This patient was a girl ten years old born May 11, 1924 in normal labor. Soon after birth, symptoms of labored breath

ing cyanosis, and altered digestion occurred. At the age of two and one-half years her ailment was diagnosed as pulmonary tuberculosis. She was sent to Denver Colorado with her mother. X-ray examination at the Children's Hospital there revealed a diaphragmatic hernia with the entire stomach and loops of intestine in the left pleural cavity (See figure 3.) The examiners found no evidence of tuberculosis. Physicians stated that the hernia was so large and so involved that it could not be cured by operation and that she would remain in a precarious state.

Despite her handicaps however the patient continued to live the life of a cripple with constantly disturbed gastrointestinal respiratory and circulatory functions. She was subject to frequent attacks

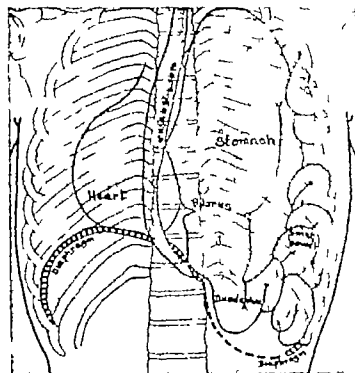


FIG. 3. Case X. Drawing made from x-ray film showing inverted stomach and loops of intestine in the left pleural cavity at 2½ years.

of smothering cyanosis coughing and vomiting. Her physical activity was greatly limited because of the dyspnea, aggravated by the intake of food. During the past year these spells became more frequent and more severe. The attacks came on suddenly; they began with belching and coughing followed by choking, cyanosis and generalized convulsions. She would be in terrifying agony until relieved by belching and vomiting. Her mother stated that in several of these attacks during the past month the child had the appearance of impending death. Her diet was limited. She was able to take sparingly of fish, cereal, grape-juice and ice cream. Water and most fluids however distressed her immediately. The two weeks before her arrival were spent in Carlson Hospital Omaha. There it was felt that her condition was so critical because of obstruction that, unless relieved by surgery she would succumb in one of her attacks.

Our physical examination revealed a poorly nourished pigeon breasted pale slender girl. There was left border dullness at the sternum with location of heart sounds revealing a dextrocardia. The left chest was barrel-shaped hyperresonant, full of rumblings tinkles and peristaltic sounds. The abdomen showed the rachitic rosary. The abdomen was markedly scaphoid. The body diameter at the sternum was twice that measured at the umbilicus. X-ray examination with barium meal and enema revealed an inverted stomach, all the small intestines two-thirds of the colon, cecum, and appendix in the left chest.

A protein diet was employed for two weeks. Dur-

ing this period attacks of bowel obstruction occurred at about the same time each day lasting from one-half hour to two hours. They were relieved by frequent change of posture and massage of the abdomen. Enemata could not be tolerated.

Operation was done March 4 1935. Under gas-oxygen-ether positive-pressure anesthesia administered by Dr. A. H. Miller the thorax was opened by a semilunar incision beginning over the costosternal cartilaginous portion of the fifth rib sweeping downward and backward over the sixth and seventh ribs ending over the tubercles of the seventh and eighth ribs posteriorly. The sixth and seventh ribs were removed. The pleura was then opened and the flap thrown back on its base.

This opening exposed the contents of the left pleural cavity which consisted of the inverted stomach, omentum entire length of the small intestine the appendix ascending and transverse colon and the spleen. (See figure 4.)

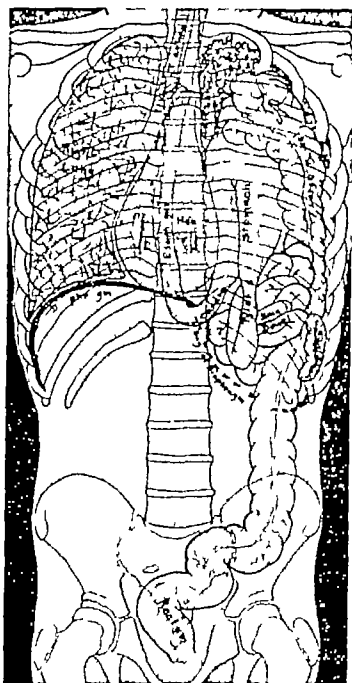


FIG. 4. Case X.

The stomach was only moderately distended up-side-down in position and occupying much of the apical and posterior portions of the left pleural cavity. The ileocecal region with the appendix was just below the clavicle. Much to our surprise the small bowel was well deflated and coiled in a comparatively small mass above the diaphragm which was found depressed below the level of the costal arch. The spleen lay in the costophrenic angle. The entire large omentum and all the large intestine ex-

cept the descending colon were above the diaphragm. The liver edge could be discerned protruding through the aperture. The lung was an apparently rudimentary organ entirely collapsed.

More room was required to deal with the hernia, so the eighth and ninth ribs were removed. Here and there adhesive bands which attached the omentum and viscera to lung and pericardium were severed. The hernial opening was discovered to be transverse through the middle of the diaphragm about five inches in length and extending from the para esophageal musculature toward the left to the

were applied at intervals of about an inch. The thoracotomy wound was then closed with interrupted sutures of silkworm gut.

The patient's condition during the operation was not alarming at any time. The duodenal tube was passed and about one ounce of brownish fluid evacuated from the stomach. Hypodermoclysis of 800 cc. of saline was given. The following day the child took small amounts of water and milk by mouth. Temperature was 100.2° by rectum, pulse 140, respirations 24. Except for incisional pain, the general condition was satisfactory. During the early

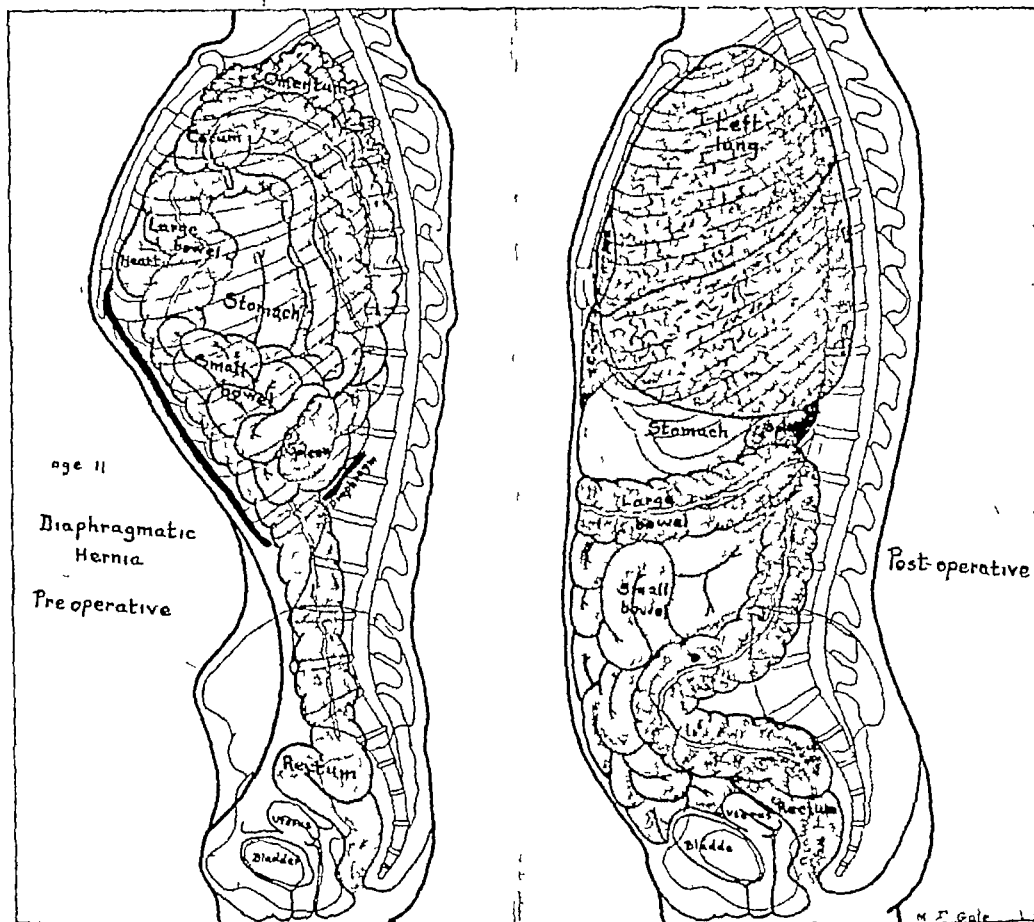


FIG 5 Case X. Profile view of organs and contour of the body before and after operation

periphery of the diaphragm. The structures in the aperture, particularly the spleen and intestines, were firmly adherent to the margin of the opening above and below. Separating and freeing these was most difficult and time-consuming, and the most dangerous part of the operation. When accomplished the edges of the aperture were grasped with Allis forceps, and the margins raised and spread apart. The operation of reduction was then begun.

First the spleen was severed from its attachments and passed downward through the opening, then the small intestines and omentum reduced. No little difficulty was met in replacing the colon and stomach. This step was finally accomplished by using a dry gauze sponge as a contiguous carrier. As the long narrow sponge was tucked downward through the hole, it carried the bowel with it. Eventually the colon and stomach were reduced in this manner. Finally the opening in the diaphragm was closed by a running suture of black silk (No 7). Several interrupted sutures of the same material

morning of March 6 she vomited frequently for a period of five hours. The mother had been warned never to give the child an enema because at one time when given an enema at the hospital in Denver the child became deeply cyanosed, dyspneic, and nearly expired. Now an enema was clearly indicated, and we reasoned that if the hernia was reduced, the success of an enema was of vital significance. It was given and to the great surprise of mother and child, no trouble ensued. The result was satisfactory and this proved the turning-point in the convalescence. Vomiting ceased. At noon she drank six ounces of orange juice. The following day, March 7, the patient ate with relish a portion of macaroni and cheese. She soon showed marked improvement and commented eagerly on the appearance of her abdomen which was no longer scaphoid but rounded.

By March 10 the temperature was normal. The bowels continued to move well with enemata. March 26 x-ray examination showed an exudate in the

left chest and about 500 cc. of turbid fluid was aspirated. April 11 she was discharged recovered having gained twelve pounds during her convalescence. She now swims rides a bicycle, and other wise leads a strenuous life. Before operation the patient measured four feet ten inches in height and weighed fifty-two pounds. By August 12 her weight was seventy-two pounds and she was two inches taller. Figure 5 shows position of organs before and after operation.

**CASE XI J N No 33908** An intelligent, cooperative boy of thirteen years poorly nourished and underdeveloped was admitted March 30 1935 with the following history:

Except for frequent spells of "colic" this child seemed normal until the age of eleven months. At that time a severe cold with paroxysmal coughing was thought to be pertussis. At fourteen months he had severe attacks of vomiting which lasted for five days and nearly proved fatal. Relief was finally obtained by enemata. X-ray film then showed contraction of the left lung. A diaphragmatic hernia was not detected. From the age of eighteen months attacks of vomiting came on every two weeks with intense upper abdominal pain and belching of foul smelling gas. There was no cyanosis or dyspnea. When five years old the boy had a second attack of "pertussis". After one severe coughing spell he was very ill and vomited thereafter every night for six months. Roentgen rays taken in Los Angeles showed pneumothorax and collapsed left lung. When repeated shortly afterwards in Oakland the films showed the colon protruding through the diaphragm into the left pleural cavity. At the age of six, left phrenicotomy was done in Oakland California without subsequent improvement. In spite of his physical handicap however the boy managed to lead a fairly active life.

Our physical examination revealed no abnormalities of eyes teeth or throat. The right chest was clear and breath and voice sounds normal. The left chest was somewhat dull over the entire middle and lower portions with breath sounds diminished over these areas. Intestinal gurglings and murmurings were audible throughout the left chest. The heart was markedly displaced to the right with left border and maximal beat at the sternal line. Sounds were regular of good quality with no murmurs. Over the left scapula was a small phrenicotomy scar.

The abdomen was soft somewhat distended and tympanitic on the left side as far as the pelvic brim. There were no masses, spasm nor tenderness. Extremities were negative.

Examination of the blood revealed a mild grade of anemia with 3 840 000 red cells 5 900 leucocytes and 75 per cent hemoglobin.

X-ray examinations April 2 1935 showed the cardiac end of the stomach displaced laterally lying above a narrow shelf like portion of the diaphragm. The thoracic portion of the stomach was larger during inspiration. The stomach was atonic, markedly dilated, and nearly filled the abdomen. The gastric rugae were thickened and tortuous. At six hours there was an eighty per cent residue in the stomach. All the small intestine, two-thirds of the colon cecum and appendix filled the left chest. At twenty-four hours the stomach still contained a small residue of barium.

Operation was done April 8 1935 the thorax was opened in the same manner as described in Case X. The seventh eighth, and ninth ribs were cut and the flap containing the ribs reflected upward. The ribs were not removed. The chest contained the

cardiac end of the greatly enlarged stomach, the major portion of the colon with cecum and appendix, all the small intestine and the spleen (figure 6). The defect in the diaphragm extended laterally from the aorta to the periphery. Adhesions around and beneath the opening in the diaphragm were freed with great effort.

The viscera were replaced with some difficulty. The aperture in the diaphragm was then sutured with silk and the operative wound closed with through and through mass sutures of silkworm gut.

Early postoperative progress was excellent with temperature nearly normal and bowel movements normal. On the third postoperative day 250 cc. of turbid fluid was aspirated from the left pleural

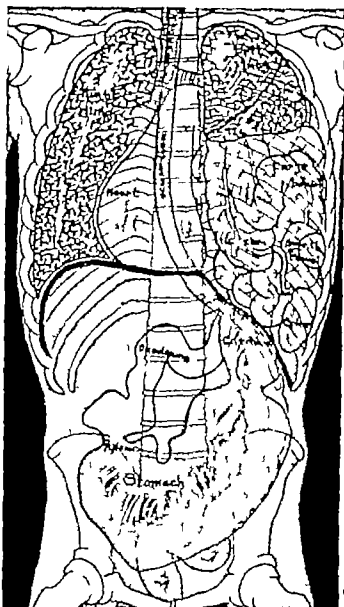


FIG. 6

cavity. April 11 a chest tap yielded 250 cc. of blood-stained fluid. The following day a tube was inserted to facilitate drainage and a transfusion was given. The next two weeks the patient made steady progress. The chest was irrigated daily with chloramine. May 14 the patient complained of pain in the left shoulder. It was also noticed that the pulse rose to about 120 when the boy was active. To correct some degree of left scoliosis of the spine and relieve the pain in the left shoulder a plaster cast was applied May 29 with marked improvement in the patient's condition. The cast was removed June 11. The patient was discharged June 15 with a small sinus in the left chest still draining. August 1 the patient reported that he had gained ten pounds and was looking forward to entering school in California in September. Figure 7 shows the position of the organs after operation.

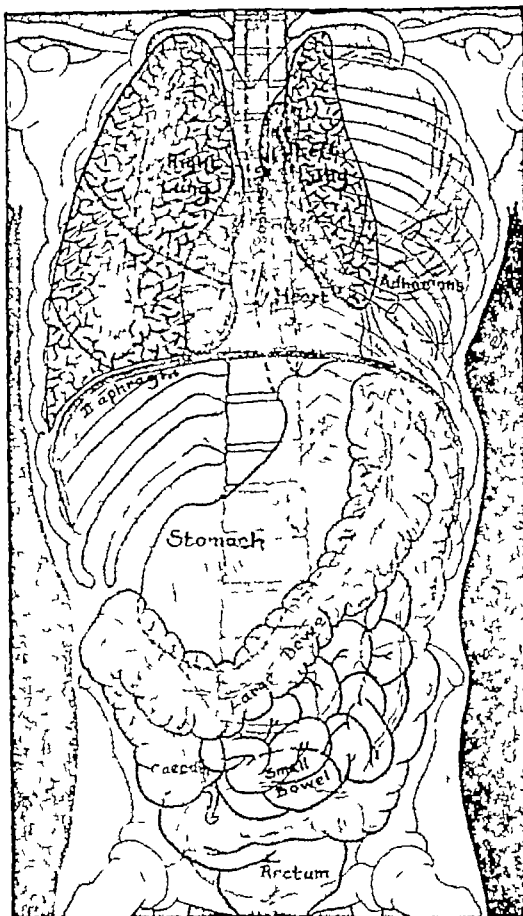


FIG 7 Case XI. A composite drawing from x-ray films taken after operation and showing small intestines and colon their normal position below the diaphragm

CASE XII A boy, nine years old, the fourth child of normal parents. Delivery was by breech presentation. During infancy feeding the child was a difficult problem and cyanotic spells were frequent. When thirteen months old he was placed in a New

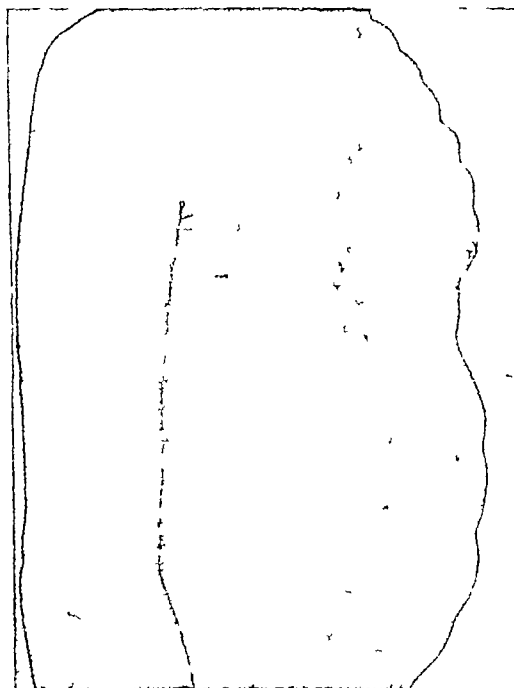


FIG 8 View of chest in Case XII showing depressed sternum.

York hospital for regulation of feeding. At this time x-ray examination revealed the small intestines in the left chest. Each night this child manifested thoracic distress relieved after vomiting. For four months prior to admission to our clinic April 5, 1935 these attacks had not recurred. The child played with his schoolmates and was an intelligent fourth grade pupil. Previous illnesses included rheumatic heart disease and the patient was reported to have had pneumonia three times. He complained of pains throughout his limbs and joints with intermittent rise of temperature.

Physical examination revealed a pale, slender boy of nine with choreiform movements. The tonsils were large and pitted. Blood pressure was 105/60.

The thorax was funnel shaped (Figure 8). The entire right chest was hyperresonant. The left chest was flat over the lower half with diminished breath and voice sounds. No peristaltic sounds were audible at the time of the examination. The apex of the heart lay to the right of the sternum. A violent cardiac impulse was seen in the right fourth interspace. The heart beat was vigorous, abnormally rapid, with a loud precordial systolic murmur. The electrocardiographic tracing revealed simple tachycardia and deep Q waves in leads 1 and 2 of uncertain significance.

A diagnosis was made of congenital diaphragmatic hernia with heart disease, rheumatic or congenital, and mitral stenosis. It was decided that the condition of the heart could withstand the operation for reduction and repair of the hernia, although the marked dextrocardia and funnel chest might present difficulty in the return of the heart to its normal position after reduction of the hernia.

A barium meal on April 8 revealed a portion of the stomach and all the small intestines in the left chest (See figure 9a). April 9 a barium enema showed all the colon proximal to the splenic flexure and appendix in the left chest (See figure 9b). At the base of the left chest laterally, there was an area which contained no loops of bowel and which was presumably occupied by the spleen.

April 13, 1935 operation was done by the thoracic route. The eighth rib was severed at each end, the flap thus made turned upward, and the ninth rib severed at one extremity. The heart was entirely to the right of the sternal indentation which formed an almost complete partition between the two sides of the chest. The rent in the diaphragm extended out to the midaxillary line, somewhat more posteriorly than in the two former cases. The large bowel was firmly adherent to the edge of the hiatus. The adhesions were very dense and tough, and had to be severed before the viscera could be replaced in the abdominal cavity. Part of the bowel could not be dissected free and was left attached to the underside of the diaphragm, the aperture being approximated above it. The rent was closed with a running suture of silk starting medially and continuing gradually toward the periphery. Near the outer edge several interrupted silk sutures were required to close the rent. The chest wall was closed with interrupted sutures of heavy silkworm gut. In the lateral sulcus of the diaphragm a small soft rubber tube was placed, secured to the parietal pleura with plain No 0 catgut and drawn out through a stab wound. Diathermic coagulation was used for all bleeders.

The patient reacted well immediately following the operation but increasing pallor was noticed, and the day after operation he was given a blood transfusion. Temperature was 101.6 degrees, pulse 130. Breathing was labored. Therefore he was placed in an oxygen tent with improvement in his condition, temperature between 100 and 101 degrees

and pulse 120. The following morning a chest tap yielded 400 cc. of dark bloody fluid. Auscultation revealed signs of pneumonia on the right side although x-ray examination showed no evidence of gross consolidation. There was a left hydropneumothorax, the fluid level being opposite the fifth interspace posteriorly. The mediastinum remained displaced with the right cardiac border in contact with the lateral wall of the chest. The patient was restless and dyspneic during the night of April 5. The following morning of the third postoperative day at about 5 00 a. m. he became cyanotic and expired.

A restricted postmortem examination through the incision revealed death due to asphyxia. The left

tained fluid. Both lungs showed marked congestion.

The lesson to be derived from this case lies in the recognition of the cause of the concealed hemorrhage which was an important factor in the cause of death. At first it was difficult to explain the presence of blood in the left pleural cavity. Upon minute inspection however two small veins were found open one in the costophrenic sulcus of the diaphragm and the other at the angle of the thoracotomy incision where the layers of the thoracic wall overlapped. Immediately after complete closure of the thoracotomy wound and artificial expansion of the left lung the negative pressure within the pleural cavity was artificially increased to or beyond the normal degree. The suction thus



FIG. 9. Case XII.

a. Roentgenogram after barium meal showing small intestinal lines in the left chest.

b. Roentgenogram after barium enema showing colon in left chest.

Pleural cavity contained about 600 cc of blood stained fluid with a number of large clots. This blood apparently came from the lateral aspect of the diaphragm where it was cut for a short distance. The line of suture was intact and held firmly. The left lung was collapsed. The left pleural cavity extended beyond the midline, the heart being entirely on the right side with a considerable degree of torsion on the great vessels. The right ventricle was hypertrophied undoubtedly the result of pulmonary resistance. No valvular disease was demonstrable. The right lung and heart showed signs indicating asphyxia. Although much blood was lost most of which was replaced by transfusion, there was no recent copious hemorrhage to account for the rapid exitus. Asphyxia was regarded as the most logical immediate cause of death aided by the left hemothorax. The right lung showed small areas of hemorrhage with

created probably kept the ends of these veins open and bleeding continued unimpeded in the free pleural cavity.

Inasmuch as no other source of bleeding could be detected it seems plausible to assume that, even from open ends of small veins a sufficient amount of blood can be extracted by suction to jeopardize life. We suggest therefore exercise of the utmost care in obtaining complete hemostasis of all vessels communicating with the pleural cavity. Possibly the use of the diathermy instead of ligation of vessels may have been a factor in affording points of origin for bleeding.

CASE XIII No 34198 W B. This patient was a boy eleven years old who had the appearance of a child of seven. He spoke haltingly and his mind seemed sluggish. His mother reported that his condition was normal until he was five years old. At



by a hit and run motorist, the tricycle was demolished and the handlebars were forced violently against his abdomen. He was taken to the Millard Fillmore Hospital, Buffalo, in a critical condition. For two months he complained of severe pain in his right chest. X-ray examination at this time showed a dark shadow in the right chest thought to be fluid. He suffered from dyspnea and difficulty in taking food. Two months later he was removed to the Children's Hospital where the diaphragmatic hernia was disclosed by x-ray examination. He remained there under observation for two years. His parents were informed that nothing could be done to cure the diaphragmatic hernia and that the in-

x-ray examination of the gastrointestinal tract with barium by mouth, showed the inverted stomach with its greater curvature at the level of the fourth rib and loops of small intestine in the left chest. (See figure 10a) May 11, the barium enema revealed the colon in the left chest, with constriction of the loops as they passed through the aperture in the diaphragm. (See figure 10b)

May 15, 1935 the hernia was repaired through a thoracotomy approach. Long sections of the eighth and ninth ribs were removed. In the left chest were the stomach, spleen, and most of the large and small intestines. The structures were adherent about the margin of an aperture which measured five-inches



FIG 10 Case XIII  
a Roentgenogram after barium meal showing inverted stomach and intestines in the left chest.  
b Roentgenogram after barium enema showing herniated colon in left chest

testines would probably become strangulated and cause death.

From this hospital the patient went to a convalescent home for six months and finally returned home in the care of his family physician, Dr. A. J. Ferris. The history is one of increasingly severe attacks of sudden epigastric pain with dyspnea, vomiting, sweating, and weakness. Spells occurred after eating and lasted for an interval varying from a few minutes to several hours. During the past year they occurred about once a week. The parents, desperate, decided to take the risk of an operation.

Physical examination revealed a poorly developed and poorly nourished boy of eleven. Blood pressure was 95/50. The percussion note was flat over the lower left chest and voice and breath sounds were diminished. The heart was considerably displaced to the right, sounds were slow, regular, and of good quality. Gurglings were audible in the left chest posteriorly. The abdomen was scaphoid. On May 10

in length. These adhesions were cut and all the abdominal viscera in the chest replaced below the diaphragm. The tear, extending from the pillar on the left side of the esophagus, to the perimeter of the diaphragm, was closed with a continuous silk suture. Several interrupted sutures of silk were then taken along the suture line to reinforce it and a small soft rubber drainage tube was secured to the dome of the diaphragm and brought out through the incision. The chest was closed in layers with a continuous suture of chromic catgut No. 1 to approximate the edges of the pleura. The fascia and muscle layers were then approximated with chromic gut. Several interrupted silkworm gut sutures were also taken and the skin closed with horse-hair.

The temperature rose to 103.8 degrees early on the morning of the second postoperative day, but soon dropped to 99.8 and the chart remained normal thereafter. The wound healed rapidly and in

nine days the patient was up and about eating regular house diet. X-ray examination June 4 1935 showed a small amount of fluid in the left chest. A chest tap however failed to obtain fluid. After discharge the boy's history was uneventful until June 17 about one month after operation. He complained of severe pain in the left chest. Four cc. of pus were drained from the wound and the pain quickly subsided. Since that time his temperature has remained normal and the child is enjoying a vacation at the seashore where he is quite cheerful and happy.

Contrary to the opinion now held by general practitioners and pediatricists that operation for congenital diaphragmatic hernia should not be undertaken before school age or until the child has reached adolescence or until symptoms of strangulation appear, we believe that operation should be done in the early weeks or months of life. The diaphragm, like any other muscular structure of the body, requires exercise for its development. Moreover, the activity of the normal diaphragm, like that of the heart, never ceases. Unlike other muscle structures of the body, it enjoys no rest periods, not even during sleep. Therefore when stalled by the contents of a hernia, symptoms of disturbed digestion, respiration, and circulation occur. As a consequence, we find these children underdeveloped and undernourished. A girl, aged four, now under observation at the hospital, gives a history of having gained only one pound in the last two years.

It is hoped that all cases operated upon will be reported. Case XII demonstrates that valuable lessons are often derived from careful investigation of the causes of failure.

The author wishes to acknowledge his indebtedness to members of the hospital staff who directly or indirectly have participated in the care of these patients or in the preparation of the written material and illustrations in this article. We are very much indebted to Dr. Albert H. Miller for a major service. He has originated and made practical application of a method of administering positive pressure anesthesia under gas-oxygen-oxygen without which our results could not have been achieved.

## REFERENCES

- Abadie J: Bull. et mém. Soc. nat. de chir. 81: 868 19 5  
 Abercrombie, B.: J. Tennessee M. A. 31: 361 (Nov.) 1934  
 Ayer L. C.: U. S. Vet. Bur. M. Bull. 61: 911 (Nov.) 1930  
 Albanese, A.: Riforma med. 1934, reported by Quérou  
 Ankerholdt Heilmann C. Arch. f. Kinderh. 83: 302 (June 16) 1931  
 Anderson N. P.: J. isch. rann. detak. vopr. 9: 218 1939  
 Aude O.: Deutsche Ztschr. f. Chir. 180: 14 (Nov.) 19 0  
 Auvray, R.: Bull. et mém. Soc. de Chir. de Paris 59: 161 (Nov. 26) 1913  
 Barford L. J.: Brit. M. J. 2: 794 (Oct. 28) 1922.  
 Barnett, G. R.: Brit. M. J. 1: 602 (April) 1914  
 Barney W. and Evans, E. H.: Arch. Pediat. 41: 799 1924  
 Barrett, W. and Wheaton, C. E. W.: Brit. J. Surg. 21: 429 (Jan.) 1934  
 Becker: Quoted by Clark, D. F. Ill. M. J. 53: 62 (July) 1927  
 Behrend, M.: Arch. Pediat. 41: 403 (June) 1924  
 Becker: Deutsche med. Wchnschr. 1940 Quoted by Liepmann, 1942  
 Béraud, L.: Lyon chir. 20: 242, 19 3  
 Béraud, L. and D. net. C.: Lyon chir. 20: 808 (Sept.) 1918  
 Bettman, R. D. and Hess J. H.: J. A. M. A. 92: 614 (June 15) 1929  
 Blumenfeld, L.: New York M. J. 116: 121 15  
 Bolling, R. W.: Surgery of Childhood. New York D. Appleton and Company 19 8  
 Bonzanigo C.: Ztschr. f. Kinderh. 86: 53 1931  
 Bowditch, H. I.: A Treatise on Diaphragmatic Hernia. Buf  
 folo M. and S. J. 9: 11 1922  
 Bradley, V. M., Zollicoff, J. D. and McKee, E. E.: Arch. Pediat. 47: 324 (June) 1930  
 Broca, A.: Les Maladies des Enfants. Paris 1914  
 Brown, H. P.: S. Clin. North America 9: 1191 (Oct.) 1929  
 Brown, S.: J. A. M. A. 97: 478 (Sept. 5) 1931  
 Brun, A.: Arch. et J. de laubert de Beaujeu: J. de radiol. et électrol. 6: 278 1923  
 Bryce A., Graham and Gray E. D.: Brit. J. Surg. 20: 492 (April) 1933  
 Byrthell, W. J. S.: Brit. J. Child Dis 18: 36 1915  
 Cabetto: Clin. pediat. 18: 449 (Aug.) 1934  
 Carmichael, R. D. and Fineman, S.: Radiology 3: 26 (July) 1924  
 Carrington, G. L.: Ann. Surg. 89: 512 (April) 19 9  
 Cantley E.: Lancet 2: 1472 1905  
 Chapman, E. F.: Brit. M. J. 2: 500 (Sept. 14) 1929  
 Clark, D. F.: Illinois M. J. 53: 62 (July) 1927  
 Clark, D. F. and Robinson, W. T.: Ann. Surg. 77: 725 1923  
 Conybeare, J. J., Donaldson, R. and Simpson, C. K.: Guy's Hosp. Rep. 52: 400 1932.  
 Coryllos P. N.: S. Clin. North America 14: 35 (April) 1934  
 Crumpley J. R. and Stephens J.: Brit. M. J. 3: 12 1933  
 Cutler, D. I.: Pediatric Nursing. New York T. H. Macmillan Company 1923.  
 de Bruin, J.: Bull. Soc. de pédiat. de Paris 83: 414 1926  
 DeBourse L. R.: Proc. Am. Pediat. Soc. (June 16) 1919 Abstract, J. A. M. A. 73: 293 (July 26) 1919  
 de los Rerros C. S.: Arch. españ. de pediat. 15: 271 (May) 1931  
 del Carril M. J. and Arandubia, F.: Prensa med. argent. 21: 783 (April 25) 1924  
 del Carril, M. J., Vergnolle, M. J. and Ramirez, P. D.: Rev. Derm. Syph. 63: 774 (May) 1925  
 Delorm, Boppe, Gratz, et Balliarg: Bull. Soc. de pédiat. de Paris 80: 695 (Dec.) 1922.  
 Dodds, G. H., and Flew J. D. S.: J. Obst. & Gynaec. Brit. Emp. 25: 737 1928  
 Donovan, C. J.: Clin. North America 11: 871 (June) 1921.  
 Downes, W. A.: Surg. Gynec. & Obst. 77: 292 (Oct.) 1918  
 Dunne G. P.: Minnesota Med. 10: 773 (Dec.) 1927  
 Duval Pierre: Bull. et mém. Soc. de Chir. de Paris 83: 1512 (Nov. 6) 1913  
 Eberfeldt, H.: Birth Injuries of the Child. New York: D. Appleton and Company 19 9  
 de Ellisalde, P.: Arch. argent. de pediat. 8: 310 (June) 1932.  
 Epstein, H. J.: M. J. & Rec. 133: 78 (July 16) 1930  
 Falcone A.: Pediatría 40: 331 (Aug. 13) 1932  
 Fawcett, E. A.: J. Kansas M. Soc. 34: 127 (Apr. 11) 1933  
 Gianniboni, P.: R. Rev. med. infimam. 16: 632 19 8  
 Gilford, S.: Brit. J. Dis. Child. 1: 636 1901  
 Giustoliani, V., and Antonelli, A.: Semana med. 11: 27 (Jan. 1) 1931.  
 Glustian V. and Bathu, M. D.: Semana med. 11: 35 1931  
 Gordon, E. B., and Goland, D. L.: Am. J. Dis. Child. 22: 679 (Dec.) 1922  
 Greenwald, H. M. and Steiner M.: Am. J. Dis. Child. 35: 361 (Aug.) 1929  
 Greenway G. H.: Lancet 1: 8 2 (March 24) 1934  
 Greaves, J.: Brit. Pediat. 37: 893 19 0  
 Grénet, H.: Bol. Soc. cubana de pediat. 8: 32 (Jan. Feb.) 1923  
 Grimith J. P. C., and Alitchell, A. G.: The Diseases of Infants and Children. Philadelphia: W. B. Saunders Company 1927  
 Grules: Clinical Pediatrics. Volume 3 New York D. Appleton and Company 1930  
 Guy C. C., and Rand G. L.: Illinois M. J. 52: 61 1922  
 Haroon, L. L., and Gertler, P. G.: Nederl. tijdschr. v. geneesk. 78: 19 (Feb. 10) 1934  
 Harpe C. B., and Anderson, O. N.: Am. J. Obst. & Gynec. 80: 324 (Sept.) 1930  
 Harrington S. W.: Surg. Gynec. Obst. 51: 604 (Oct.) 1920  
 Haynes R. S.: Infant and Child Feeding. New York D. Appleton and Company 19 8  
 Healy T. R.: Am. J. Roentgenol. 13: 46 1925  
 Hædholm, C. A.: Ann. Int. Med. 8: 155 (Aug.) 1931  
 Hess J. H.: Premature and Congenitally Diseased Infants. Philadelphia Lea and Febiger 1923  
 Hipley P. L.: M. J. Australia 11: 60 (Feb. 14) 1921  
 Holt, L. D. and Howland J.: Diseases of Infancy and Childhood. Seventh Edition. New York D. Appleton and Company 1917  
 Hunt, J. B.: Brit. J. Surg. 10: 257 19 2  
 Hunter, W. E.: California & West. Med. 82: 277 (Oct. 19 8)  
 Huska, J. and Sano U.: Orient. J. Dis. Infants 11: 82 (March) 1932  
 Jacobs, W. F.: Bull. Buffalo Gen. Hosp. 2: 6 1924  
 Jansen, J. P.: Nederl. Tijdschr. v. Geneesk. 71: 795 1927  
 Jenkinson D. L.: J. A. M. A. 92: 1963 (Dec. 27) 1930  
 Johansson, N.: Acta pediat. 13: 251 1924  
 Johnson, H., and Howe, A. G.: California & West. Med. 58: 46 (Jan.) 1932  
 Jowers, R. P.: Brit. J. Surg. 15: 322 (Oct.) 1927  
 Kahl, M.: Med. Welt 8: 62 (Jan. 14) 1923  
 Keith, A. J.: Brit. M. J. 2: 1 97 1910  
 Keith, D. T.: Am. J. Roentgenol. 7: 289 19 0  
 Kelly, S. W.: Medical Elites a of Children. St. Louis C. V. Mosby Company 1929  
 Kinney reported by Brun, et al  
 Kl. be reported by Epplinger Allgemeines und spezielle Pathologie und Therapie. Vienna, 1911  
 Klein H. O.: Beitr. a. path. Anat. u. allg. Path. 80: 609 (Oct.) 1922

- Lamarque P Dufolx M Mourgues M, et Badel Mme Arch Soc d sc. méd et biol de Montpellier 14: 250 (May) 1933
- Larson A Hosp Tid 9: 287, 1903
- Lauenstein H Ztschr f Kinderh 54: 117 1932
- Leopold J S Am J Dis Child 33: 597 (April) 1927
- Lepoutre de Lille Bull et mém Soc de chir de Paris 48: 170 1922
- LeWald L T Radiology 3: 91 1924
- Liepmann W Arch f Gynaek 68: 780 1903
- Longaker D Am J Obst & Gynec 6: 240 1923
- Lucas W P Modern Practice of Pediatrics New York The Macmillan Company 1927
- Lull C B Am J Obst & Gynec 19: 106 1930
- Massot M and Escudler F Marseille méd 60: 996 1923
- Maylard A Glasgow M J 46: 143 1896
- McCleave T C Am J Dis Child 13: 254 1917
- McFadden G D F Brit. M J 2: 46 (July 13) 1929
- McLannahan J G Brit. M J 1: 18 1925
- Menville, L J M Clin. N Amer 9: 1073 (Jan.) 1926
- Metcalf G S Wisconsin M J 29: 576 (Oct.) 1930
- Meyer Willy Med. Rec. 95: 761 1919
- Monks E H Brit. M J 1: 708 1914
- Morrison L B J A. M. A. 84: 161 (Jan 17) 1925
- Morse J L Clinical Pediatrics Philadelphia W B Saunders Company 1926
- Nalbant, J P Am J Roentgenol 28: 634 (Nov.) 1932
- Newberger C Am J Obst & Gynec 25: 306 (Feb.) 1933
- Newcomet, W S Atlantic M J 29: 687 1925-26
- Nobécourt, P, and Boulanger-Pillet Bull Soc. de pédiat de Paris 27: 190 (March) 1929
- O Connell J C in Truesdale P E J A. M. A. 77: 993 (Sept. 24) 1921
- O Dwyer J Arch. Pediat. 6: 882 1889 Ann Surg 11: 124 1890
- Oliphant, T H New Orleans M & S J 83: 104 (Aug.) 1930
- Olmsted H. C Northwest Med 27: 169 (April) 1928
- Pallier R. and Gernez, L Bull Soc. obst. et de gynéc. 22: 296 (March) 1933
- Pancoast H. K. and Boles R S Arch Int. Med. 38: 633 (Nov.) 1926
- Paterson, D: Proc Roy Soc. Med (Sect. Dis Child) 21: 86 (Aug.) 1928
- Pauchet, V and Luquet, G Bull. Acad de méd Paris 99: 92 (Jan. 17) 1928
- Peter R. and Pokorny J Rozhl v chir a gynaek (cást gynaek.) 12: 22 1933
- Philippi M Maandschr v kindergeneesk 3: 132 (Dec.) 1933
- Phillips H B Am J Surg 1: 83 (July) 1926
- Pierret, R and Breton A. Echo méd du nord 1: 430 (March 25) 1934
- Pistocchi G Glor di clin med 13: 271 (April 10) 1932
- Putschar W Zentralbl f allg Path u path. Anat. 50: 97, 1930
- Quénu J Thesis Paris 1920
- Ravies L Brit. M J 2: 884 1911
- Reichard, G A Case of Diaphragmatic Hernia in the New born. Lausanne 1918
- Reviglio G M and Scarzella M. Pediatría d med. prat. 7: 641 1932
- Richter H M Pediatrics ed I. A Abt. Philadelphia W B Saunders Company 1927
- Rivarola, R. A. and Ravcosky A L Bol y trab de la Soc de cir de Buenos Aires 17: 189 (May 10) 1933
- Robb E F Journal Lancet 51: 597 (Oct 1) 1931
- Roberts R E Brit. J Radiol 82: 17 1927
- Robertson J H Glasgow M J 111: 212 (April) 1929
- Ross L and Puviani L Pediatría Prat. 9: 67 (March) 1933
- Salomon A. V Arch. Pediat. 48: 802 (Dec.) 1931
- Sanders R. L Ann Surg 91: 367 (March) 1930
- Schisler E J J Missouri M. A. 28: 228 (May) 1929
- Schönbauer L Warkany J Zur Kinderheilk 60: 126 1931
- Schönfeld quoted by Lauenstein
- Sennels A. Ugesk f laeger 92: 274 (March 20) 1930
- Sherwood W A. quoted by Woolsey
- Sighinolfi P Bull d sc. med Bologna 2: 233 1924
- Smith E Lancet 1: 1424 1904
- Speik F. A. J A. M. A. 75: 1264 (Nov 6) 1920
- Stenzel K G Deutsche Ztschr f Chir 216: 138 1929
- Stimson P M Personal Communication June 12 1935
- Thursfield H. Proc. Roy Soc. Med 25: 783 (April) 1932
- Trémolieres T Tardieu A. and Caquot G Arch. d mal de l'app digestif 24: 445 (May) 1934
- Trillat and Belly Bull Soc. obst. et de gynéc 21: 278 (April) 1932
- Truesdale P E J A. M. A. 77: 993 (Sept. 24) 1921 Ann. Surg 86: 238 (Aug.) 1927 Ann Surg 90: 664 (Oct.) 1929 J A. M. A. 94: 528 1931
- Tuscherer J Jahrb f Kinderh 124: 307 (Aug.) 1929
- Unshelm E Monatschr f Kinderh 51 94 1931
- van Gelder J H S Maandschr v kindergeneesk. 3: 43 (Oct.) 1933
- Vannesson A. Thesis Paris 1912
- Viallet and Marchioni Bull et mém. Soc. de radiol méd. de France 20: 169 (March) 1932
- Viallet and Marchioni Bull et mém Soc de radiol méd. de 21: 566 1932
- von Mikulicz-Radecki F Zentralbl f Gynäk 46: 1718 1923
- Wiemann O Arch f klin. Chir 195: 471 (Sept.) 1923
- Williams H. O Lancet 1: 931 1908
- Williams P F Am J Obst. & Gynec. 19: 128 1930
- Woolsey J H. J A. M. A. 89: 2245 (Dec 31) 1927
- Zamorani V Prat. pediat. 5: 499 (Oct.) 1927

## PASTEUR AND KOCH SHOWED THE WAY

Of these two, only Koch was a physician, Pasteur being a chemist. Pasteur showed that fermentation and putrefaction were due to the action of living microorganisms reproduced from similar preëxisting forms. This discovery marked the end of the belief in the theory that germs of disease can develop spontaneously from non-living matter. Based on this, it was possible for these pioneers and others to demonstrate the relation of a microorganism to a specific infectious disease in man and animal.

Soon after Pasteur's remarkable discoveries, enthusiastic but uncritical workers claimed to have discovered the causative germs of many prevalent diseases, among them the "germs" of smallpox, scarlet, cancer, etc. Fortunately, Koch formulated four postulates which he insisted must be met before a germ can be accepted as the essential cause of a disease.

First, said Koch, in order to prove that a certain microbe is a cause of a certain disease it must always be associated with the disease. Secondly, we must completely isolate this microbe from the diseased organism and grow it outside the body in a pure culture. Thirdly, when a healthy susceptible animal is inoculated with this pure culture, the germ must always produce the disease.

Fourthly, the germ should be recovered from the animal so infected, and grown in pure culture outside the body. It was the insistence on these postulates which permitted the establishment of bacteriology as a science.

The discoveries of these two men put public health on a scientific foundation. They gave a tremendous impetus to the study of germs and, together with others who followed, furnished exact knowledge concerning the causative agents of a number of important communicable diseases.

While many of the important theoretical contributions to the field of modern public health have come from England, France and Germany, many of them were first applied on a large scale in this country. Thus, antitoxin, while first produced in Europe, was perfected and applied in this country on a larger scale than anywhere else. The tubercle bacillus was discovered by Koch but the dramatization of this great discovery was made in America, so that Koch, on the occasion of his visit to the New York City Health Department in 1908 said, "Most of these bacteriological and serological discoveries have come from Germany. For my part I must admit with shame that we in Germany are years and years behind you in their practical application. You have done marvelous work." — *Neighborhood Health*, Vol 1, No 1 June-July, 1935

# The Massachusetts Medical Society

## SECTION OF TUBERCULOSIS

Ball Room Assembly, Hotel Statler, Boston, June 5, 1935, 9 A.M.

### PRESIDING

Donald S. King Boston Chairman  
Olin S. Pettingill, Middleton Secretary

**CHAIRMAN KING** It is difficult to arrange every year an interesting program on one disease. In the past few years attention has been given to treatment, so this year we thought you would be interested in a symposium of Differential Diagnosis. As you will see we have had to call heavily on the roentgenologists but this is natural in view of the

fact that we are so dependent on the x-ray examination. Dr. Sosman has come from the Peter Bent Brigham Hospital to present the first subject, Differential Diagnosis of Pulmonary Tuberculosis and Carcinoma."

We will reserve discussion of the papers until the end of the Symposium and go on to the second paper on Differential Diagnosis of Pulmonary Tuberculosis and Abscess and Bronchiectasis.

Not submitted for publication.

## BRONCHOSCOPY AND THE DIFFERENTIAL DIAGNOSIS OF TUBERCULOSIS, LUNG ABSCESS, AND BRONCHIECTASIS\*

BY G. ARNOLD RICE, M.D.†

**A** CAREFUL history and physical examination together with x-ray and laboratory examinations will in a great many cases suffice to make a diagnosis of tuberculosis and lung abscess. Regarding bronchiectasis it is necessary also to add bronchography. Demonstration of bronchiectatic cavities is best made bronchoscopically, for to instill lipiodol supraglottically may be said to be a hit or miss method as it is necessary in many cases to remove pus, granulation tissue and debris through the bronchoscope before instilling the lipiodol to obtain a more complete and true picture of the situation. It may also be necessary to inspect the bronchi and bronchial openings for stenosis, tumor or foreign body and in some instances to obtain a specimen for examination.

Occasionally there are cases where usual methods of diagnosis are somewhat uncertain and bronchoscopy is of value in making a more definite diagnosis. The following cases are illustrations.

**CASE 1.** Male, forty nine years of age. Nine months before this picture was taken the patient began to have cough but no hemoptysis, and expectoration was very little and consisted of white thin frothy material. He had progressive loss of weight and strength. For five weeks prior to our seeing him he was in a neighboring general hospital. Numerous sputum examinations showed no tubercle bacilli. The patient left against advice with no diagnosis made and came to us for diagnostic bronchoscopy. This was done. A curved flexible tip aspirator was inserted in the right upper lobe bronchus and a few cc. of pus were aspirated. Direct smear showed numerous tubercle bacilli.

**CASE 2.** This patient was admitted to Rutland State Sanatorium in extremely poor condition. After

study the staff at this institution decided that the patient had definite evidence of tuberculosis which at this time was not active and that she was suffering from something other than tuberculosis. Numerous sputum examinations showed no tubercle bacilli. In their opinion the clinical picture was more consistent with sepsis than tuberculosis. She was referred to us with a tentative diagnosis of bronchiectasis. Much pus was aspirated from the left lower lobe bronchus then the bronchiectatic cavities seen here were filled with lipiodol. This picture taken about six weeks later shows definite evidence of active tuberculosis and at this time the sputum was positive for tuberculosis. This is a case of tuberculosis and bronchiectasis occurring in the same individual and at the time she was admitted to Rutland State Sanatorium she was suffering from sepsis due to blocked drainage of bronchiectatic cavities and later active tuberculosis.

**CASE 3.** The patient, seven years of age, has had no cough. General physical condition below par. A lung specialist was consulted for examination prior to tonsillectomy. The patient is a contact case, for the mother died of pulmonary tuberculosis. X-ray of chest had been taken in Boston nine months ago and a shadow was seen in first film at the time and no diagnosis was made from the film. Referred to us for diagnostic bronchoscopy. Flexible tip aspirator was passed into the right middle lobe bronchus and about 20 cc. of thick foul-smelling pus was aspirated. Direct smear showed spirilli fusiform bacilli streptococci and staphylococci few gram negative diplococci and no tubercle bacilli. Guinea pig was inoculated. At this point evidence is strongly in favor of diagnosis of lung abscess. However two weeks later the guinea pig died and autopsy showed it to be riddled with tuberculosis. A second film taken the same day shows increased ventilation of lung area involved.

**CASE 4.** A patient twenty two years of age normal weight 117 pounds had "the gripe" in September 1933 with high temperature for two weeks and at the end of this time the skin of her entire body was desquamated. She was admitted to a general hospital April 20 1934. Six weeks prior to this time she presented typical symp-

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\*Rice, G. Arnold—Bronchoscopy, Rutland State Sanatorium, Rutland, Mass. For record and address of author see "This Week's Issue," page 102.

toms of hyperthyroidism, with weight on admission ninety five pounds, basal metabolic rate plus 69 per cent, and the diagnosis of hyperthyroidism was made and she was put on Lugol's solution as preparation for thyroid operation. She was transferred to the surgical service on May 7, 1934 after giving consent to operation. On the same day, she began to run a temperature from normal, where it had remained since entering, to 101 degrees. Within three days the temperature was 105 degrees and she had developed cough. She remained very sick until the time of discharge, May 18, 1934. During this time, several x-rays were taken and no definite diagnosis was made by the roentgenologist. Two days prior to discharge she had a maculopapular pinkish rash, from ankles to neck, the consulting dermatologist was non-committal. White counts from May seventh to eighteenth ranged from 6,500 to 7,250, differential counts normal, Widal test negative, stools negative, urine normal, tests for undulant fever and typhus fever negative, negative throat smears, Wassermann and Kahn tests negative. Blood culture showed no growth. The patient was discharged against advice with diagnosis of hyperthyroidism and dermatitis of unknown origin.

She entered another hospital August 7, 1934 after having remained at home desperately sick since May 18. After a few days' stay in this hospital, where sputum examination was reported negative for tubercle bacilli and diagnosis of tuberculosis was made from interpretation of x-rays, she was discharged unimproved, diagnosis hyperthyroidism and pulmonary tuberculosis. Referred to Holden District Hospital August 17, 1934 by Dr. William B. Davidson of Worcester with tentative diagnosis of hyperthyroidism and lung abscess, right upper lobe, and request for diagnostic bronchoscopy. Weight 78 pounds, temperature 102°, pulse 130, patient extremely thin and emaciated. Flexible tip curved aspirator inserted in right upper lobe bronchus and about 20 cc thick, yellow foul smelling pus was aspirated. Direct smear showed organisms usually found in lung abscess and no tubercle bacilli. Guinea pig was inoculated. More bronchoscopies were done on September 1, 30, and Octo-

ber 10. She appeared to receive a tremendous benefit from these bronchoscopic aspirations. By November, 1934, she was symptom free and had gained sixteen pounds. Guinea pigs inoculated with material obtained directly from the bronchus after each bronchoscopy, revealed no lesions of tuberculosis. Patient continued to gain in weight and strength and examination of May 15, 1935 showed her to feel perfectly well. Weight 123 pounds, six pounds more than her usual weight prior to her illness, basal metabolic rate plus 15 per cent. Diagnosis—Lung abscess, hyperthyroidism possibly due to sepsis. First film taken day before first bronchoscopy and the second about seven weeks later.

CASE 5. Patient twenty one years of age had been an invalid for five years, much cough and profuse expectoration, four to five sputum boxes in twenty-four hours. Hemoptysis many times from few teaspoonfuls to twelve or fourteen ounces. Referred for diagnostic bronchoscopy. Plain film shows nothing definite. He had had some fifty sputum examinations, all negative for tubercle bacilli. Treated for tuberculosis in several localities. After aspirating about four ounces of thick, foul smelling pus, cavities seen in this film were filled with lipiodol. Several specimens taken directly from the cavities at different intervals through the bronchoscope failed to show tubercle bacilli in direct smear, and no lesions of tuberculosis were found in inoculated guinea pigs. Diagnosis Bronchiectasis.

CHAIRMAN KING. I am sure, as the program is proceeding you will realize there are difficulties in Differential Diagnosis, and I am glad that Dr. Lord is going to discuss this Symposium.

The third paper is by Dr. Zacks, on "Silicosis."\* We have all encountered this problem of Differential Diagnosis.

I do not know how much Dr. Hampton knows about "Nontuberculous Fibrosis" today. Before he started to write this paper he thought he knew a good deal, but I understand that as the days have gone by he has become more and more discouraged. I shall be interested in knowing just what his present conclusions are.

\*Not submitted for publication.

## PROGRESSIVE IDIOPATHIC PULMONARY FIBROSIS ASSOCIATED WITH EMPHYSEMA\*

BY AUBREY O. HAMPTON, M.D.†

AS the title of this paper indicates, we wish to discuss a series of cases of chronic pulmonary disease about which little is known. This presentation is a preliminary report of some work which your Chairman, Dr. Donald S. King, and I are pursuing. These cases are presented at this time because they are often misinterpreted as pulmonary tuberculosis. Various other clinical diagnoses are made such as asthma, bronchiectasis, heart disease, malignancy and pneumoconiosis. In view of the confusing nature of these pulmonary diseases under discussion we

will show only those cases which have had post-mortem examinations. Unfortunately, even a complete pathological examination does not allow accurate classification but most of the post-mortem findings are similar and are characterized by diffuse interstitial fibrosis, distortion and dilatation of the bronchi, diffuse emphysema and in the advanced cases emphysematous blebs.

The pulmonary changes seen at the routine x-ray examination which are due to idiopathic fibrosis are quite similar to those seen associated with tuberculosis. The chief difference is that usually tuberculosis is more localized and less likely to involve the entire lung fields. Fibrosis, however, may occur locally in both infra-

\*Read at the Annual Meeting of the Massachusetts Medical Society Section of Tuberculosis June 6, 1935.

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clavicular regions and as in the case of pneumoconiosis the upper lobes are quite commonly involved. Emphysematous blebs add to the confusion of the x ray picture in that they are often quite similar to the cavitation of tuberculosis. Pleural thickening and even pleural effusion are also common. The thin walled dilated bronchi and confluent emphysematous alveoli which occur often produce a diffuse honey-combed appearance on the radiograph. This picture is rarely seen in tuberculosis, and there are certain other helpful differential points in the roentgen examination which are obtained only by fluoroscopy and oblique and lateral radiographs. In brief they are tabulated as follows

in a hospital for several months. At about this time the patient became aware of marked palpitation on exertion. This was accompanied by a dull precordial ache and marked cyanosis on exertion. Six weeks before entering the hospital the patient's ankles began to swell. For some time the swelling was general but later a new type of swelling developed. The new type involved different parts of the body at various times such as the feet, legs, thighs, back, abdomen and face. These swellings came up rapidly over a period of several hours. The swelling was red, sensitive and there was also a tingling sensation. Accompanying this new form of swelling was a steady non-radiating gnawing moderately severe mid-epigastric pain. This pain was unrelieved by food or soda and there was no gas, nausea or vomiting or change in bowel habit. The patient was a semi-invalid for years and remained in bed for the past two months.

#### IDIOPATHIC FIBROSIS

1. Interstitial fibrosis usually diffuse but may begin in infracavicular regions
2. Progressive until death—3-30 years
3. "Honey-combed" appearance of entire lung
4. Emphysema diffuse with cavities in apices, bases and anterior lung tips
5. Cavities thin walled usually multiple and mold to each other. Adjacent lung tissue likely to be clear
6. Cavities usually not demonstrated in posterior anterior view of chest but strikingly plain in oblique and lateral views
7. Diaphragmatic outline and excursion usually abnormal. Rapid full downward excursion slow shallow upward excursion. Heart, mediastinum, trachea and main bronchi may increase in size at sudden forced inspiration. Diaphragm symmetrical high if fibrosis predominates low if emphysema is most marked

#### PULMONARY TUBERCULOSIS

1. Fibrosis usually localized
2. X ray shadows may become less marked or disappear
3. Rarely if ever "honey-combed"
4. Emphysema localized and cavities usually central or posterior
5. Walls of cavities usually relatively thick, do not "mold" and adjacent lung tissue dense.
6. Cavities best demonstrated in routine posterior-anterior views
7. Diaphragmatic outline may be abnormal but excursion usually fairly normal. Expiration and inspiration equal. No change in heart, trachea and mediastinum except shift to affected side. Position of diaphragm usually asymmetrical and varies, dependent upon the extent of the disease

The clinical aspects of idiopathic pulmonary fibrosis may best be presented by the detailed report of a case history of a typical example, but before we present this case it might be well to compare the radiographic and pathological findings in the twelve cases we have collected.

G. C. (10391). A fifty-one year old housewife admitted with complaint of bronchial asthma with wheezing and nocturnal dyspnea for twenty six years. The past history revealed that the patient had had rheumatic fever thirty years before which was not followed by any known sequelae. She had pneumonia in childhood and pleurisy at some indefinite time. The past history is otherwise irrelevant. At the age of fifteen twenty-six years before entry the patient began to have wheezing with difficult inspiration and expiration, dyspnea and nocturnal orthopnea. These symptoms persisted to the time of admission and gradually became more marked. The "asthma" was present the year around regardless of geographical location although it was worse at some times than at others. Morphia was begun at onset and was occasionally used for some years. At the time of admission it was being used daily in doses of  $\frac{1}{2}$  grain with only partial relief.

Three years prior to entry the patient had frank hemoptysis on several occasions, severe night sweats, dyspnea and orthopnea, as well as persistent cough. A diagnosis of pulmonary tuberculosis with multiple abscesses was made and the patient was treated

The family marital social and occupational histories are noncontributory. A physical examination revealed a chronically ill and apparently worried middle-aged female. There was marked dyspnea and orthopnea. The lips were cyanotic. Cervical veins were distended the liver was very large and tender and there was massive pitting edema of the legs. The chest findings were interpreted as extensive pathology compatible with advanced tuberculosis.

**Laboratory Findings.** There were no significant findings in the blood, urine or sputum. The red cell count was 5.3 millions and the leukocyte count was 13.5 thousands. Many sputum examinations at two hospitals were negative for tubercle bacilli or other specific organisms.

**Postmortem Examination by Dr. Tracy B. Mallory.** Pleural Cavity. Contains approximately 1 liter of straw-colored fluid. Both apices fairly adherent by means of thick fibrous bands to the parietal pleura. Left lung is fastened throughout its length in the axillary line by fibrous bands.

**Lungs.** Except for lower portion of right lower lobe the whole anterior surface of the right lung is made up of emphysematous bullous blebs of various sizes the largest blebs measuring 5 cm in diameter. No blebs are seen in the left lung at this stage.

After removing the lungs from the chest the emphysematous blebs observed on the right are found to make up the middle portion of the upper and middle lobes, having covered the lateral portions when in situ. Small bullae are observed on the

(Slides were shown here)



FIGURE 1a G C 10391 The posterior anterior view demonstrates cavities in left apex and infraclavicular region closely resembling tuberculosis. The large thin-walled cavities in the right apex and at the left base are more typical of emphysematous blebs. The heart is markedly enlarged and the mottling in both lung fields is due chiefly to fibrosis. There is some fluid at both bases.

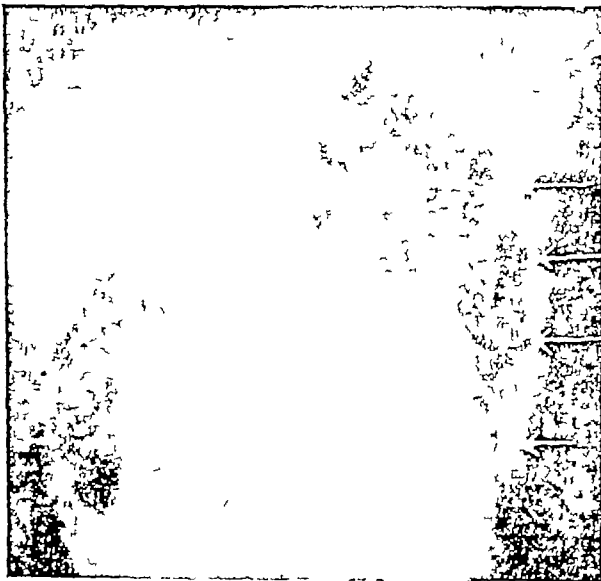


FIGURE 1b G C. 10391 In the left oblique view numerous large blebs are demonstrated in the anterior margin of the right lung. These shadows are not seen in figure 1a because of their location and physical characteristics. The walls of these cavities are thin and mold to each other.

diaphragmatic surface of the left lung. Both upper lobes are moderately firm, grayish blue, and on cut section show moderate fibrosis with cavitation on the left side, the largest cavity measuring 1 cm in diameter. No cavities are present on the right side. All the interlobar spaces are obliterated by fibrous adhesions. The rest of the lung tissue is very slightly crepitant and dark grayish blue in color.

Microscopic Study of ninety sections from varying areas of all four lobes presents a very compli-

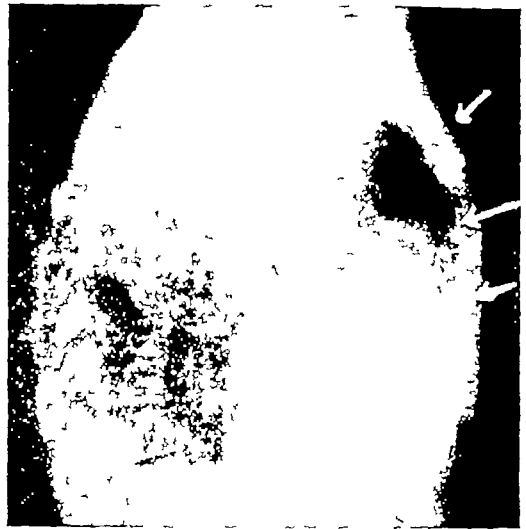


FIGURE 1c G C 10391 In the lateral view the subasternal area is seen to be composed of numerous superimposed large and small blebs. The anteroposterior diameter of the chest is above normal.

cated picture. Emphysema with enlargement of alveolar sacs up to 2.3 mm is present in all lobes, but is most marked in the two upper lobes, where sacs 0.5 cm in diameter are numerous, and less marked in the right lower lobe. Also scattered throughout all lobes, approximately in proportion to the amount of emphysema, are focal scars, varying from 1 mm to 2.5 cm in diameter, the majority averaging 2-4 mm. With the elastic tissue stain it is evident that these consist of completely collapsed alveoli with collagenous obliteration of their lumina. A scar 2 mm in diameter shows the obliterated shadows of 40-50 alveoli, so that marked focal shrinkage of the pulmonary parenchyma must have occurred with corresponding "Raumverschiebungen" (Loeschke), and nowhere in the lungs are any lesions suggestive of tuberculosis found. In general, emphysematous dilatation of the alveoli is most marked in the immediate neighborhood of the areas of scar tissue. Throughout the lung there is no diminution in the elastic tissue, except in the walls of the largest scars. For the most part, even in definitely emphysematous alveoli, it appears increased rather than diminished.

The bronchi show a definite narrowing of their lumina. This is most marked in bronchi from 2.7 mm in external diameter, where the lumen is 35 per cent of the external diameter (normal 50 per cent). The bronchioles below 2 mm in diameter show no narrowing, and in fact, are frequently somewhat dilated. Only in one area in the left upper lobe is significant dilatation of larger bronchi noted. In these bronchi the muscle tissue is greatly diminished and in a few sections is almost totally absent. The muscularis of the remainder of the bronchi throughout all lobes is notably increased in thickness, running from two to three times normal and corresponding with the findings in paroxysmal asthmatic deaths. The bronchi down to 2 mm in diameter are for the most part free from exudate, though the bronchioles fairly uniformly contain mucus, and frequently large numbers of polymorphonuclear leukocytes and epithelial cells of the larger bronchi show only a low proportion of goblet cells, though the mucous glands of the submucous layer are unusually large, their ducts dilated, and a high percentage of cells active. However, the secretion within the cells and in the ducts is of a thin, apparently watery, consistency, quite different from the marked

*ly basophilic secretion of the usual asthma case.* The epithelial basement membrane is irregular in thickness for the most part showing only slight increase in width and moderate hyalinization but in some bronchi the thickening is of extremely marked degree. Eosinophilic infiltration is entirely lacking. Lymphocyte and plasma cell infiltration is present in relatively slight degree in the subepithelial tissues, more marked but still not intense in the stroma of the glands. A slight diffuse edema of the bronchial tissues is present. A marked brown pigmentation of the bronchial cartilage is noted. The arteries of all sizes show marked changes. In the larger elastic arteries atheromatous deposits are present, but relatively subordinated to a very marked fibrous intimal thickening which is rarely absent in any section and often is great enough to reduce the calibre of a vessel by fifty per cent. Leading

from the elastic arteries are arteries of muscular type typical of systemic vessels rather than of pulmonary ones in their well-developed muscularis. Finally the arterioles show a uniform thickening of their walls with intimal proliferation and some degree of hyalinization. The veins are not abnormal.

Heart Weighs 400 grams. There is marked hypertrophy in the right ventricle the wall measuring 14 mm. The left wall measures 10 mm.

CHAIRMAN KING We have to arrange for a Nominating Committee and may I ask that the Committee sometime in the next half hour nominate the officers for the ensuing year.

The next paper which we have is entitled 'Mycotic Infection of the Lungs in the Differential Diagnosis of Pulmonary Tuberculosis' by Dr. Bakst.

## MYCOTIC INFECTION OF THE LUNGS IN THE DIFFERENTIAL DIAGNOSIS OF PULMONARY TUBERCULOSIS\*

BY HENRY J. BAKST, M.D.†

DESPITE the fact that fungi have been recognized as organisms pathogenic to man since the latter half of the nineteenth century, their incident diseases form a general group of ill defined and poorly recognized clinical entities over which considerable confusion and controversy still exist. Much of the difficulty is unquestionably due to the ability of the various fungi to cause pathological changes which are practically indistinguishable from those of bacterial origin particularly tuberculosis. A fair portion of the responsibility, however is also due to inadequate mycological study. It is to be expected that with the more widespread recognition of the importance of fungi as the causative factors of disease, sufficient interest will be awakened to necessitate the development of a more simplified groundwork for the support of clinical observation.

In the course of any confusing clinical investigation a return to fundamental principles of observation invariably results in a clarified view of what has previously been vague and complex. In our consideration of the pulmonary mycoses let us discard for a moment, the complex terminology, and widen our focus from a narrow view of the pulmonary pathology to a broad consideration of the patient as a whole. This will present a series of fundamental clinical pictures which we hope, will be of considerable aid in the differential diagnosis of pulmonary tuberculosis.

In order to differentiate these conditions on a clinically practical basis, a classification proposed by Watkins a few years ago is utilized.<sup>1</sup> The fungi are divided into three groups. The first group consists of the filamentous forms,

the second is made up of the yeast like organisms, and the third represents the more complex types.

In the first group we have such organisms as actinomycetes, coccidioidomycosis, vibriothrix, cladothrix, leptothrix, and anaeromycetes. Since this group has been demonstrated as being biologically related to the tubercle bacillus<sup>2</sup>, it is not surprising that they should produce a disease which is practically indistinguishable from tuberculosis. This is particularly true of the streptothrix which stains with a variable degree of acid fastness and produces a disease picture which is essentially pulmonary in nature.

If we may accept pulmonary actinomycosis as the disease characteristic of the first group, a clear differentiation of it and pulmonary tuberculosis may be drawn.

Our patient may present the familiar picture of loss of weight, cough, hemoptysis, night sweats and fever. The mycotic infection, however, usually involves the basal or hilar portions of the lung.<sup>3</sup> Cavity formation is much less marked than in tuberculosis and abscess formation is a frequent finding. In its tendency to spread by contiguity, with marked fibrosis and disregard of anatomical boundaries, the process may at times resemble a neoplasm rather than tuberculosis.<sup>4</sup> The lesion often spreads through the diaphragm and over 80 per cent of the cases show the presence of a sinus draining through the anterior chest wall. Persistent chest pain is almost an invariable symptom. More than half the cases have a cutaneous lesion, and the lymph nodes are rarely involved. A slight to moderate leukocytosis is frequently present.<sup>5</sup> Definite proof of the etiological factors of the disease process is obtained by microscopic examination of the pinhead sized yellow, or so-called sulphur gran-

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ules, present in the sputum or pus. With actinomycosis, a gram stain will demonstrate the presence of a tangled mass of blue threads surrounded by red clubbed ends.<sup>5</sup> A Ziehl-Neelsen stain, in the case of streptothrix, will reveal a loose network of filaments of variable acid-fastness sometimes presenting a granular appearance.<sup>2</sup>

The yeast-like organisms included in the second group consist of those which reproduce by means of thallospores, such as blastomycosis, torula, monilia, oidium and oospora, and those which reproduce by means of ascospores such as saccharomyces, willia, endomyces and coccidioides.

The characteristic features produced by the blastomyces have been adequately described by Stober<sup>7</sup> and Wilhelmj.<sup>8</sup> Their observations showed it to be a disease primarily affecting young adults subject to exposure, or employed in manual labor. The symptoms of loss of weight, cough, purulent (often bloody) sputum, and chest pain almost always date from a history of upper respiratory infection.<sup>9</sup> The outstanding features are those of pyemia with irregular fever, chills, and sweats.<sup>8</sup> The skin and subcutaneous tissues are often excessively undermined by large abscesses. Most important is the realization of the fact that 95 per cent of the cases show evidence of skin involvement which may vary from small pustules to large abscesses which break down to form chronic granulomatous lesions.<sup>8</sup> Bone and joint destruction has been found to occur in over two thirds of the cases, and may be expected to take place in almost any part of the skeletal system.<sup>10</sup> Over one third of the cases may show evidence of kidney involvement.<sup>8</sup> A blood examination will usually reveal the presence of a moderate leukocytosis.<sup>9</sup>

It is obvious that the diagnosis of blastomycosis should be considered<sup>7</sup> in any patient presenting the triad of chronic pulmonary, bone, and skin lesions.

The addition of 10 per cent sodium hydroxide to the pus or sputum, examined freshly, will demonstrate the presence of yeast-like budding forms 10 to 30 micra in diameter with doubly-refractile contours.<sup>11</sup>

Coccidioidal granuloma gives rise to a clinical picture practically identical with that of blastomycosis.<sup>12</sup> It occurs primarily on the west coast.<sup>13</sup> The cutaneous lesions show a greater tendency toward ulceration, and more marked lymph node involvement occurs. The presence of suppurative orchitis is considered to be a diagnostic lesion by Cummins who reviewed the 200 deaths resulting from this disease between the years 1892 and 1929.<sup>13</sup> Since inoculated guinea pigs show early evidence of involvement, this predilection for testicular tissue provides a valuable diagnostic measure.<sup>14</sup>

Recently at the Boston City Hospital we

have had the opportunity to observe several cases of pulmonary infection associated with monilia<sup>15</sup>, a disease originally described by Castellani in his observations on "tea taster's cough" in Ceylon.<sup>16</sup> Unfortunately moniliasis has not, as yet, been generally accepted as a cause of primary pulmonary disease. This is probably due to the frequent occurrence of monilia as a secondary invader, and also, to a lack of adequate investigation of that group of cases of tuberculosis in whom the presence of acid-fast bacilli is never demonstrated. Because of the lack of an adequate number of reported cases, it is difficult to gather information which will allow differentiation of this disease and tuberculosis on a purely clinical basis. Aside from the fact that the pulmonary lesions occur, as a rule, at the base of the lung, and tend to leave the apices clear, little can be said to distinguish it from an acid-fast process. It is a diagnosis which must rest chiefly on the adequate demonstration of these organisms in the sputum, and the persistent absence of acid-fast bacilli, together with evidence of their pathogenicity.

The third group of mycoses consists of the more complex fungi such as aspergillus, penicillium, acremonia, mucor, rhizomucor, leichtheimia, sporotrichum and alcaidum. Here again we are dealing with a group which is probably most frequently found in the capacity of a secondary invader. Here also, we must depend on the demonstration of the organisms in the absence of acid-fast bacilli. A case followed in France for twenty-seven years with clinical tuberculosis, but with acid-fast bacilli absent from the sputum persistently showed the presence of aspergillus.<sup>17</sup> Another similar case, studied for ten years, showed the invariable presence of penicillium in the sputum.<sup>18</sup>

Therefore, to summarize briefly, we must recognize in distinguishing mycotic infections from tuberculosis, the necessity for a consideration of the patient as a whole. Confusion will invariably result from a point of view which is narrowly focussed on the presence of pulmonary pathology. The atypical location of the pulmonary lesion, a discharging sinus in the chest or neck, the concomitant presence of dermal or joint lesions should invariably lead to a suspicion of mycotic infection. Proof, however, must depend on the actual demonstration of the organisms in the sputum or pus.

#### REFERENCES

1. Watkins W. W. Fungus infection with special reference to the lungs. *Southwestern Med* 16: 103 (March) 1932.
2. Claypole E. J. On the classification of the streptothrices particularly in their relation to bacteria. *J. Exper. Med* 17: 99 (Jan) 1913.
3. Foulerton, A. G. R. The streptothrichoses and tuberculosis (Mifflay lectures). *Lancet* 1: 551 (Feb 26) 1910. *Ibid* 1: 626 (March 5) 1910. *Ibid* 1: 769 (March 19) 1910.
4. Lord F. T. Discussion of the diagnosis in a case of primary pulmonary actinomycosis. *M. Clin. N. Amer* 8: 1485 (March) 1925.

8. Christison, J. T., and Warwick, M. Actinomycosis of lungs and suprarenals. *J. A. M. A.* 89: 1943 (Sept. 26) 1917
9. Besser, H.: Actinomycosis of the lungs simulating tuberculosis. *New York M. J.* 117: 523 (May 16) 1912.
10. Stober, A. M.: Systemic blastomycosis. *Arch. Int. Med.* 13: 509 (April) 1914
11. Wilhelm, C. M.: The primary meningeal form of systemic blastomycosis. *Am. J. M. Sc.* 109: 713 (May) 1916
12. Brookner, W. R., Jr. Blastomycosis of the lung. *South M. J.* 28: 412 (April) 1925
13. Avery, J. P.: Report of a case of pulmonary blastomycosis. *Journal Lancet.* 51: 89 (May 1) 1931
14. Mader, O. D., and Hammack, R. W.: Systemic blastomycosis. *California and West. Med.* 32: 87 1920
15. Hektoen, L.: Systemic blastomycosis and coccidioid granuloma. *J. A. M. A.* 49: 1071 (Sept. 8) 1907
16. Cummins, W. T., Smith, J. K., and Halliday, C. H.: Coccidioid granuloma. *J. A. M. A.* 63: 1048 (Oct. 5) 1922
17. Dickson, K. C.: Mimicry of tubercle lesion by coccidioid granuloma. *Tr. A. Am. Phys.* 44: 34 1929
18. Bakst, H. J., Hazard, J. B., and Foley, J. A.: Pulmonary mycetozoa. *J. A. M. A.* 102: 1208 (April 14) 1924
19. Castellani, A.: Observations on the fungi found in tropical bronchomycosis. *Lancet.* 1: 12 (Jan. 5) 1912.
20. Macaigne, et Nocard: Recherches sur la spore-germination dans l'aspergilliose pulmonaire. *Compt. rend. Soc. de biol.* 95: 44 (Feb. 25) 1917
21. Ibid. Recherches sur les réactions antigéniques dans l'aspergilliose. *Intradermato-réaction et réaction antigénique focale.* *Compt. rend. Soc. de biol.* 96: 446 (Feb. 25) 1917
22. Alford, P., Gressat, P., et Kresner, H.: Mycose pulmonaire à "penicillium crustaceum" avec signes cliniques et aspect radiologique dabcès du poumon. *Presse méd.* 41: 761 (May 10) 1932

CHAIRMAN KING: The final paper is by Dr. Paul D. White on "The Differential Diagnosis of Pulmonary Tuberculosis and Pulmonary Circulating Changes."

## THE DIFFERENTIAL DIAGNOSIS OF PULMONARY TUBERCULOSIS AND PULMONARY CIRCULATORY CHANGES\*

BY PAUL D. WHITE, M.D.†

ON April 10 1934, a coal miner twenty five years old was admitted to the Heathfield Sanatorium in Scotland for observation. The history of the case presented by Drs. James Grant and John Miller of Ayr was as follows:

There had been excellent health until a cough developed in January three months earlier.

"Gradually some dyspnea on exertion became apparent in the following months but he was able to walk about. On April 3rd he suffered from acute hemoptysis of bright red blood and his medical attendant had his chest examined by x rays the following day and sent him with the film to the tuberculosis dispensary.

"The patient at examination on April 5th was a healthy looking vigorous adult with a slightly pale countenance. He was a little feverish the temperature being 98.9° F and the pulse rate 96. Apart from some crepitations in the left axilla, system examination revealed no abnormality. The skiagram of the chest showed rather a large heart shadow with increased density of lung shadow in the mid zone of the left lung. Sputum examination failed to reveal tubercle bacilli. The family history was good all near relatives being alive and well."

Under observation during the next few months he remained free of fever except for a few days in August when he showed dullness and pleural friction rub at the left lung base. For months he raised sputum daily at times blood-tinged. His heart increased in size and a systolic murmur appeared at the apex.

On August 28th the patient began to go downhill. He expectorated blood in the sputum, at first a tinge only but later copious quantities of bluish-red frothy blood. The skin and conjunctivae became jaundiced cyanosis was very evident, and the liver enlarged and was painful. The heart dullness was much enlarged in all directions the apex beat being scarcely perceptible and the cardiac sounds of very poor quality. A further x ray examination was made the following day. The film of the chest showed a colossal increase in size of the heart shadow and an upward bulging of the liver shadow.

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†White, Paul D.—Physician Massachusetts General Hospital, Boston. For record and address of author see "This Week's Issue," page 1202.

Two days later there was slight anasarca, and the blood pressure was 70/64. The urine revealed no abnormal constituents in solution or suspension a feature maintained throughout the Wassermann reaction was not done.

The patient began then to complain of stranguation and on account of a tentative diagnosis of pericardial effusion an attempt was made on September 2nd to perform paracentesis of the pericardium. No fluid was obtained but owing to the evident distress of the patient the attempt was not persisted in. Thereafter the patient became more dropsical cyanosed and breathless and died fairly suddenly on September 6th.

Postmortem examination revealed generalized edema, double hydrothorax, a small pericardial effusion of 6 to 8 ounces, no tuberculosis, extreme chronic venous congestion (brown in duration) of the lungs a somewhat enlarged liver with the characteristic nutmeg appearance of chronic congestion, and a markedly dilated heart with normal valves, but atheromatous occlusion of the anterior descending branch of the left coronary artery with a large fibrosed atrophied area (infarction) in the anterior apical portion of the left ventricular myocardium with partially organized laminated clot attached to it inside the ventricle.

Such a mistake in diagnosis should of course not be made. Fortunately such a mistake can not be made often because of the great rarity under the age of thirty years and even under the age of forty years of serious coronary disease with thrombosis followed by extensive myocardial infarction and left ventricular failure with pulmonary vascular congestion. Except for the age of the patient the clinical picture is, however, quite common, that is, pulmonary edema in acute or chronic form with or without the raising of blood, secondary to left ventricular failure due to coronary thrombosis. The more important points of differentiation from pulmonary tuberculosis are the following: (1) a history, as a rule, of severe prolonged sub-

sternal pain, usually requiring morphine, at some time in the recent past, with or without a history of antecedent angina pectoris, (2) enlargement of the heart (the heart always becomes enlarged after coronary thrombosis before it fails), (3) a characteristically abnormal electrocardiogram pointing to recent coronary thrombosis—a very important sign, (4) x-ray evidence of engorgement of the blood vessels of the lung hiluses with or without engorgement of the smaller vessels extending radially toward the lung periphery, without more extensive involvement of the lung apices (there may be clouding due to pulmonary edema in severe acute attacks of left heart failure) and (5) the preponderance of moist râles at the lung bases if such râles are present—asthmatic breathing with scattered squeaks and groans may be present also when there is an associated cardiac asthma.

Pulmonary vascular congestion from failure of the left ventricle may complicate other types of heart disease besides that resulting from coronary artery obstruction. Most commonly hyperpiesia, or essential hypertension, is the factor behind left ventricular failure in most of the United States of America. The clues that differentiate such a cause of pulmonary edema and phthisis are (1) the history of a considerable degree of high blood pressure over a considerable length of time in a middle-aged or elderly person, (2) the story of dyspnea on effort for at least a few weeks, and frequently of attacks of paroxysmal dyspnea or cardiac asthma, especially at night, (3) the finding of cardiac enlargement, (4) the frequent finding of other special signs of left ventricular weakness, such as gallop rhythm, accentuation of the pulmonary second sound, and alternation of the pulse, (5) the x-ray picture of pulmonary vascular engorgement, and (6) the preponderance of moist râles at the lung bases, if there are any moist râles.

Other occasional causes of left ventricular strain and failure that may give rise to pulmonary vascular congestion are aortic valve disease (stenosis or regurgitation or both) whose presence is indicated by characteristic murmurs, luetic aortitis acting either by narrowing the mouths of the coronary arteries or by producing aortic regurgitation, and acute rheumatic myocarditis in childhood evident as an infectious process causing cardiac enlargement. Incidentally an interesting complication of a very severe acute rheumatic infection may be a hemorrhagic consolidation of the lung. Rarely "pure" mitral regurgitation and coarctation of the aorta may be important factors of strain.

There are three other cardiac conditions besides that of left ventricular failure that may simulate pulmonary tuberculosis in occasional cases. Usually the differential diagnosis is easy

and mistakes should be avoided without much difficulty in every case. These three conditions are mitral stenosis with hemoptysis, aortic aneurysm with pressure symptoms, especially cough, and congenital anomalies, particularly interauricular septal defect with marked dilatation of the pulmonary blood vessels.

Mitral stenosis should be easily distinguished by the finding of its characteristic apical mid-diastolic murmur with or without presystolic accentuation or thrill, but this murmur is often missed by a hasty or inexperienced observer who doesn't happen to listen exactly at the cardiac apex where the murmur is often localized. Useful aids in the rapid detection of the murmur are the use of the bell chest-piece of the stethoscope and auscultation with the patient supine or lying on the left side directly after exercise. Another helpful finding is the so-called mitral shape of the heart by x-ray.

Only rarely does the patient with mitral stenosis cough up blood and only very rarely any considerable amount of blood. When such an event occurs, however, there is a danger of confusion of the condition with phthisis, and first and last a considerable number of patients with mitral stenosis have been treated in sanatoria for tuberculosis. Infrequently phthisis and mitral stenosis occur together in the same case.

Aortic aneurysm may be easily missed without an x-ray. In most cases the Wassermann and Hinton reactions are positive and the subjects are usually men of middle age.

Wide open congenital auricular septal defects are fortunately rare. They give rise to great enlargement of the right heart chambers and massive engorgement of the lung hilus shadows which may be taken for enlarged glands or tumors.

Finally, a word is to be said concerning pulmonary vascular disease not necessarily associated with heart disease. The commonest is thrombosis or embolism with infarction, an acute lesion occurring as a rule as a complication of surgical convalescence or heart failure and difficult to confuse with pulmonary tuberculosis. Sudden chest pain or oppression or dyspnea, often a temporary state of shock, fever, leukocytosis, secondary dilatation of the right ventricle if the obstruction is extensive, pleurisy, and eventually signs of the pulmonary infarct by physical examination or x-ray distinguish pulmonary embolism or thrombosis in most cases. Rarely the thrombosis may be slow in its development, insidious, and difficult to diagnose, especially if it is a terminal event. In any case the blood spitting is only incidental.

A rare type of pulmonary vascular disease is endarteritis obliterans, of unknown cause, resulting eventually in enlargement of the pulmonary vessels and of the right heart chambers and

if extensive, cyanosis. It does not cause hemoptysis. The congestive heart failure if it supervenes is right ventricular, and not shown in the pulmonary circulation. Pulmonary arterial aneurysms are excessively rare and so far as I know have not been confused with phthisis.

Thus, in summary, there are rare cases of pulmonary vascular congestion due to left ventricular failure, of mitral stenosis with hemoptysis, and of aortic aneurysm with cough that

may on first glance be confused with pulmonary tuberculosis, but careful study should easily distinguish them in every case.

## REFERENCE

- 1 Grant J., and Miller J. H. Atheroma of coronary artery and myocardial fibrosis. *Brit. M. J.* 1: 333 (Feb. 22) 1936.

CHAIRMAN KING. Dr Lord has prepared a summary of this Symposium for you.

THE DIFFERENTIAL DIAGNOSIS OF  
PULMONARY TUBERCULOSIS\*

BY FREDERICK T. LORD, M.D.†

MUCH progress has been made in the diagnosis of pulmonary tuberculosis. This is due largely to the development of x-ray technique and a more complete understanding of the clinical aspects of the disease and of the conditions with which it may be confused. Occasional mistakes in diagnosis are inevitable, but their number may be reduced by complete investigation. In discussing the differential diagnosis I would emphasize the importance of the following considerations:

A family history of contact with tuberculosis or other opportunity for contagion may have an important bearing on the diagnosis in doubtful cases.

A past or present history of hemoptysis out of a clear sky is especially suggestive of pulmonary tuberculosis. Exceptions to the tuberculous origin of the bleeding in this group are for the most part due to malignant disease of the bronchi or lung. Though hemoptysis is common in patients with bronchiectasis, I have seen but one instance in which the bleeding was an initial symptom. Other rare causes are the rupture of tuberculous or anthracotic glands into the air passages, and syphilis of the trachea and bronchi. *Echinococcus* disease and *Distoma Ringeri* may also be responsible.

Primary pleurisy with or without an effusion is equal in significance to hemoptysis out of a clear sky in suggesting tuberculosis as a cause. In this group also malignant disease may be a cause of confusion. Primary endothelioma of the pleura is much less common than an apparently primary pleurisy arising by extension from a latent bronchial or pulmonary neoplasm. Examination after fixation and section of the sediment of the pleural fluid obtained after centrifuging may permit a diagnosis of malignant disease. Pulmonary infarction from latent thrombophlebitis may also cause an apparently primary pleurisy but its occurrence

after operation, delivery, or trauma, may serve to suggest this possibility.

Following occupational exposure to silicious dust the diagnosis of pneumoconiosis is not difficult, but tuberculosis develops sooner or later in a large proportion of the cases and recognition of the two diseases combined may be difficult or impossible.

The necessity for repeated examinations of the sputum for tubercle bacilli and other organisms is obvious. I would call attention to the diagnostic importance of the odor of specimens. Expectorated material with uncomplicated tuberculosis is without odor. In the presence of bronchiectasis there is a stale or musty odor in about half the cases. With lung abscess the odor is foul with few exceptions.

The use of tuberculin as a method of screening is of especial value in youth. The diagnostic importance of positive tests diminishes as age advances. The von Pirquet test is subject to an error of about ten per cent, and the test can be regarded as negative only when the intracutaneous method is used with increasing doses up to and including the injection of one milligram of tuberculin.

The leucocyte count has considerable value in differential diagnosis because of the usual absence of leucocytosis in uncomplicated tuberculosis and the abnormal elevation of the polymorphonuclear leucocytes with nontuberculous infection.

Careful attention to the clinical aspects is obviously of importance in differential diagnosis. Primary pulmonary tuberculosis is common in children but may also occur in adults. Diffuse or nodular primary lesions may be located anywhere in the lung and are associated with tracheobronchial glandular enlargement. The onset is insidious, the tuberculin test positive and leucocytosis absent. The outlook is good. There is no significant destruction of tissue. Resolution is slow leaving calcified areas and fibrosis. In this group the principal difficulty is the distinction of such lesion from acute broncho- and lobar pneumonia in which, how-

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## ADDRESS OF DR DAVID L EDSALL\*

MY mind goes back more than twenty-five years to an evening when the Pathological Society of Philadelphia held a celebration of its fiftieth anniversary. After the dinner where there had been a number of excellent speeches, Dr Abraham Jacobi sat with a group of us younger men who were very devoted to him, and spoke with warm approval of the speakers and their ease in after-dinner speaking. He said that all his life he had been afflicted with stage fright, but in the past two years it seemed to be disappearing. He was eighty-one at the time. I thought then what hard luck it was for me to look forward to over forty years of stage fright, but I am quite sure, even if I reach more than seventy-nine years, I should not be able to respond in a calm and adequate way to the kind things, the over-generous things, that I have heard said this afternoon and tonight.

My mind goes back also to twenty-three years ago when I came here. I had just gone through two attempts, in two different cities, at rather radical efforts at progress. Both were largely failures. It was, probably, in part due to mistakes but partly bad luck. I felt, however, very conscious of Napoleon's statement that any one who has been repeatedly unlucky is a poor person to put in charge of things because his previous experience destroys the morale of the organization he has charge of. When I came here I thought people might be suspicious of my personal capacity in carrying anything out when I had had such luck before. I also had in my thoughts the feeling I had always heard, as an outsider, that this was a cold and critical community and very unfriendly to outsiders. Indeed, one very distinguished person, when I was called here, advised me not to "put my head in the lion's mouth." I came and found totally contrary conditions to what I had expected. A year after I came here I was talking over things with a friend who had been in one of the earlier unsuccessful ventures. He asked me many questions and finally said, "With your previous experience you should keep pinching yourself to see if you are dreaming."

I often wondered what the reasons were for the relative ease in getting things accomplished here. I think there are two or three reasons that still stay in my mind as very conspicuous explanations of this. The first one, it seems to me, is exemplified by one of my experiences in practice. In a city where I had lived most of the people I saw who had neurasthenia had it, I thought, because they had no particular interest in anything and didn't take active part

in anything, with the result that they became bored and nervously broken down. When I saw people with similar trouble in Boston, it was because they were following an ideal with such insistence that they exhausted themselves in trying to reach what they were after. When I was in Peking—as it was called nine years ago—an able paper was published on the difference between the East and the West, by Hu Shih, the Chinese philosopher and publicist. He pointed out a variety of differences between the East and the West, and epitomized them by saying that the easterner was quite content to sit by the wayside and watch things go by, but the westerner was filled with a certain kind of discontent, what one of their poets has called a "divine discontent," which impelled him to go on and do better things than he had done before. I have had the feeling from the very beginning that one of the characteristics in this community is that element of divine discontent and the willingness to go on and do better things than had been done before. I found myself at once in an atmosphere where the President of the University, the Corporation of the University, the trustees of the hospitals, and especially the Massachusetts General where I was at work, and everyone else seemed to be striving to get things in better condition and still maintain the traditions that had made the institution what it was. I feel convinced that more than age and more than tradition, the present position of Harvard University, and the great influence that New England has had in the affairs of the nation, have been due to this attitude of divine discontent and the impulse to better things. I met no hostile opposition, except from the occasional "off-horse" that one finds in any organization, but I met much criticism—a nonpersonal, constructive criticism that was based upon dissatisfaction with imperfect things and a desire to make them better, with helpfulness in correcting them.

The other thing that impressed me very much, that many of you who live here may not see quite so clearly, is that in connection with educational, hospital or public affairs of any kind the outstandingly predominating element academically in this community is keenly interested in the one University. In almost all the organizations that I have knowledge of the controlling men are themselves Harvard men and are deeply interested in anything that may benefit Harvard. It has always seemed to me that this is one of the important assets of this University. In other places that I know anything about there is not that feeling. They may have one local university—they often have several—but the community itself is not intensely interested in one place and there are usually as many men there who are alumni of

\*At a dinner held in his honor at the Harvard Club Boston on October 23, 1935 upon his retirement as Dean of the Harvard Medical School and Harvard School of Public Health.

institutions elsewhere as of the local university. There are graduates not only of the local university but almost as many men who are graduates of Harvard, Yale, Princeton or other places, so that their academic interests and academic devotion are very mixed indeed.

Before I came here I had had some unhappy experiences with university administrative officers, university trustees and hospital trustees. I even dallied at times in my thoughts, for my amusement, with the idea that some time I might persuade a benefactor to give a large gift in order that there might be established a school for training university presidents and trustees and hospital trustees. I came to the conclusion that that idea wouldn't work here because it had been so well done already. The corporations that I had known before were bodies that seemed to me—university and hospital trustees both—to be chiefly swayed by the feeling that their job was censorship and restraint. The Corporation of Harvard University on the contrary, is thought by all the Faculty and especially by those of us who have, in administrative positions, had to make many hundreds of recommendations, to be a body that is there in order to encourage and help. The President that I served under most of the time I cannot speak of quite, I think, with calmness. I spent fifteen years serving with Mr. Lowell. Those fifteen years included, of course, many conferences and I never left any conference without a feeling that I had been helped, encouraged, and stimulated in a way that was one of the greatest gifts that I have had in all my active life. I remember well the day he told me he had the previous day given his resignation to the Corporation. I felt at that time as if I were academically orphaned. I think Mr. Lowell never knew when he first asked me to be Dean and I quite flatly refused, one strong reason for my refusal was that I had still that complex about university administrators and I was afraid that Mr. Lowell might be as arbitrary as some others I had known. At the end of fifteen years with him, the only arbitrary acts I knew of on his part were in two or three instances when disagreeable things had to be done and he insisted on doing them himself, because, he said, "Such things are part of the president's job and you have to live with those men." I thought seriously of resigning when Mr. Lowell told me he had resigned. It seemed farer to the new President, whomever he might be, not to precipitate that extra confusion and I decided to wait two years. My two years are now up and I shall always feel very happy that I did not resign earlier, because the past two years with President Conant have been two very happy years of association with him. I have always had the comfortable feeling that Mr. Conant and I were brought up on the same bottle!

My confession of faith in medical education

has, I think, been quite simple. It has been apparently, one that is sympathized with by most of my colleagues, and comes down to three main things. The first is one that I think any body would agree with, namely, that those who lead in any subject in a medical school or in any other part of a university must themselves be not only inspiring persons but they must be constantly adding to the progress of their subject. The second is that I think a medical school must grow continuously and intensively more deeply associated with the general university. Some of the older men present know the conditions when I entered Medicine, but the younger men may not see the importance of this point fully. The training in Medicine is one of the oldest trainings in the world, but it was long only a vocational training and often, in fact, almost a commercial training. Even when I entered a medical school which school was then the most influential in the country, it was true that the fees received from students ran the whole medical school and, in addition to that, it was still possible for the senior faculty to "cut a melon," so to speak, at the end of the year and divide the excess of the amounts that had been received from students and therefore increase their salaries by that bonus at the end of the year. That, I think, shows how far the change has gone. It shows how commercial the point of view was at that time and how far separated from the scholarly attitude of a general university faculty. I have heard much discussion for many years of the reasons why a medical school must be associated with a university. The usual reason given is that there is no chance of getting the money that is needed for the expensive methods of the present day without having the influence and prestige of a university behind any such efforts. There are far more important reasons than this. The practical reasons in education and research are quite obvious I think. The natural sciences have been the background upon which Medicine is built. They have become more and more essential. At the present time they are far more essential than ever before. The social sciences have always been of some degree of importance to Medicine. Psychology has long been important and no one can question that it is getting more and more important in the practice of Medicine. Economics has become so influential in Medicine that we have an Assistant Professor of Medical Economics in the Medical School, welcomed by the Faculty as being a very suitable thing. Sociology as it grows more forceful will be of essential importance. The Engineering School has become a blood brother of the School of Public Health and Public Health and Medicine are Siamese twins. The Business School already has had many associations with the Medical Faculty. I have no doubt that in a very few years there will be active and inter

ested cooperation between the Law School and the Medical School. Those are the practical aspects of it, but a larger aspect than that, I think, is that Medicine has become a scholarly pursuit in all its lines. It must exist in a scholarly atmosphere and not by itself if it is to progress adequately.

The other thing that seems to me to be so important, the third thing, is, what shall be done in regard to the superior student? I think everybody is agreed that an imperative duty in any medical school is to educate all students well and to turn them out to do an excellent job. But there is something more important almost than that. I think any faculty that is a good faculty may be depended upon to do that reasonably well, but the thing that is in my mind always is, what shall be done in regard to the exceptional man? Many years ago, long before any general restoration occurred there, I was in Williamsburg, Virginia, and while there went into the old Bruton Parish Church, which to me is, I think, the most moving place I was ever in in this country—to an American one of the most moving places in the world. They had, in restoring the pews, memorialized those great men who about the same time worshipped there. It is profoundly moving to see the names of George Washington, Thomas Jefferson, James Monroe, John Marshall, Patrick Henry, Edmund Randolph, and others only less great including, particularly, George Wythe the father of lawyers and especially the father of those two great adversaries Jefferson and Marshall, who had, each in his way, such profound influence on our country's great institutions. I question whether one could find anywhere such a galaxy of men of great influence gathered together at about the same time and at a very critical time. The Dean of William and Mary learned that I was there and insisted on my speaking to the students in chapel next morning. There is an old worn tablet in the floor of Bruton Parish Church chancel with the inscription, "Here lie two sweet infants" and after giving names and dates it ends with the simple plea, "God give us grace to follow them." I used that part of the inscription as my text in speaking to the students, thinking, of course, not of the "two sweet infants" but of those great men who had been there and who had initiated so much of the things we care most for in this country. Standing there on the slab that covers the remains of John Randolph in old William and Mary, where most of the men got such academic education as they had (George Washington's was three months in surveying) it was deeply moving to think of the profound effects of the vision, the courage and the powers of leadership of the men who had been there at that time. That gave me to think then, and gave me to think many times since, what a precious thing leadership is and

how far one may well go in attempting to find and develop those who seem to have the germs of leadership. We may all well feel very grateful to President Conant for making such determined efforts to go out and find leaders. But when you get them in your control as students they cannot be put into regular harness and regular routine with other students without great danger of blunting or killing their powers of leadership. Perhaps one of the things that I think is most feared by the conventional teacher is making experiments of this kind. I have seen repeatedly a start made to give great freedom to promising men and then because, in one or two cases, an individual did not do well with, that freedom it was given up with all the fine promising students. It is a gamble, but it is a gamble for very precious results and it is sad to think of a whole group of men, who have powers that are beyond those of ordinary men, being obliged to fall back into lock step with the whole flock because of one or two mistakes that have been made in the choice of men for such privileges. It is one of the responsibilities of the Medical School, or any other part of the University, to provide particular conditions for men who show signs of possible leadership, because of the great value they may prove to have. Since the Great War and since the awful destruction of intelligence that occurred then, it has seemed to me a peculiarly great responsibility, an almost solemn responsibility, to do what we can in this country where we have been relatively little touched by the loss of leaders, and especially during the present disturbed state of the world, to make the best conditions we can for those who may come to be leaders.

These are the things that I have had chiefly in my heart during the time that I have been Dean. I am not in the least desirous that my colleagues or my successor should feel any sentiment about carrying on details that have interested me. I trust that Dr. Burwell and my colleagues will not think that I hope my views will be followed after I have left my post. When a change occurs there must be a change or there will not be progress, but these great principles that I have spoken of are all things that I believe must be followed in order to accomplish the best that can be done. It is a happiness to think that with my successor and with my colleagues all this is in safe hands.

I have no regrets at giving up my work. I meet the relief from responsibility with great pleasure. I have great regrets in cutting the bonds with those I have worked with so long, but I shall have great happiness in one especial thing. When he was about to retire, Billroth who did so much for surgery, so much more than most of us do for any thing, was told by one of his friends that he should be very proud of his accomplishments. Billroth said he thought

little of them, but he did think often of the fact that scattered all over Germany and Austria were students of his, men who had made great names for themselves and men whom he had opportunity to help in some degree in their efforts toward their careers. I am happy to think that there are here in our own institution a large group of men that I have seen grow to leaders in their fields, and scattered over various parts of the country are others whose progress I have had opportunity to further and I shall

have the greatest pleasure in watching them go forward. I shall always look back with the most happy and most affectionate feelings toward the twenty three years that I have spent here and, perhaps, in many ways especially to the seventeen years I have spent in the Dean's work. I shall cherish particularly my association with President Lowell and recently with President Conant, and my intimate and affectionate association with many of my colleagues at the School.

## NEW HAMPSHIRE MEDICAL SOCIETY

### FACTORS IN THE MANAGEMENT OF CONSTIPATION\*

BY FRED ELLSWORTH CLOW, M.D.†

*"Do not fear to repeat what has already been said. Men need these things dinned into their ears many times and from all sides. The first rumor makes them prick up their ears the second registers and the third enters."—LAENNEC*

CONSTIPATION is the commonest single disorder suffered by human beings. Usually it is, like cough in pneumonia, a symptom. The great majority of women are thought to have it, often during the whole life, though in recent years loose clothing and more exercise have apparently decreased its incidence. As a symptom it appears in a very large percentage of histories taken at the bedside and in the office. It is essentially a delay in the evacuation of food residues, bacteria, which make up from thirty to eighty per cent of the stool (Bassler) dead epithelial cells, and chemical refuse. Reichman has described cases in which an evacuation of the bowel took place normally at two and three weeks' intervals. In deciding whether constipation does exist, an arbitrary thought has been that more than two or three days' delay constituted an abnormal state. Perfect health however, is not incompatible with these infrequent defecations, going even to the fifth and sixth days.

A definition of constipation then is not at all times so easy to compose. What to one patient is a normal condition is to the nervous health conscious, apprehensive individual a veritable Banquo's ghost. Where one is satisfied to eject a hard, irritating stool after a siege of straining another's life is utterly ruined unless the bowel be emptied at least twice each day of liquid and likewise irritating contents. To some the failure to defecate on two days a week is constipation, to others it is the failure to defecate at least each morning and night.

With constipation as in many other states, the greater the number and variety of the symp-

oms the less actual trouble the patient really has. It is always a comfort as well as a nuisance to the listener for the voluble subject to run off a list of discomforts ranging from falling hair to pain in the feet. Before he has proceeded far the doctor knows the answer. And fortunately it is often constipation, and nothing more.

In a survey for this paper more than fifty separate causes are found in the literature. It is of course, impossible to cover so vast a field, so this discussion will be limited to a few aspects of the symptom complex, the etiology of a considerable group of cases where the trouble is easily ascertained and relieved, the importance of constipation in certain types of people, the relief of the symptom as a part of the treatment of many diseases.

Medical literature is filled with the discussion of constipation, yet much of it is positively useless to the clinician. "Some writers only mention constipation in passing and dismiss the subject with a word or two about a change of diet while others are too elaborate in their discussion, leading one to infer that many, if not most cases of constipation need an exploratory laparotomy for their correct diagnosis and a major surgical operation for their cure" (Canick.)

Though it is a concomitant of many diseases, constipation is not especially characteristic of any disease. In the majority of cases it points to local disturbance of either the large intestine, rectum or anus, and it is usually functional rather than organic in origin. The relief of the symptom is not followed by cure in all people. The only result is a return to the purgative unless the patient is more than ordinarily persistent. And it is the persistent patient who is often the most difficult to relieve because of his "colon-consciousness." However probably nearly all methods of treatment partly psychic, partly physical, partly dietetic will bring lasting relief.

Customary though it is to distinguish degrees

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such as obstipation and constipation, types such as atonic and spastic, organic and functional, as though it were possible to use these classifications as bases for diagnosis and treatment, it is usually the case that one deals with a combination of etiological factors as well as physiological variations in the actions of the alimentary tract. Organic change may be functional stasis.

One can but be surprised at the number of people who over large periods have taken increasing amounts of purgatives without any cause ever being sought. It is often these patients who have rectal or anal constipation. Relief of the latter difficulty is easy, satisfactory and permanent.

To define the cause of stasis in any given case may be a trying problem. In some instances the complications of the condition are, in themselves, causes. One can never forget in the individual of almost any age the possibility of the most serious cause of all, neoplasm. The diagnosis, at a time when operation can be successful, may tax the knowledge of the most specialized. Benign stricture, too, offers its own difficulties. Lead poisoning even in these modern days cannot be entirely ignored.

Fecal colic may present the symptoms of intestinal obstruction, with severe cramp-like pains, even fever and pronounced leucocytosis. Enemata will rule out the more serious condition, but the patient may be severely prostrated with points of residual abdominal tenderness, remaining for several days, presumably caused by local peritonitis at the site of spasm. More interesting still are the cases of genuine obstruction possibly with ulceration of the gut, in an apparently normal colon, due to fecoliths.

The differentiation of atonic and spastic constipation, except in certain types of individuals, is impossible. The senile patient with flabby skeletal muscles and the person who lives a sedentary life, likewise the high-strung nervous individual who is constantly under tension, are fairly easy to classify. But types fade into each other, with the variation in the response to stimuli, with mental attitude, habits and diet.

As direct causes one must mention weakness of the bowel wall, partial obstruction, from whatever cause, and weakness of the nerve mechanism. The flabby abdominal muscles of the woman who has had pregnancies, the ineffective diaphragm of the old person with chronic emphysema, the general incompetence of the senile, the weak will of the easy going all contribute to the large group who must have some sort of laxative. Idiopathic dilatation of the colon, spasm of the musculature from irritation of harsh contents, and even the improper use of ill-adapted cathartic drugs may be features in the situation. Acute constipation of a troublesome type may occur as the result of psychic shock.

Anal constipation has been recognized for many years, in London, as a clinical entity. Frew has called attention to its significance in babies and small children and has described the characteristic greenish brown color of the stool which is practically always present. The story told by these patients, many of whom are beyond middle life, is that they have been constipated from childhood. Often the statement is volunteered that fecal matter comes to the anus but no reasonable amount of straining will expel it. Even a soft mushy stool presents difficulty. Unless the stool is of liquid consistency there is trouble. Enemata, or drastic purges, are used to produce practically every movement. Feces evidently stay for days in the rectum simply because the patient is unable to get the mass through the tight orifice.

The most important symptoms of constipation are those of a feeling of fullness and pressure with vague acute and subacute pains, or most significant, the cramp-like pains of partial obstruction, benign or malignant. The pain may be localized to regions of impaction or it may affect the region of the descending colon or the entire abdomen. The secondary disorders of a "liverish" condition, poor digestion, torpor, nausea and even vomiting may be very real indeed. Fecal accumulation most frequently occurs in the sigmoid, though the cecal region may be the site of a firm tumor that may be the cause of a mistaken diagnosis. One cannot ignore the attacks of diarrhea which may occur in constipation as a result of the irritation of an impaction in the rectum or higher in the canal.

"Biliousness" is a real entity as has been pointed out recently by workers at the Mayo Clinic. That "liverish" feeling that many people vividly describe, especially after a too great strain has been placed on the gastrointestinal apparatus through overindulgence in rich food, is a very real sensation. The shortest way to rid the patient of his accumulation of toxic products of faulty digestion and putrefactive residues is to use the duodenal tube promptly. Drainage of the bile ducts may well precede lavage using magnesium sulphate or hydrochloric acid. After the bile ducts have been emptied, using either pump suction or motor, through the tube is given a hypertonic solution of sodium sulphate, sodium chloride and sodium bicarbonate with phenolphthalein. The intestinal canal is cleared from pylorus to anus.

Constipation is a symptom, frequently, of cancer of the rectum, along with alternating diarrhea, or preceding diarrhea. The diagnosis of the latter condition depends upon remembering that it is always possible, and then looking for it. One can never forget that the replacement of constipation by diarrhea, particularly that type characterized by small frequent

painful stools, and an intolerant rectum, is an ominous sign

Blood in the stool unless it is red in color is more apt to arise from the small bowel. But every case of unexplained constipation should have repeated tests, though it must be remembered that occult blood may come from any part of the alimentary canal from mouth to anus. The difficulty of diagnosis of lesions of the large intestine where neoplasm is most frequent is considerable. Where the stool is deformed flat or ribbon like, especially with mucus, grey or brownish in color the difficulty is more often irritable colon.

The habits and diet are of first importance in the presence or absence of constipation. The patient who habitually ignores the signals from a full rectum is bound to be in more or less trouble. For the majority of people who have constipation two courses are apparently followed: the condition is allowed to drift, the victim being satisfied with a stool twice or even once a week, or various types of easily exhibited cathartics, of increasing strength, are habitually used. At some time or other most people use phenolphthalein in increasing doses.

Diet alone may be the cause of undue delay in the intestine. Concentrated carbohydrates and strained vegetables leave so little residue that peristaltic action is wanting. In the physiology of the intestinal movement it must not be forgotten that while bulk often governs movement, at the same time it may be a menace in that large boluses may be formed from such material as bran and cellulose which have been decidedly overpopulated as laxatives. The more the gut is angulated or narrowed the greater the potential dangers of this occurrence.

A fibroid in the true pelvis or a large prostate may be the offender. In certain cases of loss of tone of the rectum, and bladder, occurring particularly in organic lesions of the spinal cord a normal prostate may serve to block completely the anal canal. Unless the impaction is removed promptly and treatment directed to the rectum itself the condition of such patients becomes deplorable indeed. The prostate itself may be extruded in advance of the stool.

Certain precautions must always be observed in connection with the interpretation of constipation as a disease and as a symptom. Fecal masses in the cecal or sigmoid region are easily mistaken for neoplasms. No diagnosis of abdominal tumor is really safe until one is certain that both bladder and bowel are empty. The observation of visible peristalsis may be a pitfall, when the patient is thin and the abdominal musculature is flabby. Acute constipation can be the cause of intense suffering simulating to a marked degree a genuine acute emergency, and thus not only in children but in adults. The pain, shock and stomach disturbance have all the earmarks of a serious situation.

For a considerable period we have been teaching the laity the dangers of cathartics in the presence of abdominal pain. Many series of cases of perforative appendicitis with its grave mortality have been used to drive home this point. There is still room for more education in this direction. It has been the custom never to let slip an opportunity to tell those responsible for young people to use the enema bag freely, yet one is frequently astounded at the risks intelligent patients are constantly running.

The use of the stethoscope in abdominal examination should be as common as in auscultation of the chest. Unhappily it is not. Much information may be learned from listening to an abdomen that is in trouble, especially when the constipation is of recent development. The student should be familiar with the normal sound of gas and fluids in the gut. With radiographic evidence it may give the only physical signs to be elicited.

There are a few local results that appear to come directly from constipation. In some instances there is thinning of the gut wall, in others an actual thickening. What part delay plays in the beginnings of cancer is undetermined. Cancer occurs most frequently in men, while as Pennington has shown women are more apt to have constipation. The significance that should be attached to the development of constipation in one of normal habit previously is the most important feature. The person who complains of this, and especially of cramps due to an effort to get material past a narrow place demands the best diagnostic attention.

The reality of the somatic symptoms of absorption of material, due to delay in the bowel, has been seriously questioned. It has been shown that packing the rectum with cotton produces all the headache, torpid feeling and abdominal discomfort coming usually from stasis. One can well believe that Munthe in "San Michele" tells the truth when he admits that in his manipulations of the wealthy Parisian women with "colitis" he was a bit of a quack.

The present-day diagnosis of "irritable" colon which seems so popular should be made with conservatism, especially if one believes that the "colon-conscious" person can get symptoms of everything to which flesh is heir. The best authorities are convinced that it is not an intestinal condition but rather a neurosis. In all the work on intestinal stasis there has been a paucity of evidence of production and absorption of toxins and pathogenic bacteria that would stand the cold evaluation of science. The evidence offered by surgical treatment which was used in the early days and which proved so disastrous for so many, should make us skeptical.

There is apparent agreement that the patho-

logical changes resulting from constipation concern themselves mostly with either thinning and dilatation of the colonic walls, from mechanical distention, or hypertrophy and spastic contraction of segments of the gut from prolonged efforts to force intestinal contents through. The interior of the colon is sometimes plastered with a uniform layer of feces from cecum to anus. Prolonged neglect on the part of an old person may lead to a solid packing of the entire large intestine, failure of peristalsis and death. Diarrhea may have occurred up to near the very end.

The notion of auto-intoxication from intestinal absorption has been with us a long time. Many disorders, even epilepsy, arthritis, hypertension and chronic Bright's disease have been attributed to this. Evidence is decidedly lacking that this is the fact. It would seem that more real benefit would have resulted to these people from the millions of "internal baths" that have left behind irritated colons in dejected patients. It is probably true that more systemic infections have arisen from too brisk catharsis than from microbe action in dry solid stools which notoriously contain a much smaller percentage of bacteria. There is no question that many patients are miserable when the rectum is full, and that relief is immediate once an evacuation takes place. But the relief is almost too sudden for any change in chemical intoxication.

The discussion of treatment centers about removal of the exciting cause almost more than in any other condition. For the majority of cases a cause can be assigned and with perseverance it can be removed. The therapy of the condition has already been indicated in the discussion of the etiology.

No case of constipation, in all honesty, should be treated without rectal examination. Why doctors shy at the insertion of the finger in the rectum is a mystery, for, as a prominent surgeon remarked "if one does not put a finger in the anus he is apt to put his foot in it."

Besides

- 1 The senile patient whose bowels are "just dead." For him only laxatives are of any use, and these mildest that will produce an effect.
- 2 The patient with fever must still get his calomel and salts.
- 3 The sedentary individual should be encouraged to walk in the open air, to "ride a bicycle" lying on his back after retiring, and to massage the abdomen, although this is never effective in the more resistant types of constipation. Even the leather covered "cannon ball" will make mighty little impression. And, as a rule, unless they are undesirably health-conscious most patients quickly tire of any regimen that requires much effort or time.

- 4 The uncooperative patient must have his pills and potions.

At present the market is flooded with combinations of paraffine oil and agar, usually with some real purgative as phenolphthalein or cascara. Apparently in the doses one can afford, the first two prove inefficient. The cost of such preparations puts them beyond the use of a good many people. In any consideration of the prolonged use of mineral oil two points should not be forgotten. This is the same oil that is admittedly the cause of epithelioma of the skin in textile workers. One may too, properly question the propriety of covering every particle of food in an envelope of undigestible fat, especially when we purposely omit lard and butter from the diet. What effects, if any, these obvious objections possess only the future can assess.

Milk of magnesia, cascara, and the almost forgotten compound licorice powder all have their uses, especially for temporary purposes. One or two glasses of hot water while dressing may stimulate the rectum to satisfactory evacuation. Arabian paste, easily prepared in the kitchen from prunes, figs, dates and senna leaves offers a mixture that can be used by every adult and the older children.

In many cases of functional indigestion the first thing to do is to stop all cathartic drugs. While some folks can stand drastic purgation without discomfort others are made utterly miserable with "gas and distress" by the mildest laxative.

- 5 For temporary use and I regret to say, too often permanently such laxatives as cascara and combinations of aloin and belladonna must be used.
- 6 Enemata are the safest and most effective ways of emptying the lower bowel. I know of no condition in which an enema of a pint of salt solution can do harm.
- 7 The treatment of anal constipation is simplicity itself. Examination discloses a firm narrow band encircling the anus, tight, tender and unyielding, just external to the pectinate line. Unless the rectum is investigated digitally the condition is sure to be missed. Gradual dilatation by bougies is not necessary or expedient for the obstruction is easily removed at one sitting, without division of the sphincter muscle. Apparently it does not recur. If fissure is present, as not infrequently happens from the repeated insults to the anal mucocutaneous lining, it is cured by the same operation which relieves the obstruction. Under general anesthesia the tight band is gradually and gently stretched, taking plenty of time for thor-

ough dilatation. Blood should not be produced. In many cases fissure of the anus is present with its sentinel pile. No anesthetic is needed in a baby for the stricture-like band is never so tense and spastic as in adults, so gentle dilatation with the index finger is not too painful.

In spite of all one says and does millions of people are still going to seek their relief at the drug counter. One cannot wholly blame them when the treatment of so apparently simple a condition is yet imperfectly understood. How a dose of castor oil produces its effect is still a mystery. On the one hand is the costly and elaborate investigation often followed by a radical operation. On the other is the box of pills or the bottle of patent medicine given without a thought by the harassed physician or by the suave counter prescribing druggist. Between them is the rational régime which relieves the condition but does lend itself to the present hurried mode of life. The patient deserves a sensible investigation of his difficulty.

Whether or not one believes in auto-intoxication, it is a fact that many persons suffering from a variety of conditions are relieved by transduodenal lavage and a genuinely clean intestinal tract. It is conceded that there is such a condition as biliousness and that drainage of the bile ducts and emptying the bowels does not relieve it. Migraine may not be caused by absorption of noxious toxins from the bowel but many of its victims are relieved by a cathartic which possibly removes the allergic substances, and by the prolonged use of lavage in not a small percentage of cases are permanently relieved.

The use of belladonna and olive oil enemata, to be retained overnight, relieves the spastic lower colon and sigmoid. It always does away with the patient's discomfort when evacuation leaves him with a feeling that "there is still something left."

Such extensive operations as colectomy in vogue a few years ago, as the result of Lane's teaching, have fortunately been given up. The last state of the patient was far worse than the first. The concept of auto intoxication upon which these drastic measures were based has been disproved. It is generally accepted that bacteria do penetrate the intestinal wall, to be destroyed in the lymphatic protective mechanism and in the liver. In any event it appears that the loose stool is far more dangerous than the dry solid type. It would appear that advanced workers who have dared put their patients on a régime which produced firm hard stools at long intervals had at least done them no harm. (Burnett.)

There can be no question that constipation is a nearly universal symptom, that it possibly has deep consequences for the patient that it

may be of serious import in the history and physical examination. In spite of the fact that the majority of people will stick to the pill box or the greasy bottle, physicians should realize that the condition deserves serious study and efficient treatment. In many instances the cause is easily discovered and as easily remedied. The patient is always entitled to the best in evaluating this symptom as he is in dealing with other more spectacular manifestations of disease. We are certainly not discovering a new disease concept.

The tremendously successful exploitation of the people of this country by commercial interests through the sale of laxative drugs alone is an index of the frequency of the condition discussed. We should remember, however, that constipation is not particularly a disorder of civilization when it is noted that Hippocrates and the medical writers of China and Egypt seriously considered it. Hippocrates describes abdominal massage. The Talmud advises the use of water, in large quantities, and vegetables. In modern medical literature hardly a disorder has had more attention, yet the problem still plagues us. We are managing a situation that has plagued man from the dawn of his birth.

#### DISCUSSION

PRESIDENT LORD: I will call upon Dr. Richard W. Robinson of Laconia to discuss this paper.

DR. RICHARD W. ROBINSON: *Mr. President and Members of the New Hampshire Medical Society*—I wish first to compliment Dr. Clow upon his courage in reading a paper on this subject. I don't know of anybody who could have done it any better than he.

Of course the problem of constipation is so universal to all of us that it should demand interest, but the very commonness of it, I suppose explains why we so seldom hear it discussed at our meetings. Another reason is that being armed with a number of drugs and materials, many so largely adroitly to us that give us the means of overcoming its most prominent symptom we forget its importance.

Leaving out the mechanical obstructive types of constipation, the type of constipation that is produced by such metallic poisons as lead and those constipations that result from diseases of the central nervous system I think as Dr. Clow has said that most of the remaining cases of constipation can be classified as neuroses, some perhaps purely as neuroses, but the majority of them as neuroses only if we consider as a neurosis all functional nerve disorders. I think that the largest number of constipated individuals owe their condition at first, to deliberate failure to respond to the calls of nature and later to the taking of cathartics in order to relieve themselves at a more convenient time. I feel sure that a great many indefinite abdominal complaints are due to an irritated colon from the constant use of drug cathartics, and that the relief of a great many patients depends on getting them off the cathartic habit. That, to me is the most important problem of constipation.

I think it has been pointed out that a large percentage of individuals that come into the clinics in

the cities with a tentative diagnosis of chronic appendicitis, gall bladder diseases, and so on, those who have nothing particularly definite about their complaints, turn out to be patients who have habitually taken cathartics. They show tenderness that extends along the whole of the large bowel. This tenderness is present upon palpation, and these patients are certainly relieved by getting them away from drug cathartics.

I do not believe that there is any place in the treatment of constipation for any drug by mouth, with the exception of the occasional administration of pure bile or bile salts, and this only rarely. The mineral oils that we have always considered to be the least irritating of all of the substances used in the relief of these ordinary cases of constipation, I believe, have been shown to contain a sufficient amount of sulphur to be in itself definitely irritating to the colon.

Now, there are a great many ways that have been described in the literature of dealing with the type of patient that I am speaking of. I will not enter into any discussion of them, except to describe to you a routine which has proved satisfactory to me.

Of course, the most important thing is the establishment of a definite habit time of bowel movement. The normal time, the most propitious time, is shortly after breakfast in the morning. I have been, in the last few years, prescribing for these patients, the drinking of a pint of normal saline an hour before breakfast in the morning. That gets them up early, but it does not do them any harm, and then I have them go to stool, at a prescribed time, in conducive surroundings, trying to convince them that they must take the time and be mentally at rest. After a period of fifteen minutes of effort, if they are not able to move the bowels at first, I have them take a small enema of normal saline, simply to start the bowel movement along.

If their diet, by history, is deficient in cellulose and fruit sugars, I think it is important to give them a moderate amount of these. I don't think it is valuable to stuff them full of indigestible substances.

DR. LOUIS C. AGER, *Mr. President*—Perhaps I have a foolish habit of contradicting people, but it is at least useful in making us think. All physicians should read Henshaw Ward's book on "wishful thinking."

Back in the last century when I was studying medicine I heard a lot about ribbon stools and their diagnostic importance. Having a mechanical turn of mind I tried to visualize their formation, but I have never been able to see it. I was doing considerable autopsy work in my undergraduate days and studied the intestine with the problem in mind. Just stop and think. The feces in the large bowel are quite liquid under normal conditions. We know that there is almost no absorption of liquid in the small intestine. On the other hand with stasis the feces remain so long in the large bowel that they become hard and dry. The sigmoid pouch is much more voluminous than the upper bowel, and the muscular pressure during defecation is strenuous. If the stool is soft it must be moulded into a solid mass. The shape of the stool depends upon the size and shape of the anal orifice.

PRESIDENT LORD: Is there further discussion, gentlemen, of this paper of Dr. Clow's?

DR. FLANDERS, *Mr. President*—I would like to discuss this paper from the standpoint of the patient, and not as a doctor. I have discovered that a man can go two days without a movement of the bowels and not die. A few years ago, when we made the rounds in the hospital, the first thing we used to

ask the nurse was, "Did the patient's bowels move yesterday?" and if the answer was "No," we said, "My God! why haven't you done something about it?"

I think I have been through the whole regimen. I have had my gall bladder pumped out. I have swallowed eighteen inches of hose with a lead sinker on the end and have lain five hours on my side until I was as hysterical as a woman. When bile was not rising in sufficient quantities, the nurse obligingly drenched me with a solution of sulphate of magnesia. I certainly cannot recommend this procedure from the standpoint of the patient, nor can I commend it as a physician. I have eaten bales of hay, have drunk gallons of water and stuffed myself with vegetables until I stuck out like an alderman, but it did not help a great deal.

When I suspected that I might have an appendix, I did not dare to take any more cathartics, and that was a grievous condition. Just the other day I read that phenolphthalein is poisonous, so that is definitely out of the picture.

As for an enema it is difficult to get enough in to do any good. I have a vivid recollection of one case that was managed successfully. I once had a Negro patient who had a stoppage. He had lived in the woods all winter and eaten corn meal until he was unable to defecate.

I told his father to take him home and give him an enema. He asked, "What's dat, Boss?" I replied, "Make up a lot of hot soapsuds and get a lot into him. He will say he can't hold any more, but give him plenty." Later the father reported success, although the treatment was crude and unduly vigorous.

An enema may be good in an emergency, but just now I am very hazy as to the treatment of chronic constipation. I have tried everything except unwarranted extreme treatment, and I am still constipated.

## MISCELLANY

### PERSONALS

Dr. Richard W. Robinson of Laconia will be in New Haven the first three days of each week as a member of the "Urological Clinic" at the New Haven Hospital of Yale University. He will also be a part time instructor at the "Urological Clinic" of Yale Medical School. Dr. Robinson graduated from the School in 1920.

Dr. Charles F. Keeley of Claremont and Dr. Howard E. Thompson of Nashua have been made Fellows of the American College of Surgeons. They made the trip to San Francisco to receive their certificates of membership.

Dr. John L. Fromer of Bethlehem sailed recently on the SS. Manhattan for Cork, Ireland, where he will study at the Rotunda Hospital in Dublin, Irish Free State, until May.

### NURSES

The State Board of Nurse Examiners held a routine business meeting Tuesday, October 8, at the office of the Commissioner of Education in Concord. The Board's membership comprises Miss Belle Valentine, R.N., of Concord, Miss Rosanna O'Donoghue, R.N., of Portsmouth, Chairman, Miss

Addie M Moore R.N. of Grasmere Miss Louise Thompson, R.N., of Keene, and Sister Larivee R.N., of the Notre Dame Hospital in Manchester

The annual graduation exercises of the Elliot Community Hospital Training School Keene were held Thursday evening October 24 James A Hamilton Superintendent of the Mary Hitchcock Memorial Hospital at Hanover gave the graduation address.

Public Health and School Nurses from Sullivan and Cheshire Counties held their semiannual meeting at the Elliot Community Hospital October 18 Many suggestions were offered in connection with school health problems Miss Eva Fortier R.N., of Hinsdale presided at the session.

The commencement exercises for the school for nurses of the Laconia Hospital were held Friday October 26 An address was given by Marietta D Barnaby, R.N., Registrar of the Central Directory for Nurses Boston. Dr Clifton S Abbott President of the New Hampshire Medical Society presented the diplomas

Health and Welfare provisions of the Social Security Act as they may affect New Hampshire were outlined and discussed at the forum for Graduate Nurses of the State conducted at Concord, November 15 by the State Board of Health More than 100 nurses were in attendance Dr Charles Duncan, Secretary of the Board was one of the principal speakers.

The Training School for Nurses at the Littleton Hospital was discontinued November 1. This is in line with the general trend in New Hampshire where student nurses are being concentrated in a few educational centers

#### COUNTY MEETINGS

At the recent annual meeting of the Grafton County Medical Society held at Hanover the following officers were elected

President Ralph G Perry Wells River Vt.  
Vice-President Kenneth Churchill Lebanon.  
Secretary Treasurer Leslie K. Sycamore, Hanover  
Censors Ralph E Miller Hanover John M Page Littleton Arthur W Burnham, Lebanon.  
Member of Committee on Medical Jurisprudence Arthur T Downing Littleton.  
Delegates Robert M Deming, Glenciff Leslie M McKinlay North Haverhill Leslie K. Sycamore Hanover

The Belknap County Medical Society held its monthly meeting at Plymouth, November 13 Dr Leslie K. Sycamore of Hanover spoke on "X Ray Examination and Gall Bladder Disease" Dr Raymond J Turley of Meredith presided at the meeting

#### CLINICS

The State Cancer Commission is now maintaining clinics in eleven New Hampshire communities Members of the Commission include Dr James W Jameson of Concord Dr George C Wilkins of Manchester Joseph W Epply of Manchester and John L. T Shaw of Chichester

The New Hampshire Tuberculosis Association held its eighteenth annual meeting at the Hotel Carpenter Manchester N H. the latter part of October The guest speaker was Dr Arthur J Strawnson of Worcester Mass., who praised New Hampshire for its campaign against tuberculosis resulting in a death rate of but 35 per 100 000 population yearly the lowest in all of New England and ninth lowest in the United States Dr Robert B Kerr of Manchester was reflected Executive Secretary

A Maternal Health Center has recently been organized with offices at 1 South Street, Concord Dr Ursula G Sanders of Concord is President.

#### HOSPITALS

The Margaret Pillsbury General Hospital at Concord is now equipped with a 100 per cent shock proof Theradex machine for use in the treatment of cancer This makes it one of the first New England hospitals to have a complete shock-proof x ray equipment

Under the will of the late Albert N Parlin the Elliot Community Hospital of Keene received a check for \$20 000 to be used to establish what is known as the Albert N Parlin Free Bed

The Laconia Hospital is to be the recipient of \$2 000 under the will of Laura Weeks, late of Providence, R. I

Through a gift of a \$10 000 x ray equipment by former Governor and Mrs. Huntley N Spaulding the Frisbie Memorial Hospital of Rochester is to have an up-to-date x ray room installed

#### COMPARISON OF DEATH RATES FROM TUBERCULOSIS IN THE NEW ENGLAND STATES IN 1934 (PULMONARY AND ALL FORMS)

State	Death Rate per 100 000 Population
New Hampshire	35.5
Maine	37.7
Connecticut	44.4
Rhode Island	44.4
Massachusetts	48.6
Vermont	52.6

—Bulletin N H State Board of Health

# CASE RECORDS of the MASSACHUSETTS GENERAL HOSPITAL

ANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C CABOT, M D

TRACY B MALLORY, M D, *Editor*

CASE 21501

## PRESENTATION OF CASE

A sixty-one year old Nova Scotian teamster was admitted complaining of loss of weight and regurgitation of mucus

For about ten years at intervals the patient had regurgitated small amounts of mucoid material which seemed to come "from the back of his throat" This, however, afforded him no particular discomfort It was not accompanied by nausea and only recurred at scattered intervals About three years before entry it became somewhat more frequent, was associated with nausea, and the regurgitated material occasionally had a foul odor As before, it appeared to come from the back of the throat and the patient stated that he did not believe that it was actually vomited It was usually small in amount but as the frequency increased he eventually brought up as much as a quart daily The nausea became so troublesome that he curtailed his meals more and more During the month before entry he limited his diet to milk and ginger ale only At about this time he had a slight burning pain beneath the lower end of the sternum for a few days This was relieved by powders prescribed by his physician As a result of gradual loss of weight and strength he was compelled to cease working several weeks before admission At the time of admission he was unable to eat more than a spoonful of soft food at a time and the regurgitated material was now quite constantly foul smelling His weight, which had been 190 pounds ten years previously and 164 one year previously, was now only 135 pounds There was never any hematemesis or dysphagia Two weeks before admission an x-ray taken at another hospital showed a "pouch at the lower end of the esophagus"

He had suffered from hayfever occasionally until one year before admission His gallbladder had been removed thirteen years previously and a bilateral hemorrhaphy was done two years later

Physical examination showed a well-developed but poorly nourished man who appeared to have lost considerable weight recently There was complete edentia The neck was negative and the trachea was in the midline The heart and

lungs were normal The blood pressure was 130/75 The scars of the hernia repairs and cholecystectomy wound were well healed, but there was a recurrent inguinal hernia on the right side

The temperature, pulse and respirations were normal

Examination of the urine was negative The blood showed a red cell count of 4,700,000, with a hemoglobin of 80 per cent The white cell count was 4,600, 70 per cent polymorphonuclears Three stool examinations were negative There was no occult blood The nonprotein nitrogen of the blood was 24 milligrams A Hinton test was negative Gastric analysis showed a free hydrochloric acid of 0 to 50 and a total acid of 75 to 111

An x-ray following a barium meal exhibited gross irregularity of the lower esophagus and herniation of the fundus of the stomach through the esophageal hiatus The hernia, grossly irregular as a result of many filling defects, formed a tumor mass between the heart and the spine There was no obstruction to the passage of barium The stomach below the diaphragm, and the duodenum were negative A plain film of the chest showed clear lung fields and costophrenic angles The heart was not remarkable Within the shadow of the heart was a rounded shadow 10 centimeters in diameter

There was moderate improvement in the patient's ability to retain food On the thirteenth hospital day an exploratory laparotomy was performed but additional surgical intervention was deemed inadvisable The patient died on the following day

## DIFFERENTIAL DIAGNOSIS

DR CHESTER M JONES As I started to read this I wondered whether we were not dealing with a diverticulum of the esophagus with retention of food which was later regurgitated As we read along, however, the picture becomes very unusual for a diverticulum without any complicating factor

Heartburn or burning pain under the sternum, for instance, I think would be distinctly unusual for simple diverticulum

"At the time of admission he was unable to eat more than a spoonful of soft food at a time and the regurgitated material was now quite constantly foul smelling" This, of course, indicated stasis

"His weight, which had been 190 pounds ten years previously and 164 one year previously, was now only 135 pounds" A very striking loss of weight and that, it seems to me, definitely rules out a diverticulum alone on which to base all his symptoms or as the basis of the loss of weight

From the story alone it seems to me that we have a right to consider two or three diagnoses

It is possible that he had an esophageal diverticulum, at the lower third of the esophagus, but this seems unlikely in view of the fact that he had so much stasis and because of the quality and character of the symptoms, and with such a striking loss of weight. The only other condition I know of that will give as much vomiting as that is either a diaphragmatic hernia, a fairly large one, with stasis in the hernia at times, or, of course, an obstruction lower down in the stomach itself. I think Dr Mosher is absolutely correct in saying that diaphragmatic hernia is very frequent and very commonly does not have symptoms. Occasionally they produce symptoms, however, but I think it is rather rare. The usual symptom is easy vomiting, especially when leaning forward with regurgitation through the cardia from a large gastric pouch above the diaphragm. There may be pain at times which sometimes simulates gall stones. It usually occurs at about the age of sixty, but I think it is extremely unusual for a patient with a simple diaphragmatic hernia no matter how large, to have vomiting of this degree and the terrific loss of weight that he had. I take it he was a laborer doing hard work who could not be bothered about anything except symptoms that were striking. I think this pouch seen by x ray was a pouch all right and that it represented a sacculization possibly from a diaphragmatic hernia, but with some complicating factor.

"He had suffered from hayfever occasionally until one year before admission. His gallbladder had been removed thirteen years previously and a bilateral herniorrhaphy was done two years later." I should say these facts were unfortunate from the patient's point of view but contribute nothing to the history.

"The neck was negative and the trachea was in the midline." This suggests that there was no mediastinal tumor which was displacing the trachea.

Aside from the emaciation, the physical examination does not help us at all in making a diagnosis. There was no evidence of herniation of the diaphragm with the stomach and colon above the diaphragm.

Following histamine there was a perfectly good secretion of normal gastric juice with nothing in it that was diagnostic. One thing I would like to know about the gastric analysis which is not given is the question of tube stasis. Was there a large amount, and how much was removed? It is possible the tube might have gone through the hernia and that there was no stasis where the stomach was explored with the tube.

I should like to comment on the x ray films. I should think we have the explanation here of the complicated factor in this diaphragmatic hernia which was the basis of loss of weight and illness. Most diaphragmatic hernias are not described in this way, as having many filling

defects in the portion of the stomach which is visible. Filling defects—unless associated with food stasis—should represent polyp or very striking gastritis with hypertrophy of the rugae with pseudopolypoid formation. I think polyps ought to be considered. Polyps themselves do not cause symptoms such as are described here unless there is a complicating factor. For that reason one would have to consider malignant degeneration of polyps which apparently were seen in this portion of the stomach above the diaphragm. There was no actual obstruction of the esophagus from the point of view of the roentgenologist but there must have been some pressure on the esophagus and some difficulty in the passage of solid food. The patient was existing on liquids and not taking sufficient calories in the liquid to maintain weight and strength. The shadow in the region of the heart might well be a tumor mass in the wall of the stomach in the upper portion of the diaphragmatic hernia.

I suppose that an attempt was made to explore this diaphragmatic hernia on the basis of there being a tumor there and in the hope that the tumor might be resected, certainly a very major operation and obviously it was more than this patient could stand.

I should think from the story and x ray report that one had the right to make a diagnosis of diaphragmatic hernia, that a portion of the stomach above the diaphragm developed polyps with malignant degeneration of some of them. The interesting thing is that there is no evidence of involvement of the stomach below the diaphragm. I think it occurs occasionally. With any diaphragmatic hernia, if there is fixation of the portion of the stomach above the diaphragm, one might develop quite striking gastritis. I think I have seen such cases. They do have some discomfort and pain and we do know there is a tendency in chronic gastritis with polypoid formation to have degeneration of the polyps with the development of malignancy. I think that is what occurred here, above the diaphragm, and not in the portion of the stomach below the diaphragm.

#### X RAY INTERPRETATION

DR RICHARD SCHATZKI The examiner (I did not examine the patient myself) saw the barium run along this mass which is visible just above the diaphragm. It is irregular and has the appearance of an ulcerated tumor. The barium runs along the border of the mass much as the esophagus does along a large herniated stomach. Here you see the shadow described as lying behind the heart representing the same mass. There is perhaps one factor which is not quite consistent with a hernia, that is the fact that a well developed fundus seems to lie below the diaphragm.

I should like to say a few words in general in regard to diaphragmatic hernia which we are



discussing There are, in principle, two different types of hernia, the congenital type which has a short esophagus and is rather rare, the acquired type which is much more common, particularly in old people. In these cases the esophagus is pushed upward by the stomach or the herniated stomach lies alongside of the esophagus. We examined a number of old people and could demonstrate hernias in about three out of four cases when examined with particular care in regard to the question of herniation. Some of these patients received air insufflation of the colon in order to increase the abdominal pressure. These hernias in old people are apparently nothing but an increase of the normal movability of the esophagus and stomach in the hiatus.

May I use this opportunity to say a word about the differential diagnosis of varices and cancer of the esophagus by x-ray? One may get a wrong impression from the last case which was discussed here. The differential diagnosis in most cases is rather simple. In difficult cases demonstration of normal relief during peristalsis speaks in favor of varices and rules out cancer. Another test which may help is based on the fact that the size of varices can be changed by change of the intrathoracic pressure. There are, however, a few cases in which differential diagnosis is extremely difficult. The important fact which this case taught us was to call such a lesion cancer if there is difficulty in swallowing.

DR JONES May I ask one question in view of that? You showed me a case a year and a half ago which had a definite picture of occluding mass of varices in the esophagus. The patient had definite symptoms of obstruction.

DR SCHATZKI Yes, we first called it cancer, later saw the lesion extend over the whole esophagus and did not know what to call it. An enlarged spleen was discovered at that time. Liver test showed slightly impaired function. He died later and we did not get an autopsy. He had difficulty in swallowing up to his last day and I now think that he had cancer.

#### CLINICAL DISCUSSION

DR EDWARD D CHURCHILL The preliminary diagnosis was diaphragmatic hernia with carcinoma of the stomach. "Exploration in the region of the esophageal hiatus revealed a large, hard mass involving the cardiac end of the stomach and impacted in a diaphragmatic hernia. On gently running a finger alongside the mass an area of necrosis and pus was encountered in malignant tissue. Obviously a terminal case. Closed without drainage." Encountering a perforated carcinoma in that region spells the death of the patient and there is nothing more to be done about it.

#### CLINICAL DIAGNOSES

Carcinoma of the stomach  
Diaphragmatic hernia

#### DR. CHESTER M JONES'S DIAGNOSES

Diaphragmatic hernia.  
Polyps of the stomach  
Malignant degeneration of the polyps

#### ANATOMIC DIAGNOSES

Leiomyosarcoma of the distal third of the esophagus with extension into and ulceration of the mediastinal lymph nodes  
Dilatation of the esophageal hiatus of the diaphragm  
Operative incision Exploratory laparotomy  
Peritonitis, acute localized.  
Hydrothorax, bilateral  
Arteriosclerosis, slight coronary and aortic  
Cholecystitis, chronic  
Cholelithiasis  
Operative scars Bilateral inguinal herniorrhaphy

#### PATHOLOGIC DISCUSSION

DR TRACY B MALLORY At autopsy a large tumor mass was found within the diaphragmatic hernia. It turned out to be not in the stomach but in the terminal portion of the esophagus, stopping absolutely short at the cardia, and the stomach was entirely free. The tumor had spread through the esophageal wall and involved a group of mediastinal lymph nodes on the anterior surface of the esophagus just behind the pericardium which were greatly enlarged to a mass six or seven centimeters in diameter. There was a small area of localized peritonitis in the immediate neighborhood of the operative exploration which is, of course, what would be expected from the findings at operation. The surprise in the case did not come until the microscopic sections of the tumor were examined. It turned out not to be a carcinoma but a leiomyosarcoma of the esophagus which is a quite rare tumor in this location, probably fifteen or so cases on record.

DR AUBREY O HAMPTON How polypoid was this mass? How much of the lumen of the esophagus was involved?

DR MALLORY Most of the mass was external to the esophagus rather than within it.

#### CASE 21502

#### PRESENTATION OF CASE

*First Admission.* A fifty-four year old white American female was admitted complaining of hoarseness.

One year before entry the patient noticed a swelling in her neck but was advised by her physician that it was of no significance. A few

months later she found that she was gaining weight and was advised to take thyroid tablets, which she did not do. She had been rather nervous during the year preceding admission, a fact which she attributed to familial difficulties. Four months before entry she had an attack of "grippe" which was associated with hoarseness. After the subsidence of the "grippe" the hoarseness persisted and attempts at lengthy conversation produced some breathlessness. There was a slight nonproductive cough during this time. She also had slight difficulty in swallowing which manifested itself as a "sensation of pressure" in the esophagus. There was no marked dysphagia. Her weight at the onset of her illness was 183 pounds. At the time of admission it was 193 pounds. The catamenia were still present and regular.

She had had diphtheria at the age of thirty-three and probably malaria at thirty-four.

Physical examination showed an obese apprehensive, middle-aged female in no acute physical distress. The eyes were normal. Oral hygiene was poor. The right lobe of the thyroid was slightly enlarged, hard and irregular and a small nodule about one centimeter in diameter was palpable in it. There was no tenderness. The thyroid seemed to extend on the right side subinternally. The heart action was rapid but was otherwise negative. The blood pressure was 240/120. The lungs were clear.

The temperature was 98.6°, the pulse 98. The respirations were 20.

Examination of the urine showed a specific gravity of 1.032, with a slight trace of albumin. The sediment contained 30 white blood cells and an occasional red blood cell but was otherwise negative. The basal metabolism rate was plus 10.

X-ray examination showed slight thickening of the soft tissues of the neck anterior to the trachea. The trachea was slightly displaced posteriorly with no appreciable flattening or lateral displacement. There was no visible mass in the chest. A slight mottling in the right first interspace was considered suggestive of an old healed tuberculosis.

Three days after admission an operation was performed and about half of the right lobe of the thyroid was removed. It was impossible to remove the entire lobe because of adherence and infiltration. Postoperatively the patient had very little reaction, convalesced well, and was discharged thirteen days after admission.

#### *Second Admission, nine months later*

After leaving the hospital the patient felt well for about five months and then began to feel drowsy after breakfast. This sensation was relieved by a brief rest. A month later the mass in the right side of her neck again became evident but there was no dysphagia or dyspnea. She occasionally had a tickling sensation in her throat. One month before her readmission a second operation was done on her neck at another

hospital. She reentered this hospital for roentgen therapy.

Physical examination showed no essential change from that done at the previous admission.

She received two doses of x-ray and was discharged in two days.

*Third Admission, one year and three months later*

Since her last admission she had felt quite well until three months before entry, when she became quite markedly fatigued while attending her sick children. About the same time, following exposure to a "draft", she developed pain in her right hip and a stiff neck. The pain in the hip was dull in character, persistent, and resulted in the necessity of using a cane. She received eight x-ray treatments which relieved this lameness. Shortly afterward, however, severe pain occurred in the left hip and she returned to the hospital for relief.

Physical examination was refused.

X-ray examination showed a moth-eaten destruction of the left pubis and bones in the left acetabular region with soft tissue thickening. There was also some periosteal bone destruction at the upper end of the right femur.

She was given local irradiation and was discharged two weeks after entry.

#### *Fourth Admission, three weeks later*

The patient returned at this time for further roentgen therapy. The x-ray examination showed slight distortion of the trachea as a result of a peritracheal soft tissue mass. A small defect was noted in the manubrium of the sternum. She was discharged three days later after receiving treatment.

*Fifth Admission, three months later for further x-ray treatment.*

Physical examination showed her to be fairly well developed and nourished and quite uncooperative. She complained of tenderness everywhere. The neck, pelvic girdle and left foot showed a brownish discoloration and thickening of the skin. There were several irregular firm masses on both sides of the neck moving with deglutition. The liver edge was felt three fingerbreadths beneath the costal margin upon deep inspiration. There was a slightly tender swelling of both ankles. There was no limitation of motion of the left hip but tenderness was elicited over the left ilium.

Examination of the blood showed a red cell count of 3,890,000, with a hemoglobin of 70 per cent. The white cell count was 5,600, 70 per cent polymorphonuclears, 11 lymphocytes, 14 monocytes and 5 eosinophils.

#### *Sixth Admission, one month later*

Bence-Jones protein was not found in the urine.

X-ray showed a questionably active lesion below the right lesser trochanter. There was diminution of density in the bones and region of the right knee. There was a mass observed

at the end of the left second rib near the costochondral margin. The right side of the diaphragm appeared to be paralyzed, which was relieved after x-ray treatment.

She was discharged one week after reentry.

*Seventh Admission*, one and a half months later.

Since her last admission she had been having considerable pain across her chest and in the right knee and left ankle.

She refused to allow examination of her knee. A firm mass was present at the left costochondral junction. The heart was not enlarged but a soft systolic murmur was audible. Its location was not recorded. The blood pressure was 160/90. There was tenderness present over the right hip joint. The right knee and left ankle joints were swollen and tender. She received a series of x-ray treatments and was discharged in three weeks.

*Final Admission*, two months later.

Since her last admission she had been confined to bed most of the time because of marked weakness. The right knee was quite painful. There were also swellings in the left upper chest and axilla which were likewise painful.

Physical examination showed the patient to be mentally dull. The mass in the left anterior chest was larger than at the previous admission. There were no nodes in the axillae. Breath sounds were coarsened generally but the heart and lungs were otherwise unchanged. The spleen extended 2 centimeters beneath the costal margin with inspiration. There was a mass palpable on the medial aspect of the left heel.

Examination of the blood showed a white cell count of 5,300, 70 per cent polymorphonuclears, 1 lymphocyte and 29 per cent monocytes. An occasional stippled cell was observed.

She received further roentgen therapy and was discharged in two weeks. Following her return to her home she went progressively downhill and finally died four months later, three years and two months after the first entry.

#### DIFFERENTIAL DIAGNOSIS

DR ROBERT R. LINTON: "One year before entry the patient noticed a swelling in her neck but was advised by her physician that it was of no significance." A very questionable thing to tell a patient I should think.

"The catamenia was still present and regular." The last statement is entirely irrelevant as far as the story goes. It is unusual that it should have been regular and present at fifty-four.

From the present illness I should state that the important facts are she was admitted complaining of hoarseness, she had noticed a lump in her neck a year before and she had difficulty in swallowing. The first thing that comes to my mind, of course, is malignancy, and malignancy

most likely associated with the thyroid gland or with an aberrant thyroid. The tumor might also be in connection with the larynx or in close proximity to it. I do not think the fact that she had gained ten pounds during the last year is of great importance. Perhaps the only importance I would place is that with the disease I am thinking of I would not expect a great loss of weight early in the disease.

"The right lobe of the thyroid was slightly enlarged, hard and irregular, and a small nodule about one centimeter in diameter was palpable in it." This description would rather indicate that the lump the patient had noticed was in the thyroid, since it is the only mention of any lump that is made here. The description is a little difficult to understand, "hard and irregular, with a nodule one centimeter in diameter." One would rather expect a number of nodules would have been felt rather than simply one.

I should say that the laboratory data were essentially negative. The urine test I imagine was not a catheter specimen so that the sediment could be discredited.

From the description of the operative procedure here I should say there were two possibilities: one is carcinoma of the thyroid and the other is a thyroiditis, a Riedel struma. It is certainly obvious that whatever it was, it was impossible to remove it completely. It is very unusual to remove only half a lobe of the thyroid. I should say one usually removes at least three quarters, and possibly more. So we have the added fact that there was operative difficulty in removing what was attempted.

DR TRACY B. MALLORY: A point which is not put in there, Dr. Linton, but which I think you might as well know, is that the pathologic diagnosis at that time was chronic thyroiditis.

DR LINTON: That is interesting.

You cannot tell me what they did at the other hospital?

DR MARSHALL K. BARTLETT: I was present at that operation. It was equally unsuccessful. We attempted to remove the other lobe with about the same degree of failure.

DR LINTON: As you see she had a number of admissions following this second admission. The third was one year and three months later at which time she had developed pain in the right hip and a stiff neck and again received x-ray treatment and was discharged home. The x-ray examination at this time "showed a moth-eaten destruction of the left pubis and bones in the left acetabular region with soft tissue thickening and some periosteal bone destruction at the upper end of the right femur." That explains the pain in the right hip. She apparently had more pathology in the left that was not giving symptoms.

The brownish discoloration of the skin I interpret as being due most likely to x-ray therapy.

At the sixth admission apparently someone suspected multiple myeloma and a Bence-Jones protein was done which was negative.

No note of the neck is made at this admission but in the previous admission it showed a great many nodules which moved on deglutition.

The blood is not significant I think.

Perhaps Dr. Hampton will demonstrate the x rays at this time.

DR. AUBREY O. HAMPTON. I think the first pain she complained of was in the right hip. At that time we took this film of the pelvis. You can see here a moth-eaten bone destruction in the left pubis and periosteal elevation and subperiosteal destruction in the right femur. A little farther down the shaft in the right femur there is this extensive bone destruction which is fairly typical of malignancy.

This is a film of the pelvis after radiation and the bone destruction which was here has disappeared and new bone is present—a complete healing of that lesion. The femur responded likewise and there is no evidence of disease the second time. Here is a better film of the pubis before treatment. It is very obviously destroyed.

The films of her chest which showed paralysis of the diaphragm are not here but I know that she had paralysis of the diaphragm on three different occasions and each time immediately after treatment over the neck or sternum the diaphragm would begin to move again—that is, within one week. I at no time saw a mass in the substernal area. She did have, however, destruction in the sternum, very indefinite, and I think in one or two ribs that I do not have here. Her os calcis showed a very unusual condition and was apparently involved also. There was a round area of bone destruction in its center and she had considerable pain in that heel and in her knee. We never were sure that she had bone destruction around the knee. The relief from pain by x ray was quite prompt but the recurrence was almost as prompt.

DR. LINTON. You have a skull plate?

DR. HAMPTON. I think we did at the time multiple myeloma was suspected, but the skull was negative.

I might also add that I saw and treated her many times and that she had at no time any palpable glands that I could find.

DR. LINTON. It seems obvious to me that the diagnosis is a carcinoma with metastases to the bone. The question is where did it arise? We have everything to point to the fact that it arose in the neck. We have a history of a lump the story of dysphagia, no difficulty in breathing, but difficulty in swallowing. We have two incomplete operations on the thyroid.

The breast is one of the common sites of carcinoma with metastases to bone and here we have no note of her breasts. They presumably

were normal. One of the other common conditions is carcinoma of the prostate. This patient being a female we can rule that out. Another condition is carcinoma of the thyroid. I think it is not unlikely that there may have been a small nodule of carcinomatous tissue which could have been missed either at the operation or in the specimen. It only needs to be a very small one. The metastatic distribution of the disease may overshadow the primary lesion so that it may be missed. I think I will stick to carcinoma of the thyroid with bone metastases.

DR. GEORGE W. HOLMES. May I make one suggestion? This tumor responded very well to radiation.

DR. LINTON. Then I should suspect papillary adenocarcinoma of the thyroid.

DR. HOLMES. They do not as a rule respond readily.

DR. LINTON. Then I suppose I will have to consider Hodgkin's disease.

DR. HAMPTON. I may have misled Dr. Linton. The response to the lymphoma dose of radiation was exceedingly prompt and the lesion would recur just as promptly in the same place.

DR. J. H. MEANS. There was a case that you probably remember that Dr. Mixer operated on, a very rapid fulminating type of thyroid malignancy which did respond to x ray very rapidly twice and then recurred in the mediastinum and was followed by very rapid death. Histologically there was a dispute among authorities as to what kind of tumor it was. I think Dr. Mallory rather favored carcinoma, but Dr. Allen Graham of Cleveland was here and called it a lymphoma. Dr. Hartwell I think was on the lymphoma side, but it was impossible to decide with finality what kind of tumor it was, apparently. It is interesting that Dr. Mallory and one other thought it was a carcinoma and yet it did respond very well to x ray so perhaps Dr. Linton is justified after all in his position. Thyroid tumors are unlike all others in the body anyway. They are very peculiar.

DR. HOLMES. We have had very few cases of metastases from tumor of the thyroid to bone and my experience, of course, is limited. Carcinomas from any part of the body may be fairly sensitive to radiation but as a general rule they are not.

Another point that is against carcinoma is the location of the metastasis in the heel. Carcinomas as a rule do not involve the bones of the hands or feet except when there is a pretty generalized distribution through the skeleton.

#### CLINICAL DIAGNOSIS

Lymphoblastoma of the thyroid and bones.

DR. ROBERT R. LINTON'S DIAGNOSIS

Carcinoma of the thyroid with multiple metastases.

## ANATOMIO DIAGNOSES

Lymphoblastoma of the thyroid, with metastases to the sternum, ribs, right femur and left os calcis and with extension to the mediastinum

Pathologic fractures of the right femur

Involvement of the right phrenic nerve with paralysis of the right diaphragm

Cholelithiasis

Endometrial polyp

Pseudomucinous cystadenoma of the left ovary

## PATHOLOGIC DISCUSSION

DR. MALLORY The tumor in this case was exactly the same type that Dr Means has been describing in the other case. The original pathologic diagnosis was chronic thyroiditis and there is no question that he had an extensive and severe thyroiditis. When the tumor promptly recurred two months later, and Dr Miller operated again, it was then perfectly obvious that we were dealing with some form of malignancy. The sections removed at that time were very difficult to interpret and we finally called them lymphoma. Going back to the original section from the first operation we were then able to see what we had missed before, a very small area of pretty definite tumor in one corner of one section.

The patient finally was autopsied at home and we removed pieces of numerous tumors all over the body and put through numerous sections. I have been looking them over this morning and not in a single one of these tumors was I able to find a viable tumor cell. The last dose Dr Hampton gave her seemed to have killed off the cells as far as can be judged by the microscope or else one of those mysterious spontaneous degenerations of malignant tumors occurred.

So the postmortem gave us no additional his-

tologic information. The tumors we found scattered through a large number of bones and there was a very large recurrent mass in the lower portion of the neck running into the anterior mediastinum, infiltrating the manubrium and portions of the first two ribs. It grew posteriorly behind the pericardium, around the hilus of the lung, surrounding the phrenic nerve on the right very definitely. The lymph nodes throughout the body were negative and the spleen was negative. The distribution of this lesion is certainly not that of lymphoma. The majority of the metastases are apparently blood borne rather than lymphatic borne and the remainder of the tumor found is a local extension from the original mass.

There has always been a tremendous amount of argument over the classification of this particular group of tumors. There is one group of men who have done a good deal of special work on thyroid tumors who feel that every tumor in the thyroid is carcinoma whether it looks like carcinoma, fibrosarcoma or lymphosarcoma. This is one which they might cite in their favor. It certainly looks much more like lymphoma than carcinoma but in general its behavior is a little bit more like carcinoma. I still think lymphoma and fibrosarcoma may occur in the thyroid, however.

DR. LINTON To me there is one thing in which it did not seem like carcinoma of the thyroid. It did not have metastases to the lung.

DR. MALLORY Yes, you would expect metastases to the lung.

DR. LERMAN When I first saw the slides I thought it was chronic thyroiditis and with the recurrence it looked more like lymphoma. I sent a few to Dr. Allen Graham and he reported that it was a typical case of lymphosarcoma. He suggested the possibility of its having arisen from a Hashimoto struma. He has reported two cases and Smith one case, but the original sections do not suggest it.

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## ANNUAL REGISTRATION OF PHYSICIANS

A BILL providing for the annual registration of physicians has been filed recently with the Secretary of State by the Board of Registration in Medicine. The real intent of the bill is slightly different from the obvious purpose which appears on superficial examination, because of what seems to be an inverted order in the sections 4a and 4b. The real intent of the bill is to provide accurate and adequate information, easily accessible to all, as to which physicians the state now regards as qualified to practice medicine. Annual registration is only one of the elements necessary in fulfilling this intent.

At present there is at the State House an accurate list of all physicians whom the Board of Registration has licensed and has unlicensed, but this list refers only to these two acts. There is no way of knowing whether a person registered by the Board has died, or has moved to another state, no way of knowing whether

the certificate of any person registered by the Board is being misused, as in the case of impersonation of a deceased person to whom it was issued. There is no record of the whereabouts of the person registered if he has failed to record his certificate with the town clerk either originally or after moving to another town. Finally, although the list of registered physicians in the office of the Board is open to public inspection (by statute, only the copy of the list in the office of the Secretary of State is thus open) the securing of information by a person in a distant part of the state is time-consuming if one writes, and expensive if one telephones. Thus copies of the list should be more easily available, in all parts of the state, as in the office of every physician, every town clerk, every board of health, every drug store and every hospital. It is clear that a list meeting the requirements stated above and distributed widely throughout the state would be of very great advantage in protecting the citizens against unlicensed practitioners of medicine, because knowledge as to registration could be easily and almost immediately obtained.

What objection can there be to the making of such a list and to the wide distribution of copies? A possible objection might come from the medical profession who would have to pay the annual registration fee. They are now harassed enough by petty taxes for this and for that, among which the requirement of a certified check to pay the one dollar annual narcotic tax is one of the most annoying. Why should they have another charge imposed upon them?

The medical profession should consider first the possible advantage to the public, and then the possible advantage to themselves. Nothing more need be said as to the possible benefit to the public if results are obtained comparable with what was accomplished in the state of New York when it introduced annual registration of physicians. In the first year, one thousand unlicensed practitioners of medicine left New York to go to states without the annual registration. Undoubtedly Massachusetts received many. It has been estimated that in time a thousand would leave Massachusetts if the bill became law. This would be no small gain in protecting the public.

There might be economic gain for the physician. If the money now acquired by this thousand were to go to the medical profession it might not reach the figure of a million dollars, a low estimate of the income received by the quacks and charlatans, but it would certainly be more than the cost of annual registration.

There is another economic advantage for the physicians: the state will give them a certain amount of legitimate advertising, as in its opinion they are qualified practitioners. The opinion of the state may or may not be justified but it will be published and widely dis-

tributed throughout the state as an annual reminder

There is a possible objection Why should the ethical upright, honest, registered physician pay for the enforcement of the law against the quacks and charlatans and other unregistered persons? Well, the whole activity of the Board of Registration in Medicine is under the police power of the state The original registration fee is not merely to defray the cost of making out a certificate of registration It is to assist in the exercise of the police power of the state, and the costs of the annual lists, and of annual registration might be met by increasing the original fee for registration A more just allocation of these costs is to have a low fee for examination and original registration for the physician beginning to practice, and to distribute the continuing cost over the years of practice by an annual fee for annual registration as long as the physician remains in practice

The heart of the matter is that the state should register physicians, as it now does, keep a list, as it now does, and add to that a procedure for keeping the list accurate, complete and up-to-date and making it easily available to all interested persons by wide distribution throughout the Commonwealth

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

TRUESDALE, PHILEMON E M.D Harvard University Medical School 1898 F A C S Surgeon, Truesdale Hospital, Fall River, Mass His subject is "Diaphragmatic Hernia in Children with a Report of Thirteen Operative Cases" Page 1159 Address 151 Rock Street, Fall River, Mass

RICE, G ARNOLD M.D Tufts College Medical School 1916 Bronchoscopist, Rutland State Sanatorium, Rutland, Mass Ear, Nose and Throat Surgeon and Bronchoscopist, Holden District Hospital, Holden, Mass His subject is "Bronchoscopy and the Differential Diagnosis of Tuberculosis, Lung Abscess, and Bronchiectasis" Page 1173 Address Holden Clinic, Holden, Mass

HAMPTON, AUBREY O M.D Baylor University College of Medicine 1925 Assistant Roentgenologist, Massachusetts General Hospital His subject is "Progressive Idiopathic Pulmonary Fibrosis Associated with Emphysema." Page 1174 Address Massachusetts General Hospital, Boston

BAKST, HENRY J Ph B, M.D Harvard University Medical School 1931 Junior Visiting Physician, Boston City Hospital Assistant in Medicine, Boston University Medical School

His subject is "Mycotic Infection of the Lungs in the Differential Diagnosis of Pulmonary Tuberculosis" Page 1177 Address 482 Beacon Street, Boston

WHITE, PAUL D A.B, M.D Harvard University Medical School 1911 Physician, Massachusetts General Hospital, Boston Assistant Professor of Medicine, Harvard University Medical School His subject is "The Differential Diagnosis of Pulmonary Tuberculosis and Pulmonary Circulatory Changes" Page 1179 Address Massachusetts General Hospital, Boston

LORD, FREDERICK T A.B, M.D Harvard University Medical School 1900 Clinical Professor of Medicine, Emeritus, Harvard University Medical School Member of Board of Consultation, Massachusetts General Hospital President, Massachusetts Tuberculosis League His subject is "The Differential Diagnosis of Pulmonary Tuberculosis" Page 1181 Address 305 Beacon Street, Boston

EDSALL, DAVID L A.B, Sc D, M.D University of Pennsylvania School of Medicine 1893 Jackson Professor of Clinical Medicine, Harvard University 1912-1923 Chief of Medical Service, Massachusetts General Hospital 1912-1923 Dean, Harvard Medical School 1918-1935 and Harvard School of Public Health 1921-1935 He presents an address given upon his retirement as Dean of the Harvard Medical School and Harvard School of Public Health Page 1184. Address c/o Dr Cecil K Drinker, 55 Shattuck Street, Boston

CLOW, FRED ELLSWORTH M.D Harvard University Medical School 1904 F A C P Visiting Physician, Huggins Hospital, Wolfeboro, New Hampshire His subject is "Factors in the Management of Constipation" Page 1187 Address Brown House, Wolfeboro, New Hampshire

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#### THE VALUE OF ARTIFICIAL MENOPAUSE IN CANCER OF THE BREAST

In recent years there has been a renewed interest in artificial menopause as an adjunct in the treatment of carcinoma of the breast Review of the work carried out by Beatson and

\*A series of short selected articles by members of the Section is being published weekly  
Comments and questions by subscribers are solicited and will be discussed by members of the Section

his followers early in the century discloses that they secured favorable temporary regressions in about a third of their cases of inoperable cancer of the breast as a result of bilateral oophorectomy. The procedure was rather widely used until the development of radiation therapy of fered a direct and more effective palliative at tack on advanced lesions.

The original proposal of castration was based partly on the known relation between ovarian activity and growth of the breast, and partly on the apparently slower growing and less malignant characteristics of cancer in older women. New data have gradually accumulated in substantiation of these observations. Careful studies of end results of operations for cancer of the breast have shown that the percentage of cures in young women is less than in women who have passed the menopause, and that the grade of malignancy, as shown by histological study tends to be higher in young women. Other studies have shown that there is a definitely increased likelihood of developing cancer in the remaining breast after removal of one breast for cancer. If pregnancy occurs this likelihood becomes almost a certainty and latent metastatic foci are stimulated to rapid and highly malignant growth.

From the laboratory have come experiments showing that oophorectomy prevents or decreases the incidence of spontaneous mammary cancer in susceptible strains of mice, and that transplantation of the ovary into young castrated males in some instances causes the development of spontaneous mammary cancer.

Radiation therapy has been used considerably to relieve pain due to bone metastases in the lumbar spine and pelvis and many patients treated in this way have experienced an artificial menopause. In this group of patients some very striking regressions of the malignant metastases have been observed even in areas of the body where no treatment was given. Stimulated by these observations radiologists have been inclined to bring about an artificial menopause as part of their treatment of inoperable and recurrent carcinoma of the breast. Thus a considerable group of cases has been accumulated, and results have been encouraging enough to warrant an extension of the method. Most of the cases have been treated too recently to permit statements as to the duration of the regressions which appear to occur in about a third of the women who are before the age of menopause.

Some clinics have been recommending artificial menopause by  $\gamma$  radiation as a routine procedure in young women after operation for cancer of the breast. This seems justifiable on the grounds (1) that the per cent of cures is greater after the menopause (2) that a subsequent pregnancy carries a grave hazard of activating

latent metastases, or carcinoma of the remaining breast, (3) that since established metastases in some instances undergo regression after x ray artificial menopause, it is reasonable to infer that latent foci of metastatic disease will be inhibited or postponed in their development. The procedure is too recent to be evaluated in terms of the percentage of five-year cures, but the evidence on which it is based warrants its employment before end result studies are available.

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Smith Herbert Harold, 29 Williston Road Brookline.  
Turner Ralph Gordon 107 Louis Pasteur Avenue Roxbury Office 52 Bay State Road, Boston  
Tynan James Joseph 666 Adams Street, East Milton  
Younge, Paul Adolph 11 Morton Road Milton Office 101 Bay State Road Boston

#### Norfolk South

MacKinnon, George Lincoln, 119 Elm Avenue Wollaston.  
Maguire James Alfred 279 East Squantum Street Atlantic.

#### Plymouth

Cahill John Edward 25 Division Street, Brockton Office 481 Main Street, Brockton  
Eastwood Medora Viola, 63 Court Street, Plymouth.  
McLean Sterling Alexander 4 Rock Street, Middleboro  
Welch, Robert Francis 25 South Avenue Brockton. Office 221 Main Street, Brockton.

#### Suffolk

Butler Allan Macy 1A Acorn Street, Boston. Office Children's Hospital Boston.  
Clifford Milton Henry 156 Newbury Street Boston Office 270 Newbury Street, Boston.  
Deraw Matthew Arnold 80 East Concord Street Boston  
Howard, Edgerton McClellan 479 Beacon Street, Boston  
Moore Merrill 270 Commonwealth Avenue Boston  
Nason Louis Howard 573 Huntington Avenue, Boston Office 483 Beacon Street Boston (On and after January 1 1936)  
Frien, Edwin Louis 99 Commonwealth Avenue Boston  
Salemi Charles 9 Prince Street, Boston.  
Schraffe, Louis Emilio 19 Bennington Street, East Boston  
Simmons Fred Albert Jr 101 Bay State Road Boston.  
Thompson Milton Strong Jr., 51 Allston Street, Boston.

#### Worcester

Brown Bessie Florence State Hospital Westboro.  
Gardiner Harry Miller Westboro State Hospital Westboro  
Halling Raymond Francis 19 Chapin Street, Southbridge  
Heller Hyman 53 Main Street, Webster

#### Worcester North

Barnes, Janet Stetson, State Colony Gardner  
Edgar William Ladell, 145 Main Street, Athol  
Ward Arthur Henry Ash Street, Winchendon.  
Willcox, Paul Harlan State Colony Gardner

#### THIRD ANNUAL POSTGRADUATE MEDICAL EXTENSION COURSE

The following sessions have been arranged by the Committee for the week beginning December 15

##### Barnstable

Sunday December 15 at 4 00 P.M., at the Cape Cod Hospital Hyannis Subject Latest Developments in Endocrinology Instructors J O Aub and Oliver Cope J L B Vall Chairman

##### Bristol South (Fall River Section)

Monday December 16 at 4 00 P.M., at the Stevens Clinic of the Union Hospital, Fall River Subject Diseases of the Liver Surgical Problems in Diagnosis of Acute Disease of Gall Bladder and Liver Instructors E S Emery and H M Clute Eugene A. McCarthy Sub-Chairman.

##### Essex South

Tuesday December 17 at 4 00 P.M. in the Nurses' Home of the Salem Hospital Salem Subject Pediatrics The Neonatal State and Its Diseases Medical and Surgical Aspects Instructors J L Morse and P J Mahoney Walter G Phippen Chairman.

##### Hampden

Thursday December 19 at 4 00 P.M., at the Academy of Medicine Professional Building 20 Maple Street, Springfield and 8 00 P.M. at the Holyoke City Hospital, Holyoke Subject Neurological Aids in the Diagnosis and Treatment of Disease from the Medical Viewpoint. Problems of History and Examination with Special Reference to (a) Neurosyphilis, Multiple Sclerosis and Other Degenerative Conditions. (b) Diseases with Acute Onset, such as Meningitis and Cerebral Accidents Instructor H R Viets George L Schadt and George D Henderson Chairmen.

##### Hampshire

Wednesday December 18 at 4 15 P.M., in the Nurses' Home of the Cooley Dickinson Hospital Northampton. Subject Kidney and Bladder Diseases B (Surgical) Prostatism and Related Diseases Cystitis and Pyelitis Instructor Richard Chute Robert B. Brigham, Chairman

##### Middlesex South

Tuesday December 17 at 4 15 P.M. at the Cambridge Hospital, Cambridge Subject Neurological Aids in the Diagnosis and Treatment of Disease from the Medical Viewpoint. Problems of History and Exam-

ination with Special Reference to (a) Neurosyphilis, Multiple Sclerosis and Other Degenerative Conditions (b) Diseases with Acute Onset, such as Meningitis and Cerebral Accidents Instructor Abraham Myerson Edmund H Robbins, Chairman

#### Norfolk South

Monday, December 16, at 8 30 P M, at the Quincy City Hospital, Quincy Subject Neurological Aids in the Diagnosis and Treatment of Disease from the Medical Viewpoint Problems of History and Examination with Special Reference to (a) Neurosyphilis, Multiple Sclerosis and Other Degenerative Conditions (b) Diseases with Acute Onset, such as Meningitis and Cerebral Accidents Instructor J B Ayer David L. Belding, Chairman

#### Plymouth

Tuesday, December 17, at 4 00 P M, at the Brockton Hospital, Brockton Subject Peripheral Diseases of Blood Vessels Instructors H F Root and R H. Smithwick W H Pulsifer, Chairman

#### A NEW COUNCILOR FOR NORFOLK DISTRICT

Dr S F Curran of Dorchester has been elected to fill the vacancy existing in the Council among those representing Norfolk District.

## MASSACHUSETTS LEGISLATIVE NOTES

### BILL FOR THE ANNUAL REGISTRATION OF PHYSICIANS

THE COMMONWEALTH OF MASSACHUSETTS  
Board of Registration in Medicine,  
State House, Boston

December 1, 1935

#### *To the General Court of Massachusetts*

In accordance with the provisions of section 33 of chapter 30 of the General Laws, a copy of the recommendations for legislation to be contained in the annual report of this Department (Pub Doc No 56), is herewith submitted, together with a draft of the bill embodying the legislation recommended This draft has been submitted to council for the House of Representatives, as required by law

Yours very truly,

STEPHEN RUSHMORE, M D, *Secretary*,  
Board of Registration in Medicine

THE COMMONWEALTH OF MASSACHUSETTS  
In the Year One Thousand Nine Hundred  
and Thirty-Five

AN ACT to provide for the Annual Registration of Physicians and the Annual Publication of the List of Physicians duly registered.

*Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as-follows*

SECTION 1 Chapter one hundred and twelve of the General Laws, as appearing in the Tercentenary edition thereof, is hereby amended by inserting after section four the two following new sections —

SECTION 4A Every person registered by the board as a qualified physician, who is engaged in the practice of medicine within the commonwealth, shall annually in December renew his registration for the ensuing calendar year by payment of two dollars to the board and recording with the board his name, his registration number, his professional address, and such other information as the board may require, on blanks furnished by the board at the request of the physician and signed by him under the penalties of perjury, and thereupon the board shall issue to him a certificate showing that he is entitled to continue in the practice of medicine for the period covered by said renewal Whoever, being duly registered under section two or corresponding sections of earlier laws, practices or attempts to practice medicine without complying with the requirements of this section, shall be punished by a fine of not less than five nor more than one hundred dollars

SECTION 4B On the first day of March of each year, the board shall publish a list of the physicians who, in compliance with the provisions of section two or section 4A, as the case may be, are authorized by the board to engage in the practice of medicine in the commonwealth during the current calendar year, giving the name of each registrant, his registration number, his professional address, and such other information as the board may deem necessary, and shall send to each registrant a copy thereof

#### RECOMMENDATIONS

#### *I Providing for Annual Registration of Physicians and for Annual Publication of the List Thereof .*

The statute now provides for the registration of qualified physicians and the keeping of a list of such registered persons which is open to public inspection in the office of the Secretary of State In practice the information contained in the list is given out at the office of the Board as a matter of convenience to enquirers No provision is made by the statute for keeping the list up to date and the Board, therefore, knows nothing about a physician after registration, except the town in which he records his certificate (statutory), unless complaint is made to the Board, or by chance his death is reported He may have changed his place of residence and even left the State, or he may have died

The Board, therefore, does not know who is actually practicing medicine in Massachusetts, and it is impossible for the law enforcing body to restrict practice to registered persons The result is that there are probably a thousand unlicensed practitioners in the State, and it may well be that a considerable

number are practicing under licenses of deceased physicians

The providing of an accurate, complete and up-to-date list made easily available by wide distribution throughout the State will go far to eliminate unregistered practitioners of medicine from Massachusetts. Such a list is impossible without annual registration

## MISCELLANY

### DR. H. P. MOSHER DELIVERS THE MUTTER LECTURE

On December 4 1935 Dr Harris P Mosher delivered the Mutter Lecture at the College of Physicians of Philadelphia. The title was Histology and Pathology of the Esophagus with Clinical Applications.

### MEDICAL AFFAIRS IN MAINE

**Cancer Clinics** A well planned and supervised cancer clinic has now been in operation at the Maine General Hospital in Portland for the past three years. This hospital has an adequate x-ray apparatus and an ample supply of radium.

At the Central Maine General Hospital in Lewiston and at the Thayer Hospital in Waterville cancer clinics have been established with however a more limited supply of radium. In Bangor at the Eastern Maine General Hospital the radium supply is entirely privately owned.

At a recent meeting of the Council of the Maine Medical Association it was voted to hold the next Clinical Session of the Association in Waterville in October 1936. These annual clinical sessions have been extremely well attended and are very popular.

On November 21 1935 a combined meeting of the Kennebec County Medical Society and the Kennebec Valley Dental Association was held at the Elmwood Hotel in Waterville with a large attendance. A clinical session was held from 5 to 6 P.M., dinner at 6 30 P.M. and the scientific session at 7 30 P.M. The following papers were read and excited much valuable discussion:

"Relation of Dentistry to Medicine, by Dr Percy Butterfield D.D.S., Togus Me.

"Blood Dyscrasias Manifest by Oral Lesions" by Dr Theodore Hardy Waterville, Me.

"Acute Oral Conditions" by Dr F T Hill Waterville, Me.

EDW H RISLEY M.D., Reporter

### DR. ARTHUR BERK ADDRESSES A ROTARY CLUB

At a meeting of Rotary Clubs at Plymouth New Hampshire recently Dr Arthur Berk of Brookline Massachusetts with an office at 270 Commonwealth Avenue Boston delivered an address with the title "The Mind and Its Problem."

### WPA GRANT FOR MIDDLESEX COUNTY SANATORIUM

The trustees of the Middlesex County Sanatorium at Waltham have been officially advised that the Federal Government has granted an appropriation of \$304 000 toward the enlargement of the Institution by one hundred and sixty beds.

Dr Sumner H. Remick, Superintendent of the Sanatorium assisted the County Commissioners in filing with the Public Works Administration the necessary application for these funds in August. In September in furtherance of the project, Dr Remick accompanied by the Chairman of the Hospital Trustees Honorable Walter C. Wardwell of Cambridge and Frank Kiernan Executive Secretary of the Massachusetts Tuberculosis League went to Washington to interview Mr Harry L. Hopkins. Later when results did not seem to be forthcoming the same group visited Honorable David I. Walsh at his home in Clinton and laid the needs of the Hospital before the Senator. He was so impressed with the emergency situation which has arisen through long waiting lists and the increasing demands for hospital care by the patients in the cities and towns in the district, that he agreed to interview Honorable Harold Ickes, Secretary of the Interior and Public Works Administrator. A few days later the County Commissioners received word that the appropriation had been granted.

The Middlesex County Commissioners secured legislation in the 1935 General Court enabling them to raise funds to meet the Federal grant, if secured for the building of the addition to the Sanatorium. As soon as word was received from Washington Dr Remick and his associates proceeded to the business of arranging for the letting of contracts and other details. Matters have progressed now so that the contracts will be let within a few days and it is expected that the addition to the Institution will be available for the reception of patients on or before January 1 1937.

### ANTI-VIVISECTION ACTIVITY

The New York Anti Vivisection Society is working to have a bill enacted which is designed to prohibit vivisection of dogs.

## CORRESPONDENCE

### ELECTROSURGICAL CHOLECYSTECTOMY

Editor *New England Journal of Medicine*

In this *Journal* issue of October 9 1930 I published methods for electrosurgical removal of acutely inflamed and of sclerotic gall bladder. "The gall bladder is emptied, split to the cystic duct, which is tied, cut the gall bladder away along its attachment to the liver leaving the section in contact with the liver in place. The cutting can be done with the electrosurgical unit the hemorrhage controlled by clamping and tying the larger vessels and coagulating the smaller ones the remaining tissue of the gall bladder being fulgurated."

In November 1933<sup>1</sup> Thorek published a method called "cholecystelectrocoagulectomy" which was essentially the same, except that he used it on "unselected" cases, advocated contact coagulation of the portion of the gall bladder left in place, instead of fulguration, did not tie the branches of the cystic artery, but depended on coagulation to stop them, advocated "peritonization" of the coagulated gall bladder bed and the tied stump of the cystic duct. In this article, even though exploration of the bile duct was advised, drainage was decried, the idea being that drains are "inimical" to healing of electrocoagulated surfaces.

Recently I have reported (this *Journal*) experimental work which led to the development of the method<sup>2</sup> and its application in clinical cases<sup>3</sup>, *advocating, however, electrocoagulation of the remaining segment of the gall bladder according to Thorek in preference to the original method of fulguration*. I disagreed with Thorek on the question of peritonization of surfaces, and upon drainage.

In a letter published in this *Journal*, November 14, 1935<sup>4</sup>, Thorek accused me of sins of omission and commission, and in no uncertain terms held me up as a menace to society unless I should drop the electrosurgical applicator from my hand. Now, since I disagree with Thorek on a few points, and since he violently disagrees with me on everything, I fear that the reader may come to the conclusion that electrosurgical cholecystectomy is dangerous or worthless. That would be unfortunate, and warrants a discussion.

As a matter of fact electrosurgical cholecystectomy is safe, simple, and valuable. Be not disturbed by hairsplittings between fulguration, carbonization and coagulation so long as the biterminal coagulating current is used and a thorough job done<sup>5</sup>, and the larger vessels tied—and so long as drainage is used according to indications which hold for ordinary surgery<sup>6</sup>. The procedure is most helpful in the difficult case with sclerosis or inflammatory thickening in and about the gall bladder and ducts, and, though Thorek uses it on all cases, it is not worth while where the vessels can be easily dissected.

In his letter Thorek says, "Experience contradicts Whitaker's conclusions on the behavior of electrocoagulated tissues." My conclusions were based on experiments with thirty seven animals which were carefully reported<sup>7</sup>. In a new subject under investigation may not one man disagree with another, or even with the majority, if he believes his experiments justify so doing?

Thorek claims misrepresentation in my statement that he depends upon coagulation to stop the cystic artery. It is my belief that the artery and its branches should be tied instead of being coagulated, since it seems to me that the coagulum is likely to loosen sooner than the tie. I quote Thorek's answer to this<sup>8</sup>: "The fact is that I *never coagulate the cystic artery* but always ligate it. *Again, the coagulum never loosens* in undrained, properly performed operations but becomes absorbed." If the coagulum never loosens it would

seem safer to coagulate the artery than to tie it, a catgut tie does loosen. Thorek's first article<sup>1</sup> to which I referred<sup>9</sup> makes no mention, either in the text or on the illustrations, of tying the cystic artery. His second and third articles<sup>2, 3</sup> do to be sure. I am sorry for having overlooked this. But why did he change his method? Maybe the coagulum became "absorbed" too soon.

Thorek says, "Careful scrutiny of the sixteen cases recorded by Whitaker forces the conclusion that unless one is equipped with a thorough knowledge of the principles underlying electrosurgical methods he had better hold on to the time-honored cold scalpel in surgery of the gall bladder."

"Careful scrutiny" has disclosed (as the autopsies did<sup>10</sup>) that the method of electrosurgical cholecystectomy had nothing to do with the three deaths in my sixteen cases. One died weeks afterward from a stone left in the common bile duct. That happens occasionally in all the surgical families with which I am familiar—perhaps not in Dr Thorek's. Another died of cardiac infarct which, though unknown, was present at the time of operation. Electrosurgical cholecystectomy or any other kind was a mistake. It was performed in the hope of relieving intolerable suffering. In this case and in the third<sup>3</sup> however, autopsy showed the coagulum on the gall bladder bed firm, no liver damage, no bile leakage, no peritonitis, nor other cause of death concerned with the operative site. It would seem that Dr Thorek was uncharitable to say the least in the foregoing statement and its implications.

Yet Thorek's condemnation of me as a dangerous individual is based on the death of these three patients in a series of sixteen—a mortality of "18.45 per cent" which he compares with "a global mortality of 9.6 per cent" in 12,144 cases<sup>11</sup>. (A series of sixteen selected cases, the majority with advanced disease, compared with a general series of 12,144<sup>12</sup>.) Furthermore "accuracy demands"<sup>13</sup> that I "correct" one of Thorek's figures. Three of the sixteen died—a mortality, not of "18.45 per cent" but of 18.75 per cent! Thorek concluded<sup>14</sup>: "In other words twice as many people succumbed at the hands of Whitaker as in the *worst cases* (*italics mine*) operated on by surgeons elsewhere."

In view of these figures and this statement let us see how the "accuracy" invoked by Thorek in his letter fares when examined. His published articles<sup>1, 2, 3</sup> state "a global mortality of 9.28 per cent", with no mention of "*worst cases*", also<sup>15</sup>: "From a careful survey of the literature it appears that the average surgical mortality in uncomplicated cases is about eight to ten per cent, and in complicated cases, ten to twenty per cent." In my series of sixteen cases, mostly complicated, because I do not advise this method in simple cases, the mortality was 18.75 per cent. Certainly *statistics should have a generous admixture of intelligence and honesty*.

Compare Thorek's results. His operation has been performed "on 149 consecutive unselected patients without a single fatality"<sup>16</sup>. These "unselect-

ed cases" naturally include every patient with a diseased gallbladder however complicated upon whom he operates—"acute and chronic cholecystitis cholelithiasis, gangrene of the gall bladder early perforation with escape of bile suppurations etc." In July 1934 the number of these consecutive unselected patients without a fatality was 75\* to date it is 148\*

Thorek says that I had "above fifty per cent of bile leaks" Accuracy demands that I point out a fault either in his count and computation or in his intention. Seven out of the sixteen cases drained bile. In five of these no attempt was made to tie the cystic duct on account of the danger of dissection with obscured landmarks from inflammatory swelling. Perhaps Thorek can always safely dissect and tie the cystic duct so that there is no danger of leakage in these cases but others cannot and do not. In the remaining two of the seven who drained bile the common duct was explored. Perhaps Thorek does not have bile leakage in these cases.

Thorek in the summary of his second article\* says "Drainage is entirely omitted. In the body of the article, however he hedges a bit on this point and says, in certain conditions drainage is a necessity (italics mine) namely in obstruction of the common bile duct, icterus progressive septic cholangitis inability to peritonize the cystic duct and gall bladder bed (italics mine) and the like. Examination shows that on account of extensive inflammatory changes these areas could not have been peritonized in ten of my sixteen cases" (even if I had wished to do so) I drained them. Thorek according to the foregoing admission would have drained them. Why does he condemn me for doing what he himself would have done? Furthermore if according to Thorek, drainage in combination with electrosurgery is so dangerous in these cases though he grudgingly admits it should be done why does he not eschew electrosurgery here? Yet he does treat them electrosurgically because his cases are consecutive and "unselected." It appears that in this question of drainage Dr Thorek is inconsistent.

I shall perform a series of comparative experiments on dogs using my original method with drainage in one set and Thorek's method in the other. (In one experiment carried out according to his technique the dog was discovered a month later to have a large cold subhepatic abscess.) With patients, however in spite of Thorek's warning I shall continue to use drainage in all cases of empyema and gangrene of the gallbladder and where the cystic duct cannot be cleanly and safely dissected and securely tied and where exploration of the bile ducts is performed.

## REFERENCES

1. Whitaker L. R.: Surgical management of gallbladder disease. New Eng. J. Med. 203: 718 (Oct. 9) 1930
2. Thorek, M.: Cholecystelectrosurgery without drainage in treatment of gall bladder disease. Illinois M. J. 64: 4-5 (Nov.) 1935
3. Whitaker L. R.: Electrosurgical cholecystectomy. I. Ex-

- perimental observations. New Eng. J. Med. 213: 688 (Sept. 24) 1935
4. Idem: Electrosurgical cholecystectomy. II. Clinical application. New Eng. J. Med. 213: 874 (Oct. 8) 1935
  5. Thorek, M.: Electrosurgical cholecystectomy. New Eng. J. Med. 213: 938 (Nov. 14) 1935
  6. Thorek, M.: Electrosurgical obliteration of the gallbladder (seventy consecutive unselected cases without mortality). M. A. 103: 168 (July 21) 1934
  7. Thorek, M.: Electrosurgical obliteration of gallbladder. Arch. Phys. Therapy X-Ray & Radium 16: 97 (April) 1935

LESTER R. WHITAKER, M.D.

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Boston Mass

## ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON PHARMACY AND CHEMISTRY

535 North Dearborn Street

Chicago Illinois

November 2 1935

Editor New England Journal of Medicine

In addition to the articles enumerated in our letter of October 3 the following have been accepted

Calco Chemical Co. Inc.

Acriflavine Neutral—Calco

Tablets Acriflavine Neutral—Calco ½ grain (uncoated)

Scarlet Red Medicinal Bleibrich—Calco

Lederle Laboratories Inc.

Concentrated Solution Liver Extract Parenteral

—Lederle 1 cc.

Diphtheria Antitoxin Globulin — Lederle-Modified

Tetanus Antitoxin Globulin—Lederle-Modified

Rabies Vaccine—Lederle (Semple Method) 2 cc. vials

Sharp &amp; Dohme

Apricot Allergenic Extract—Mulford Artichoke

Allergenic Extract—Mulford Bass (Sea) All

lergenic Extract—Mulford Bean (Kidney) All

lergenic Extract—Mulford Bean (Soy) All

lergenic Extract—Mulford Blackberry All

lergenic Extract—Mulford Bluefish Allergenic

Extract—Mulford Brazilnut Allergenic Extract

—Mulford Brussel Sprouts Allergenic Extract—

Mulford Carp Allergenic Extract—Mulford

Chestnut Allergenic Extract—Mulford Cinna

mon Allergenic Extract—Mulford Clove All

lergenic Extract—Mulford Cranberry Allergenic

Extract—Mulford Egg (Whole) Allergenic Ex

tract—Mulford Fig Allergenic Extract—Mul

ford Hickory Nut Allergenic Extract—Mulford

Honey Dew Allergenic Extract—Mulford Huck

leberry Allergenic Extract—Mulford Lactal

bumen Allergenic Extract—Mulford Lemon Al

lergenic Extract—Mulford Lentil Allergenic Ex

tract—Mulford Okra Allergenic Extract—Mul

ford Olive Allergenic Extract—Mulford Pea

(Black-eyed) Allergenic Extract—Mulford Pepper

(Red) Allergenic Extract—Mulford Pepper

(Sweet) Allergenic Extract—Mulford Perch

Allergenic Extract—Mulford Plum Allergenic

Extract—Mulford Pumpkin Allergenic Extract

Mulford, Radish Allergenic Extract — Mulford, Raspberry Allergenic Extract — Mulford, Rhubarb Allergenic Extract — Mulford, Scallop Allergenic Extract — Mulford, Shad Allergenic Extract — Mulford, Shad Roe Allergenic Extract — Mulford, Smelt Allergenic Extract — Mulford, Swiss Chard Allergenic Extract — Mulford, Trout (Sea) Allergenic Extract — Mulford, Turkey Allergenic Extract — Mulford, Vanilla Allergenic Extract — Mulford, Watermelon Allergenic Extract — Mulford, Yeast Allergenic Extract — Mulford, Camel Hair Allergenic Extract — Mulford, Goat Hair Allergenic Extract — Mulford, Hog Hair Allergenic Extract — Mulford, Cottonseed Allergenic Extract — Mulford, Dust, House Allergenic Extract — Mulford, Glue (Fish) Allergenic Extract — Mulford, Pyrethrum Allergenic Extract — Mulford, Silk Allergenic Extract — Mulford, Tobacco Allergenic Extract — Mulford

E R Squibb & Sons

Ipral Sodium Tablets,  $\frac{3}{4}$  grain

Ipral Sodium Tablets, 2 grains

White Laboratories, Inc

White's Cod Liver Oil Concentrate (Liquid), 5 cc vials

Winthrop Chemical Co, Inc

Ampules Novocain Solution 2%, 3 cc

Ampules Novocain Solution 10%, 2 cc

Sterile Ampules Novocain Crystals for Spinal Anesthesia, 300 mg

Sterile Ampules Novocain Crystals for Local Anesthesia, 500 mg

The following products have been accepted for inclusion in the List of Articles and Brands Accepted by the Council But Not Described in NNR (New and Nonofficial Remedies, 1935, p 445)

Arlington Chemical Co

Arlco Proteins (for Diagnosis)

Eli Lilly & Co

Lubricating Jelly—Lilly

Your sincerely,

PAUL NICHOLAS LEECH, *Secretary*,

Council on Pharmacy and Chemistry

## RECENT DEATHS

**ROBERTS** — **FREDERICK ALPHA ROBERTS, M.D.**, of Pittsfield, Massachusetts, died suddenly November 30, 1935

He was born in Jacksonville, Vermont, in 1863, and graduated from the College of Physicians and Surgeons of Baltimore in 1897

He was a Fellow of the Massachusetts Medical Society and the American Medical Association. He is survived by his widow, an adopted daughter, Leonette Roberts, and a brother, Arthur Roberts, of Brattleboro, Vermont

**PHELPS**—**OLNEY WINDSOR PHELPS, M.D.**, of Warren, Massachusetts, died at his home, December 2,

1935, after a brief illness following a year's gradual physical decline

He was born in Waitsfield, Vermont, February 11, 1848. Following graduation from the Dartmouth Medical School in 1878 he served as assistant physician in the Insane Asylum at Brattleboro, Vermont. In 1882 Dr Phelps moved to Bellows Falls, Vermont, where he practiced for three years. In 1891 he moved to Warren, Massachusetts. His total medical career covered fifty-seven years.

Dr Phelps was a member of the board of health and the school committee of Warren for several years and was active in civic organizations. He joined the Massachusetts Medical Society in 1892 and retired in 1914.

His widow, Mrs Florence Johnson Phelps, a son, Dr Olney Draper Phelps, of 27 Elm Street, Worcester, Massachusetts, two grandchildren, and a brother, Elleroy E Phelps, of Lebanon, New Hampshire, survive him.

**ADLER**—**HERMAN MORRIS ADLER, M.D.**, died at the Phillips House of the Massachusetts General Hospital, December 7, 1935.

He was born in 1876 and graduated from the Columbia University College of Physicians and Surgeons of New York in 1901. His premedical education was acquired at Harvard College and later he returned to Boston, after having established a reputation in psychiatry, to serve as assistant professor of psychiatry at the Harvard Medical School from 1912 to 1917, and chief of staff of the Boston Psychopathic Hospital.

Dr Adler was especially noted for accomplishments in criminology and psychopathology and held the position of professor of medical jurisprudence and criminology at the medical college of the University of Illinois and later occupied the same chair at the University of California.

He was a Fellow of the Massachusetts Medical Society. Dr Adler is survived by his widow. His family home was in Berkeley, California.

## NOTICES

### MASSACHUSETTS MEMORIAL HOSPITALS

The problem of "The Application of Proper Surgical Technique in the Operating Room" will be presented for consideration at the next Surgical Section meeting on December 13, 1935, at 12 o'clock noon in the Ladies' Aid Room, Talbot Memorial.

The speakers' list, which was scheduled for that meeting, will be presented at a Special Meeting, December 20, 1935, at 12 o'clock noon.

MILO C GREEN, *Secretary*

### REMOVAL

**JOHN ROCK, M.D.**, has removed his office to the Free Hospital for Women, 8 Cumberland Avenue, Brookline. Telephone Longwood 0264.

UNITED STATES CIVIL SERVICE  
EXAMINATIONS

Junior Medical Officer (Interne) \$2 000 a Year  
Junior Medical Officer (Psychiatric Resident)  
\$2 000 a Year

St. Elizabeths Hospital, Washington D C

Applications must be on file with the manager of the Fourth U S Civil Service District, Washington, D C not later than December 16 1935

The United States Civil Service Commission announces open competitive examinations for the positions named above Vacancies in these positions and in positions requiring similar qualifications will be filled from these examinations unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer or promotion

Application forms—The necessary forms may be obtained from the Secretary Board of United States Civil Service Examiners, at any first-class post office or from the United States Civil Service Commission Washington D C (the title of the examination desired should be stated)

## Social Worker Positions

Applications for the positions of social worker (psychiatric) and junior social worker United States Veterans Administration must be on file with the U S Civil Service Commission, Washington, D C., not later than January 8 1936

Full information may be obtained from the Secretary of the United States Civil Service Board of Examiners at the post office or customhouse in any city which has a post office of the first or the second class, or from the United States Civil Service Commission, Washington D C

MEDICAL CLINIC AND STAFF ROUNDS AT THE  
PETER BENT BRIGHAM HOSPITAL

At 3 30 P.M. on Thursday December 19 in the Amphitheatre of the Peter Bent Brigham Hospital Dr Henry A. Christian Physician-in-Chief Hersey Professor of the Theory and Practice of Physic in the Harvard Medical School, will give a medical clinic To it are cordially invited practitioners and medical students

Owing to the holidays the clinics of December 26 and January 2 will be omitted

On Saturdays in the wards of the Peter Bent Brigham Hospital, from 10 to 12 staff rounds will be conducted by Dr Christian.

INTERNATIONAL MEDICAL POSTGRADUATE  
COURSES IN BERLIN

The Berliner Akademie für ärztliche Fortbildung the successor of the Dozentenvereinigung für ärztliche Fortbildung in Berlin which is managed by the Chief Burgomaster of Berlin, is holding the

following medical postgraduate courses in the spring of 1936

- 1 Course on the practical results of recent research work in the domain of internal medicine (February 24 to March 4)
- 2 Syphilis of the internal organs (March 5 to 7)
- 3 Courses in tuberculosis in the City of Berlin's Tuberculosis Hospital "Waldhaus Charlottenburg" in Sommerfeld (March 16 to 21)
- 4 A week's postgraduate course in obstetrics and gynecology (March 23 to 28)
- 5 Practical progress of x-ray diagnosis and radiotherapy paying regard to clinical pathological anatomical and physiological points of view (March 9 to 14)
- 6 A week's course in abdominal surgery (April 20 to 25)
- 7 Introductory course in homeopathy (April 20 to May 16)
- 8 Special courses in all branches of medicine with practical work at the bedside and in the laboratory are held every month

Courses 1 to 7 will be held in German, and the special courses also in foreign languages

For programs and further information apply to the Geschäftsstelle der Berliner Akademie für ärztliche Fortbildung Berlin NW7 Robert Koch-Platz 7 (Kaiserin Friedrich Haus)

REPORTS AND NOTICES  
OF MEETINGS

## LECTURE ON THE CARE OF THE PATIENT

Dr Arthur R. Crandell of Taunton Mass. delivered a lecture on "The Care of the Patient" Thursday November 14 at the Harvard Medical School He presented views of a general practitioner in a moderate-sized city which, although differing from those of physicians in rural communities and metropolitan districts, have the common aim with them of improving the general welfare of the patient. The family practitioner must be content with a life of general service instead of the brilliant career of the specialist.

The great increase in medical knowledge in the last half century has changed the situation of the general practitioner He no longer can hope to possess a thorough knowledge of the whole field of medicine nor personally to give to his patients many of the benefits of modern scientific therapy He must become a skilled internist referring patients requiring special forms of treatment to qualified specialists

Dr Crandell commented on the state of medical knowledge forty years ago At that time the public was well satisfied with "snappy diagnoses" and considered the physician as more or less of a 'neuro-mancer' There were relatively few hospitals laboratories were poorly equipped preventive medicine had not yet been developed diphtheria control was inadequate typhoid fever was rampant, diabetes



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B R Squibb & Sons

Ipral Sodium Tablets,  $\frac{3}{4}$  grain

Ipral Sodium Tablets, 2 grains

White Laboratories, Inc

White's Cod Liver Oil Concentrate (Liquid), 5  
cc vials

Winthrop Chemical Co, Inc

Ampules Novocain Solution 2%, 3 cc

Ampules Novocain Solution 10%, 2 cc

Sterile Ampules Novocain Crystals for Spinal  
Anesthesia, 300 mg

Sterile Ampules Novocain Crystals for Local  
Anesthesia, 500 mg

The following products have been accepted for in-  
clusion in the List of Articles and Brands Accepted  
by the Council But Not Described in N.N.R. (New  
and Nonofficial Remedies, 1935, p 445)

Arlington Chemical Co

Arlco Proteins (for Diagnosis)

Eli Lilly & Co

Lubricating Jelly—Lilly

Your sincerely,

PAUL NICHOLAS LEECH, *Secretary,*

Council on Pharmacy and Chemistry

## RECENT DEATHS

**ROBERTS** — **FREDERICK ALPHA ROBERTS, M.D.**, of  
Pittsfield, Massachusetts, died suddenly November  
30, 1935

He was born in Jacksonville, Vermont, in 1863,  
and graduated from the College of Physicians and  
Surgeons of Baltimore in 1897

He was a Fellow of the Massachusetts Medical  
Society and the American Medical Association. He  
is survived by his widow, an adopted daughter,  
Leonette Roberts, and a brother, Arthur Roberts, of  
Brattleboro, Vermont

**PHELPS**—**OLNEY WINDSOR PHELPS, M.D.**, of War-  
ren, Massachusetts, died at his home, December 2,

1935, after a brief illness following a year's grad-  
ual physical decline

He was born in Waitsfield, Vermont, February 11,  
1848. Following graduation from the Dartmouth  
Medical School in 1878 he served as assistant physi-  
cian in the Insane Asylum at Brattleboro, Vermont.  
In 1882 Dr Phelps moved to Bellows Falls, Vermont,  
where he practiced for three years. In 1891 he  
moved to Warren, Massachusetts. His total medi-  
cal career covered fifty seven years.

Dr Phelps was a member of the board of health  
and the school committee of Warren for several  
years and was active in civic organizations. He  
joined the Massachusetts Medical Society in 1892  
and retired in 1914.

His widow, Mrs Florence Johnson Phelps, a  
son, Dr Olney Draper Phelps, of 27 Elm Street,  
Worcester, Massachusetts, two grandchildren, and  
a brother, Elleroy E Phelps, of Lebanon, New  
Hampshire, survive him.

**ADLER**—**HERMAN MORRIS ADLER, M.D.**, died at the  
Phillips House of the Massachusetts General Hos-  
pital, December 7, 1935.

He was born in 1876 and graduated from the  
Columbia University College of Physicians and Sur-  
geons of New York in 1901. His premedical educa-  
tion was acquired at Harvard College and later he  
returned to Boston, after having established a repu-  
tation in psychiatry, to serve as assistant professor  
of psychiatry at the Harvard Medical School from  
1912 to 1917, and chief of staff of the Boston Psycho-  
pathic Hospital.

Dr Adler was especially noted for accomplish-  
ments in criminology and psychopathology and held  
the position of professor of medical jurisprudence  
and criminology at the medical college of the Uni-  
versity of Illinois and later occupied the same chair  
at the University of California.

He was a Fellow of the Massachusetts Medical  
Society. Dr Adler is survived by his widow. His  
family home was in Berkeley, California.

## NOTICES

### MASSACHUSETTS MEMORIAL HOSPITALS

The problem of "The Application of Proper Sur-  
gical Technique in the Operating Room" will be  
presented for consideration at the next Surgical Sec-  
tion meeting on December 13, 1935, at 12 o'clock  
noon in the Ladies' Aid Room, Talbot Memorial.

The speakers' list, which was scheduled for that  
meeting, will be presented at a Special Meeting,  
December 20, 1935, at 12 o'clock noon.

MILO C GREEN, *Secretary*

### REMOVAL

**JOHN ROCK, M.D.**, has removed his office to the  
Free Hospital for Women, 8 Cumberland Avenue,  
Brookline. Telephone Longwood 0264.

Dr Olga Steinecke Taunton  
Dr Benjamin Margulolis Dorchester Center  
Dr Charles O Joyce, Danvers  
Light refreshments will be served  
W FRANKLIN WOOD M.D., *Secretary*  
Address McLean Hospital  
Waverley Mass

## NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

The next meeting of the New England Ophthalmological Society will be held on Tuesday December 17 1935 at the Massachusetts Eye and Ear Infirmary 243 Charles Street Boston.

## PROGRAM

9 00 A.M.—Clinic and Operating Room  
11 30 A.M.—Neuro-Ophthalmological Conference

## EVENING PROGRAM

8 00 P.M.

Case Report  
Color Blindness Dr William Rowland.  
Malarial Treatment of Interstitial Keratitis Dr Benjamin Riseaman Dr H. Houston Merritt. (By invitation)  
Paper  
Surgery of the Cornea. Dr Ramon Castroviejo  
New York.

BENJAMIN SACHS M.D. *Secretary*

## BOSTON MEDICAL HISTORY CLUB

Boston Medical Library 8 Fenway Monday December 16 1935 at 8 15 P.M.  
Benjamin Shattuck, Medical Practitioner of Templeton. By George Cheever Shattuck, M.D.  
The Doctors Warren of Boston By Joseph H. Pratt, M.D.

BENJAMIN SPECTOR, M.D. *Secretary*

## NEW ENGLAND PHYSICAL THERAPY SOCIETY

The New England Physical Therapy Society will meet as the guests of the Ring Sanatorium and Hospital 163 Hillside Avenue, Arlington Heights Massachusetts, on Wednesday evening December 18 1935

A buffet supper will be served at six thirty and the meeting will open promptly at eight.

The subject under discussion will be the present status of physical therapy in the mental hospitals of this state with a forecast as to future trends

## PROGRAM

Inventory and Forecast. Clifton T Perkins M.D., Assistant to the Commissioner Massachusetts Department of Mental Diseases.

The discussion will be opened by Winfred Overholser M.D. Commissioner Department of Mental Diseases.

Time will be allowed for general discussion. Physicians are cordially invited to attend.

WILLIAM D McFEE, M.D., *Secretary*

41 Bay State Road,  
Boston Massachusetts.

SOCIETY MEETINGS, CONGRESSES  
AND CONFERENCESCALENDAR OF BOSTON DISTRICT FOR THE WEEK  
BEGINNING MONDAY DECEMBER 16 1935

## Monday December 16—

\*9 10 A.M. Boston Dispensary 25 Bennet Street, Boston Social Service Case Presentation Miss Edith Canterbury  
8 15 P.M. Boston Medical History Club. Boston Medical Library 8 Fenway

## Tuesday December 17—

\*9 10 A.M. Boston Dispensary 25 Bennet Street, Boston Nephritis. Dr Henry D Stebbins  
9 A.M. 11 40 A.M. 8 P.M. New England Ophthalmological Society Massachusetts Eye and Ear Infirmary 43 Charles Street Boston  
\*12 M. South End Medical Club. Office of the Boston Tuberculosis Association, 554 Columbus Avenue Boston.  
2 30 P.M. Pediatric Ward Visit Massachusetts Eye and Ear Infirmary  
7 45 P.M. Gardner Auditorium, State House Boston Adult Problems "The Blues and Fatigue States." Dr Karl M Bowman.

## Wednesday December 18—

\*9 10 A.M. Boston Dispensary, 25 Bennet Street, Boston. Ward Cases. Dr S J Thannhauser  
112 M. Clinico Pathological Conference Children's Hospital.  
6 30 P.M. New England Physical Therapy Society buffet supper 8 P.M. Meeting Ring Sanatorium and Hospital Arlington Heights

## Thursday December 19—

8 30 9 30 A.M. Clinic, Surgical and Orthopedic Staffs of Children's Hospital, at the Children's Hospital  
\*9 10 A.M. Boston Dispensary 25 Bennet Street, Boston. Uric Acid in the Pathogenesis of Gout. Dr Bernard Jacobson.  
\*3 30 P.M. Medical Clinic at the Peter Bent Brigham Hospital

## Friday December 20—

9 10 A.M. Boston Dispensary 25 Bennet Street Boston Ward Cases. Dr S J Thannhauser  
12 M. Clinical Meeting of the Children's Medical Staff. Ether Dome Massachusetts General Hospital.  
12 M. Massachusetts Memorial Hospitals Surgical Section Meeting

## Saturday December 21—

\*9 10 A.M. Boston Dispensary 25 Bennet Street, Boston Treatment of Diabetes. Dr S J Thannhauser  
10 1. Staff rounds at the Peter Bent Brigham Hospital.

Open to the medical profession  
Open to Fellows of the Massachusetts Medical Society

December 12—Alpha Omega Alpha Lecture. Harvard Medical School Amphitheatre Building C, 5 o'clock.

December 15—William Harvey Society, Auditorium of the Beth Israel Hospital, Boston at 8 P.M.

December 12—Boston Floating Hospital Board Room, 12 noon to 1 P.M.

December 13—Massachusetts Psychiatric Society. See page 112.

December 13—Massachusetts Memorial Hospitals. See page 1210.

December 16—Springfield Medical Association. See page 1187 issue of December 6.

December 16—Boston Medical History Club. See notice elsewhere on this page.

December 17—The South End Medical Club, 1 noon office of the Boston Tuberculosis Association 554 Columbus Avenue Boston.

December 17—New England Ophthalmological Society. See notice elsewhere on this page.

December 18—New England Physical Therapy Society. See notice elsewhere on this page.

December 18—Medical Clinic at the Peter Bent Brigham Hospital. See page 1211.

December 20—Massachusetts Memorial Hospitals. See page 1210.

February 24 to May 16 1936—International Medical Postgraduate Courses in Berlin. See page 1211.

## DISTRICT MEDICAL SOCIETIES

## ESSEX SOUTH DISTRICT MEDICAL SOCIETY

January 8—Wednesday Danvers State Hospital, Hathorne Clinic 5 P M Dinner 7 P M Speaker Dr Hoskins Subject To be announced later

February 5—Council Meeting, Boston

February 12—Wednesday Addison Gilbert Hospital, Gloucester Clinic 5 P M Dinner 7 P M Speaker and subject to be announced later

March 4—Wednesday Lynn Hospital Clinic 5 P M Dinner 7 P M Speaker Dr Timothy Leary Subject Arteriosclerosis

April 1—Wednesday Essex Sanatorium, Middleton Clinic 5 P M Dinner 7 P M Speaker Dr Richard H Overholt of the Lahev Clinic Subject Chest Surgery

May 7—Thursday Censors' Meeting

May 13—Wednesday Annual Meeting Salem Country Club Dinner at 7 P M Speaker Dr Paul White Subject to be announced later

R. E. STONE, M D, Secretary

## FRANKLIN DISTRICT MEDICAL SOCIETY

Meetings are held on the second Tuesday of January March and May at the Weldon Hotel, Greenfield, at 11 A M

CHARLES MOLINE, M D, Secretary

## MIDDLESEX EAST DISTRICT MEDICAL SOCIETY

Meetings to be held at the Bear Hill Golf Club at 12 15 P M

January 8

March 11

May 6

## NORFOLK DISTRICT MEDICAL SOCIETY

January 28, 1936—Hotel Kenmore at 8 P M Subject Compulsory Sickness Insurance' Speakers to be announced

February 25, 1936—Massachusetts Memorial Hospitals at 8 P M Papers by the staff

March 31, 1936—Hotel Kenmore, at 8 P M Dr Benedict F Bolland—Cauterization of the Cervix Uteri Using Various Electrical Methods Illustrated with lantern slides

May, 1936—Annual Meeting (Place, date and subject to be announced)

The censors meet for the examination of candidates May 7 1936, November 5, 1936

FRANK S CRUICKSHANK, M D, Secretary

1236 Beacon Street, Brookline, Massachusetts

## PLYMOUTH DISTRICT MEDICAL SOCIETY

January 16—Goddard Hospital Subject and speakers to be announced later

March 19—Plymouth County Sanatorium, South Hants

April 16—Brockton Hospital

May 21—Lakeville State Sanatorium

G. A. MOORE, M D, Secretary

## SUFFOLK DISTRICT MEDICAL SOCIETY

January 29, 1936—Joint Meeting with the Boston Medical Library at 8 Fenway 'Observations Around the World' Dr Walter B Cannon

March 18, 1936—Meeting at the Boston Medical Library "The Laboratory and Clinical Story of Fatigue," Dr Arlie V Bock and Dr David B Dill Discussion Dr Donald J MacPherson and Dr Augustus Thorndike, Jr

April 29, 1936—Annual Meeting at the Boston Medical Library "The Treatment of Septicaemia," Dr Champ Lyons "The Pleurality of Scariatal Streptococcus Toxin," Dr Sanford B Hooker Discussion Dr Hans Zinsser

The medical profession is cordially invited to attend all of these meetings

ROBERT L DeNORMANDIE, M D, President,

CHARLES C LUND, M D, Secretary,

FRANCIS T HUNTER, M D,

Boston Medical Library

## WORCESTER DISTRICT MEDICAL SOCIETY

January 8, 1936—Wednesday evening Worcester City Hospital, Worcester, Mass Dinner and scientific program Subjects of program to be announced later

February 12, 1936—Wednesday evening Worcester State Hospital, Worcester, Mass Dinner and scientific program Subjects of program to be announced later

March 11, 1936—Wednesday evening Memorial Hospital, Worcester, Mass Dinner and scientific program Subjects of program to be announced later

April 8, 1936—Wednesday evening Hahnemann Hospital, Worcester, Mass Dinner and scientific program Subjects of program to be announced later

May 13, 1936—Wednesday afternoon and evening Annual Meeting of Society Time, place and details of program to be announced in an April issue of the Journal

ERWIN C MILLER, M D, Secretary

## BOOK REVIEWS

Handbook of Anaesthetics J Stuart Ross and H P Fairlie Fourth Edition 299 pp Baltimore William Wood & Company \$4 00

This country lacks, to a sad degree, a modern textbook of practical instruction in anesthesia The 'Handbook of Anaesthetics', written by two anesthesiologists of Edinburgh and Glasgow for the instruction of medical students, unfortunately fails to meet this need According to our present standards here, its atmosphere is unwonted and out-of-date, for it is permeated with the odor of chloroform, and, with its frequent descriptions of certain closed methods of gas and vapor administration, it is stifling from lack of oxygen

The chapters on shock, anoxemia, nitrous oxide, ethylene, and chloroform are notably good Also those on local and spinal anesthesia, written by a third author, are definitely praiseworthy, though they suffer from brevity The chapter on choice of anesthetics deals with only five drugs, two of which are chloroform and ethyl chloride, the carbon dioxide absorption method of giving gases, now well established in this country, is skeptically referred to as experimental, the use of carbon dioxide for hastening induction and recovery is not mentioned, and no modern gas machine commonly used in this country is described, for these reasons the book is unsuited to the student of anesthesia here Because suction is not mentioned among the methods given for clearing the respiratory tracts of fluids, because asphyxia of the infant is entirely omitted from the discussion of anesthesia during labor, and because a maximal dose of avertin is advised without any qualifying provisions, for such reasons the book appears to be even unsafe to put into the hands of those who most need a handbook of anesthetics

Midwifery By ten teachers under the direction of Clifford White Edited by Comyns Berkeley, J S Fairbairn and Clifford White Fifth Edition. 740 pp New York William Wood & Company \$6 00

This is a textbook on obstetrics written by ten well-known English obstetricians It is interesting to have such a book to refer to in order to see how our English confreres carry out obstetrical procedures For use as a textbook in America it will scarcely be a success, because the treatment that is advised in various complications and the techniques used are not those to which American obstetricians subscribe As a reference book, however, it is of value

# The New England Journal of Medicine

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DECEMBER 19, 1935

NUMBER 25

## THE ELECTROCARDIOGRAPHIC DIAGNOSIS OF ACUTE CARDIAC INFARCTION WITH SPECIAL REFERENCE TO THE VALUE OF PRECORDIAL LEADS\*

BY JAMES M. FAULKNER, M.D.†

THE decision as to whether a patient is suffering from acute cardiac infarction is a momentous and often a difficult one. Therefore, any refinement of technique which promotes more ready recognition of the condition is worthy of careful study and evaluation. The recent employment of chest leads in the electrocardiographic diagnosis of cardiac infarction has yielded encouraging results which have prompted this investigation.

The history of the clinical study of coronary thrombosis is a brief one. In 1912, J. B. Herrick<sup>1</sup> gave the first description in English of the clinical features of sudden obstruction of the coronary arteries. The same gifted observer called attention to abnormalities in the electrocardiogram following coronary thrombosis<sup>2</sup> and suggested to Fred M. Smith the study of experimental coronary occlusion in dogs by which the electrocardiographic changes seen in human cases were reproduced.<sup>3</sup> Smith showed that these changes have marked variations from day to day, and even from hour to hour, and may eventually disappear.

In 1920, Pardee<sup>4</sup> called attention to a particular form of inversion of T waves, i.e. late, sharp inversion with upward convexity of the RS-T interval which was frequently associated with occlusion of coronary arteries as shown at postmortem.

However, interest in the clinical diagnosis grew rather slowly. For example, in 1924 only three cases which had received the diagnosis of coronary thrombosis during life had come to autopsy at the Massachusetts General Hospital.<sup>5</sup>

In 1928, Parkinson and Bedford<sup>6</sup> called attention to a definite sequence of changes in the RS-T segment and the T waves of the electrocardiogram following cardiac infarction. "Shortly after the onset of symptoms a transient deviation of the R-T segment from the iso-electric plane occurs. This is followed by a deep inversion of the T waves in either lead I or lead III, but not in both, and often by

a lesser degree of T inversion in lead II. Curves obtained after a few weeks conform to one of two main types according to the incidence of T inversion in lead I or in lead III. Subsequent T wave changes in the direction of normal are recorded, and even complete return to normal occurs." These authors speculated as to the possibility of correlating the site of the infarct with a specific type of electrocardiographic abnormality but drew no conclusions from their limited autopsy material.

In the following year Barnes and Whitten<sup>7</sup> found that the electrocardiographic changes of the T<sup>+</sup> type described by Parkinson and Bedford were usually associated with infarction of the anterior wall of the left ventricle, and the T<sup>-</sup> type with infarction of the posterior wall of the left ventricle. They observed, as others had before, that infarction of the right ventricle was rare.

More recently the effect of cardiac infarction on the initial deflections of the ventricular complex have received attention. Pardee has pointed out that the incidence of heart disease, particularly the anginal syndrome, is high in individuals exhibiting a large Q wave in lead III in the presence of a normal electrical axis or left axis deviation.<sup>8</sup> He presented evidence which suggested that the large Q III is due to disease of the left ventricle. A refinement of his criteria has added to the diagnostic value of Q-wave changes by excluding many normal individuals<sup>9</sup>, and their importance in relation to cardiac infarction has been amply confirmed by others, notably Wilson and his coworkers.<sup>10</sup> Wilson's observations indicate that deviations of the R-T interval are due to currents of injury set up at the borders of injured cardiac muscle whereas the changes in the initial ventricular complex (Q R S) are explained by the death of areas of formerly active tissue. The former is, therefore, a transient and the latter, a permanent change.

The most recent important contribution to the electrocardiographic diagnosis of cardiac infarction was the introduction of the chest lead by Wolfersht and Wood in 1932. Although chest electrodes had been employed by others previously, they were the first to demonstrate clearly that with this technique many cases of

From the Thorndike Memorial Laboratory, Second and Fourth Medical Services (Harvard), Boston City Hospital, and the Department of Medicine, Harvard Medical School, Boston, Massachusetts.

†Faulkner, James M.—Assistant in Medicine, Harvard University Medical School. For record and address of author see "This Week's Issue," page 135.

fresh infarction show electrocardiographic changes which do not appear in the standard limb leads. The changes in the chest lead have also been considered to be of value in localizing the site of the infarct.

In taking the chest lead, Wolferth and Wood placed the right arm electrode over the precordium\* and the left arm electrode on the back of the chest just below and mesial to the left scapular angle. This lead they designated as lead IV. In subsequent studies they also made observations on an electrocardiographic lead taken from the precordium to the left leg which they designated as lead V, and on a lead taken from the posterior electrode to the left leg which they designated as lead VI. Comparison of the results derived from the three chest leads showed that leads IV and V were very similar in appearance and lead VI yielded little, if any, additional information of importance. Since their original publication, the clinical use of chest leads in the diagnosis of cardiac infarction has been made in a number of clinics. The practical value of the method has been confirmed by others and its theoretical validity soundly established. The subject has been somewhat confused by the fact that many subsequent investigators have used slightly or widely different parts of the body for placing the electrodes so that their results are not comparable one with another. While it is quite possible that one or more chest leads may be found which will yield even more information than those employed by Wolferth and Wood, their series, together with others using the same technique, represent the largest and best controlled from the point of view of autopsy protocols as well as for normal individuals. It appears, from their own observations, that in most cases all of the information desired can be derived from one of the two precordial leads. As pointed out by Wilson<sup>12</sup>, it is the electrode nearest the heart which is the predominating factor in inscribing the electrocardiogram in chest leads. The position of the distal electrode is therefore of relatively minor importance. The records of Wolferth and Wood's lead IV (anteroposterior) are almost identical with their lead V (precordium to left leg) and, for practical purposes, the two may be used almost interchangeably. Since lead V is a little easier to take technically, it is perhaps, of the two, the method of choice. An excellent critical review of the subject of chest leads appears in a recent article by Roth<sup>13</sup>.

The amount of information to be derived from precordial leads not yet being fully established, it seemed worthwhile to report on our experience with this procedure at the Boston City Hospital with 250 individuals, in all of

whom there was a question of recent coronary thrombosis. The precordial lead employed in almost all of these was "lead V", only a few at the beginning being "lead IV". We have evaluated these records by the criteria set forth by Wood and Wolferth and more accurately defined as regards normals by Master<sup>14</sup>. The ventricular complex in the precordial lead as thus defined consists of an initial downwardly directed wave, the Q-wave, followed by an upward R-wave, an isoelectric interval and, finally, a negative T-wave. The Q-wave is normally at least 15 mm in depth and the R-wave at least 25 mm in height. The R-T interval is either slightly below the isoelectric level or just isoelectric. In normal persons it is never above the isoelectric level or more than 2 mm below it.

The changes observed in the precordial lead following acute cardiac infarction may be divided into two main types corresponding with the T<sup>1</sup> type and the T<sup>2</sup> type described by Parkinson and Bedford.

In the first type, the Q-wave of the precordial lead either disappears or is markedly diminished in size, and the R-T interval is at first markedly depressed. The depression of the R-T interval persists for from five to nine days and gradually disappears. A high peaked upright T-wave develops and tends to remain (see figure 1).

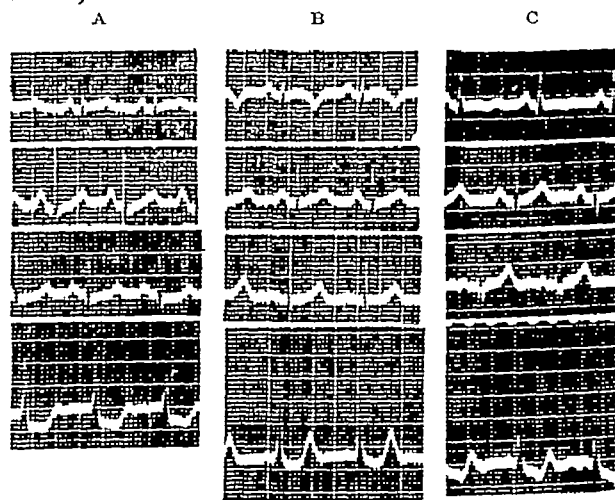


FIGURE 1. Electrocardiogram of the T<sup>1</sup> type. Leads I, II, III and V. A 3 days B 19 days and C 9 months after coronary thrombosis.

In the second type, the precordial lead is often normal although it may show elevation of the R-T interval or upright or flat T-waves. Changes when they do occur are not usually permanent (see figure 2).

Before proceeding to the analysis of our cases, it may be pointed out that the possibility of factors other than myocardial infarction operating to affect the electrocardiogram have been ruled out as far as possible. By confining this study to the diagnosis of acute infarction, we have avoided the difficult problem of distin-

\*The exact position of the precordial electrode is important. For the sake of technical simplicity and uniformity in this series a point 4 cm to the left of the mid sternum in the fourth intercostal space was used.

guishing between electrocardiographic changes due to old infarction and those due to myocardial damage from other causes. This has limited the electrocardiographic criteria to (1) deviations of the R-T segment or (2) marked variations in the ventricular complex from day to day. One condition, other than cardiac infarction which may be associated with deviation of the R-T interval is inflammation of the pericardium, such as tuberculous pericarditis. In this instance however, the characteristic feature is an elevation of the R-T interval in all

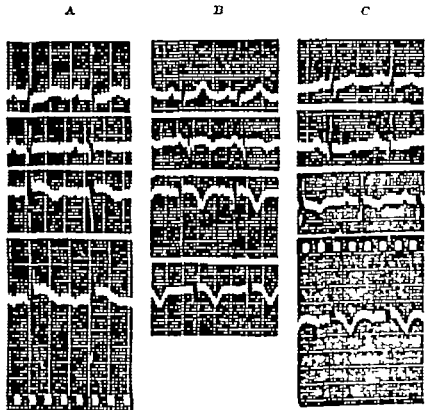


FIGURE 2. Electrocardiogram of the T<sub>2</sub> type. Lead I, II, III and V. A, 6 days; B, 33 days; and C, 10 months after coronary thrombosis.

leads rather than in one or two leads only. Other conditions which may produce comparable changes in the electrocardiogram are diphtheritic and other forms of acute myocarditis, massive pulmonary embolism<sup>18</sup> and, perhaps, digitalis intoxication.<sup>16</sup>

A comparison of the electrocardiographic interpretation with the final clinical diagnosis is of some interest although, of course, it does not approach in significance a comparison with necropsy findings.

Of the 250 cases studied, fifty-one were interpreted as acute cardiac infarction from the electrocardiogram (see figure 3). Of these forty-four were so diagnosed clinically, three were classed as suspicious and four as negative. Nine cases had a questionable electrocardiographic interpretation of acute infarction. Of these four had a positive clinical diagnosis, three a questionable diagnosis and two a negative diagnosis. Of the 190 cases who had no electrocardiographic signs of acute infarction the clinical diagnosis was in agreement in 163 cases but twenty-four had a positive clinical diagnosis and three were classed as questionable. The discrepancy between the clinical and the electrocardiographic diagnoses is explainable in part by the fact that some of the cases in which a

positive clinical diagnosis was made did not have electrocardiograms until after the acute stage of infarction was over and the characteristic electrical changes might be expected to have disappeared.

In thirty-five of the fifty-one cases exhibiting the electrocardiographic signs of cardiac infarction the diagnostic abnormalities were present simultaneously in both the precordial and limb leads. In these instances the chest lead was of value only in confirming the evidence derived from the standard leads. In five cases the changes persisted in the limb leads after the chest lead had returned to normal. In two cases the abnormality appeared only in the standard leads. In one case, in which the clinical picture was unmistakable, the electrocardiographic diagnosis was made only by striking variations in the record from day to day, although no single record was in itself diagnostic.

In eight cases the diagnostic abnormality was present at some time only in the chest lead. All of these cases had a positive clinical diagnosis of coronary thrombosis. In three, the changes appeared only in the chest lead throughout, in two, it preceded the development of changes in the standard leads, in two, it followed them and in one it both preceded and followed them. This group of eight cases comprising approximately 16 per cent of our total positive diagnoses illustrates the importance of the precordial leads. In three cases out of fifty-one the diagnosis could never have been made without the chest lead.

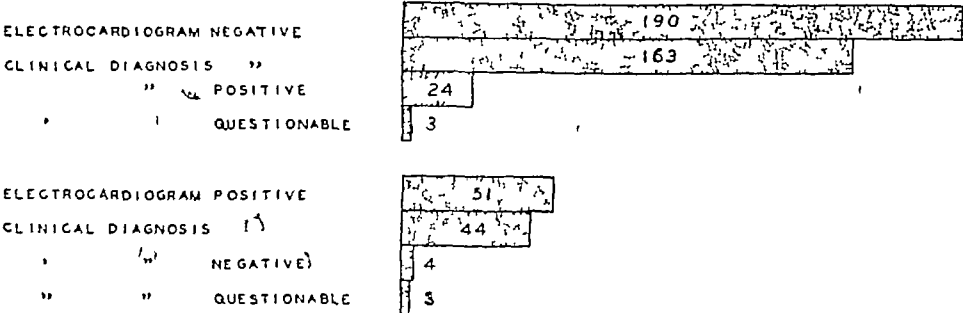
Complete necropsy records were available on thirty-three cases on which precordial leads had been taken. These records were of routine hospital necropsies performed by a number of different pathologists. The exact extent or localization of the infarct beyond the statement that it was situated in the anterior apical or posterior portion of the ventricle was not always clearly recorded. This must be borne in mind in evaluating the correlation between the electrocardiographic and the anatomical localization of the infarcted areas. Thirteen cases showed acute cardiac infarction at postmortem. The electrocardiographic diagnosis was made in eleven of these (see figure 3). In each of the two cases in which the electrocardiographic diagnosis was not made a single record was obtained shortly before death. In one it appeared that the infarction although recent, was of too long standing to show the characteristic changes in a single record the history indicating clearly that the thrombosis had occurred nineteen days before the record was taken. It showed an absence of the Q wave in the precordial lead a flat T<sub>1</sub>, very low T<sub>2</sub> and inverted T<sub>3</sub>. In the other, the record was obtained a few hours after the onset and showed intraventricular block. In both there was infarction of the anterior wall of the left ventricle and both showed

marked coronary sclerosis with extensive myocardial scarring

Of the thirteen cases with acute infarction, twelve were in the anterior or apical portion of the left ventricle and one in the posterior wall. The anterior infarcts were associated with the following electrocardiographic findings—five with changes of the T<sup>1</sup> type, three with changes of the T<sup>s</sup> type, two with changes

showed an upright T<sup>1</sup>—still with low origin. This patient died two days after the last record was taken and showed a dissecting aneurysm of descending thoracic aorta without involvement of the coronary arteries or pericardium. It seems obvious that there will always be instances of borderline or doubtful changes in the electrocardiogram which cannot be interpreted with certainty. The cases which are most difficult to

A CLINICAL CASES



B POST MORTEM CASES

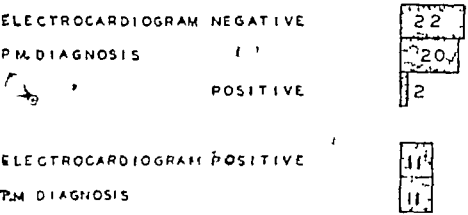


FIGURE 3 Correlation between the electrocardiographic findings and the clinical and postmortem findings in acute cardiac infarction (9 cases in which the electrocardiographic diagnosis was questionable are not shown in this chart)

of a nonspecific type, and two with signs of old coronary disease only. The one case with posterior infarction showed electrocardiographic changes of the T<sup>s</sup> type.

In this series the correlation was better between the electrocardiographic type and the artery occluded than with the actual site of the infarct. All of five instances of the T<sup>1</sup> type were associated with occlusion of the anterior descending branch of the left coronary artery and three out of four of the T<sup>s</sup> type had occlusion of the circumflex branch.

In the remaining twenty autopsied cases in which there was no infarction, a questionable electrocardiographic diagnosis was made in four. One of these had left bundle branch block with a markedly depressed R-T interval in the chest lead (7 mm). Another had intraventricular block with an elevated R-T level in the chest lead (3.5 mm.). The third case showed an auricular tachycardia with two to one heart block and a ventricular rate of 115. The take-off of T<sup>s</sup> was 4 mm below the baseline. The fourth case showed inversion of T<sup>1</sup> with low origin and upward convexity of S-T on two records taken two days apart, and three days later

evaluate are those in which there is electrocardiographic evidence of old myocardial disease and, particularly, bundle branch block.

SUMMARY AND CONCLUSIONS

In a series of electrocardiograms including precordial leads on 250 patients, a diagnosis of fresh cardiac infarction was made fifty-one times. In eight of these the diagnostic feature was present at some time only in the chest lead, and in three it was never present in the standard leads.

A comparison between the electrocardiographic and the autopsy findings was made in thirty-three cases. Out of thirteen cases with acute infarction the electrocardiographic diagnosis was positive in eleven. Localization of the infarct was not reliable by the method used.

Of the twenty cases who did not show infarction, four had a questionable electrocardiographic diagnosis, and in the remainder it was negative.

The findings here recorded support the following conclusions:

- (1) During the first two weeks after the de-

veloping of cardiac infarction the electrocardiogram is a highly accurate method of determining the diagnosis

(2) The precordial lead offers additional information of definite value in the diagnosis of fresh cardiac infarction

## REFERENCES

- Herrick, J. B. Clinical features of sudden obstruction of the coronary arteries. *J. A. M. A.*, 89: 2016 (Dec. 7) 1912.
- Ibid. Thrombosis of the coronary arteries. *J. A. M. A.*, 78: 237 (Feb. 3) 1919.
- Smith, F. M. The ligation of coronary arteries with electrocardiographic study. *Arch. Int. Med.* 83: 4 (July) 1918.
- Pardee, H. E. B.: An electrocardiographic sign of coronary artery obstruction. *Arch. Int. Med.* 85: 244 (Aug.) 1920.
- Faulkner, J. M.; Marble, H. C., and White, P. D. The differential diagnosis of coronary occlusion and of cholelithiasis. *J. A. M. A.* 83: 2289 (Dec. 27) 1924.
- Parkinson, J., and Bedford, D. E. Successive changes in electrocardiogram after cardiac infarction (coronary thrombosis). *Heart* 14: 195 (Aug.) 1923.
- Barnes, A. R., and Whitten, M. B.: Study of the R-T interval in myocardial infarction. *Am. Heart J.* 5: 143 (Dec.) 1927.
- Pardee, H. E. B.: The significance of an electrocardiogram with a large Q in lead 3. *Arch. Int. Med.* 46: 470 (Sept.) 1920.
- Durant, T. M. The initial ventricular deflection of the electrocardiogram in coronary disease. *Am. J. M. Sc.* 166: 225 (Aug.) 1924.
- Wilson, F. N. MacLeod, A. G. Barker, P. R., Johnston, F. D., and Klossner, L. L. Electrocardiogram in myocardial infarction with particular reference to initial deflections of ventricular complex. *Heart* 16: 155 (June) 1923.
- Wolferth, C. C., and Wood, F. C. The electrocardiographic diagnosis of coronary occlusion by the use of chest leads. *Am. J. M. Sc.* 183: 30 (Jan.) 1925.
- Wilson, F. N., Johnston, F. D., and Hill, L. G. W. Interpretation of galvanometric curves obtained when one electrode is distant from heart and other near or in contact with ventricular surface: observations on cold blooded heart. *Am. Heart J.* 10: 163 (Dec.) 1924.
- Roth, L. R.: On the use of chest leads in clinical electrocardiography. *Am. Heart J.* 10: 722 (Aug.) 1925.
- Master, A. M.: The precordial lead in 104 normal adults. *Am. Heart J.* 9: 512 (April) 1924.
- McGinn, S., and White, P. D.: Acute cor pulmonale resulting from pulmonary embolism: its clinical recognition. *J. A. M. A.* 104: 1473 (Apr. 27) 1925.
- Strauss, H., and Katz, L. N.: Effect of distalis on appearance of lead IV. *Am. Heart J.* 10: 546 (April) 1925.

## NEW ENGLAND SURGICAL SOCIETY

## SECONDARY CARCINOMATA OF THE LARGE BOWEL\*

BY EDWARD L. YOUNG, JR., M.D.†

BY secondary carcinoma of the large bowel I have reference to those cases where following an operation for the disease, a second growth occurs in the colon at some distance from the primary tumor

The etiology of carcinoma of the colon just as in all malignant tumors remains obscure. Nevertheless we do know of certain contributing or predisposing factors, and in particular we recognize the fact that certain types of benign growths may show a malignant degeneration. This is a definitely recognized fact in relation to adenomatous polypi of the large intestine. We have no proof that they all become malignant but certain it is if a patient lives long enough, the vast majority will make trouble of this nature. Neither do we know with certainty that all carcinomata of the large bowel originate in polyps but there is a good deal of evidence to make us think that at least a large proportion of them do. It is of course, well recognized that these papillomata are very apt to be multiple. In fact the presence of one should put the burden of proof on the individual who tries to prove it is the only one. Although these facts are beyond dispute I think they have received too little attention in relation to the recurrence of cancer of the colon. When a patient comes back with a recurrence of this disease, it is too often assumed that it is a recurrent manifestation of the first growth when in fact it may be and I think often is entirely separate and just as amenable

to treatment if recognized in time as the first tumor. I believe that is the important fact relating to this subject and the justification for this paper. The following cases are illustrative of the problem at hand and I am putting them down in the order in which it seems to me they emphasize the story.

CASE 1. M. G. H., E. S. 281130 a male aged thirty eight. He came to the hospital in January 1927 with the story of one year of intermittent pain in the right lower quadrant. His bowels had been normal until two weeks before entry when they were loose but there was no blood. X-ray showed a tumor of the caecum. At operation a right colectomy was done and the pathological diagnosis was adenocarcinoma of the colloid type with intestinal polyps. Inasmuch as the mucous membrane above the growth showed numerous small adenomas from the size of a buckshot to a pea. Those examined did not show any malignancy. He has been followed in the tumor clinic. Shortly after operation he reported an occasional show of blood on the stool but he laid it to hemorrhoids which he undoubtedly had. X-rays were negative through December 1929 nearly three years and no rectal examination was done until just after the last x-ray. That examination showed rectal polyps. He was referred to the House where he was seen by Dr. D. F. Jones, in consultation on January 5 1930 who stated that inasmuch as the patient was known to have had polyp in the ascending colon and rectosigmoid region, he undoubtedly had them between and that he would eventually die of carcinoma if he did not have a total colectomy but that the operation was of sufficient severity so that if the patient could be made to understand the problem, he should be the one to decide. As a result the visible polyps in the rectum were fulgurated and eight months later a large papilloma of the rectum was excised with the diathermy current. The pathological report on this says: A growth 4 x 3 x 1 1/4 cm microscopically showing atypical changes of the epithelium very suggestive of malignant degeneration.

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but no invasive growth and examination of the base or stock shows no malignancy" On the basis of this report, the patient was advised to have a total colectomy but at this time refused and in April, 1933 came back to the hospital with obstruction in the sigmoid and operation showed a generalized carcinomatosis from which he died four months later. No recurrence of the original growth was in evidence at any time.

This case is the typical picture which is seen so often where polyposis of the large bowel is present.

CASE 2 Private case, a female, aged fifty-three. This patient reported with thirty six hours of acute intestinal obstruction with no previous story that could be obtained at any time other than vague digestive disturbances. Immediate operation showed what was apparently a carcinoma of the sigmoid and a cecostomy was done. At the second operation careful palpation showed not only the growth but about two inches below a mass which, at first, was thought to be feces but was found to be fixed so that the resection was made to include it. The pathologist's report was somewhat of a surprise as he said that the carcinoma was actually a diverticulitis and that the mass below was a polyp with a definite beginning malignancy. That patient has been followed routinely since without evidence of recurrence by x-ray or laboratory study.

This case is, of course, what would be called a "lucky break" for the patient and shows what is apparently a single polyp inasmuch as in four years no evidence of other polypi has developed. Nevertheless, I believe the burden of proof is on us to watch her and make sure that no further secondary cancer develops.

CASE 3 M G H, E S, a man, aged fifty, came into the hospital in April, 1930 with symptoms extending back only a few weeks. Distress and in definite indigestion were the main symptoms. There was a palpable mass in the right upper quadrant and x-ray showed a tumor of the hepatic flexure. At operation a resection was done and no metastases were found. The pathological report was adenocarcinoma and no involvement of lymph nodes, only a moderate rate of growth and a relatively low malignancy. He had no further symptoms until February, 1933 and he reentered in April and at that time there was a growth in the upper end of the descending colon. Resection of the splenic flexure was done but this time there were metastases to the lymph nodes and when last seen four months ago he had a palpable liver and beginning jaundice. There was no evidence in the x-ray at any time either in 1930 or 1933 that there were polyps elsewhere in the colon and, at the last operation, careful palpation failed to show anything. This patient had not been followed between the two operations in the out-patient department.

I think this patient shows what is more apt to be the truth than the case previously noted, namely, that other polypi are present at the original operation but not palpable to the ordinary search. Had this case been followed in a routine fashion, it might well have been possible to recognize the secondary growth early enough to offer him still a good chance of per-

manent cure instead of which it has probably resulted fatally by this time.

CASE 4 A female, aged fifty five, went to her doctor with a slight temperature of unknown origin and an increasing constipation, no localizing symptoms. An obstruction was demonstrated at the splenic flexure and in 1931 operation was done with a resection of the splenic flexure. The pathological report at that time was adenocarcinoma, grade 3. The patient did well and her check ups were purely clinical until 1933 when it seemed to me that we must consider all of these cases as having potential malignancy elsewhere, and routine barium enemas were done as well as routine search for occult blood in the stool and rectal examinations. Everything went smoothly until the x-ray in September, 1934 which showed a slight filling defect in the low sigmoid. There was no other evidence of trouble, however, and she did not show positive guaiacs until the first of 1935. At that time she did have two or three positive guaiacs and another barium enema showed the same persisting suggestive area in the sigmoid. Accordingly, operation was done and an early carcinoma of the sigmoid was found. Because of the previous operation and the resulting tension, the large bowel from the middle of the transverse colon down to the lower sigmoid was removed and on section of the old anastomosis, an early recurrence was found in the wall. The lymph nodes were not invaded and it seems as though she had a better chance for cure than the usual secondary operation gives.

In this instance I had not reached the point that I now have where the suspicious x-ray should have resulted in earlier action.

With these cases as illustrations my thesis is simple. I believe that whenever a carcinoma of the large bowel is successfully operated on, that colon should be considered as having one or more starting points for later growths. Accordingly, I believe the following procedures should become routine. Before operation, the roentgenologist should report not only that there is an obstruction or a growth but also should, to the best of his ability, say whether there are other areas which suggest possible polypi. I believe that a proctoscopy should be done to see whether the rectum and low sigmoid will show polyps. At operation whenever it is possible, the surgeon should palpate carefully the whole area of the colon to see whether he can demonstrate other tumors. It is always difficult and oftentimes impossible to recognize small, soft, pedunculated papillomata so that this manoeuvre must not be considered sufficient to rule out future trouble. After the patient's recovery, these cases must be considered to have potential malignancy elsewhere in the large bowel until time and careful study have ruled it out. This study should mean a routine check-up at least every six months and should consist of the following: (1) A careful x-ray study by a roentgenologist competent to give reasonable hope of early recognition of trouble, (2) routine study of stools for occult blood. The patient should also be instructed to report any change in bowel habits that show

any tendency to persist or recur. It seems to me that we have here a clear indication to justify this bother and expense to the patient in contradistinction to innumerable cases of vague abdominal symptoms which when first seen suggest a functional background and where the patient would generally feel that it was an unfair hardship and expense to put him through a complete x ray, proctoscopic, and laboratory check up.

#### DISCUSSION

Dr. LUCIUS C. KINGMAN, Providence, R. I., Mr. President—Dr. Young has covered this whole matter very well. We have all seen cases such as he describes and we are of the opinion that secondary operations in cancer of the big bowel are quite justified when we have symptoms pointing to a local condition. On secondary operation I have found obstruction due to cancer of small bowel and of course that due to adhesive peritonitis is not uncommon.

As to how long a patient should be followed until we feel he is free from a chance of recurrence I do not know. Probably all malignancy should be followed as long as the patients live or as long as you can persuade them to remain under observation.

On the hospital cases, I think the only practical method is a special clinic for malignancy. We can not throw them into the general outpatient clinic or even the general follow up clinic on service. The

financial problem comes in as Dr. Young mentioned and at times we would be swamped if we followed these cases perhaps in the ideal way which he has mentioned.

I should like to give a little word of warning about x ray reports. I do not believe you can diagnose every case of malignancy of the big bowel by x ray even well advanced. I have been misled that way and in cases where they have been repeatedly x rayed by experts in more than one town.

What he said about the complete examination of the big bowel at the time of operation is a very important thing and probably most of us have not done that so well as we should. We go in and feel the growth locate that size it up. We are so interested in the job we go ahead and do it. We forget there is a bowel below that may have polyps or implantations or what not.

Dr. Young has told us several things that we should always bear in mind.

Dr. FRANK H. LAHEY, Boston, Mass. I have one thing to add and that is the value of contrast enemata. Lockhart Mummery has just reported a series of cases of carcinoma of the rectum and colon followed over a series of years in which there was a high incidence of secondary carcinoma.

We have had this same experience and everyone who deals with colons surgically is bound to have this same experience of there being coincident other papillomata which may degenerate into malignancy. For that reason I would urge strongly that everyone take advantage of the value of so-called contrast bismuth and air enemata for the demonstration of possible other coincident papillomata.

### RETICULOCTE RESPONSES IN THE PIGEON PRODUCED BY MATERIAL EFFECTIVE AND NONEFFECTIVE IN PERNICIOUS ANEMIA WITH DESCRIPTION OF THE HISTOLOGICALLY DIFFERENT REACTIONS OF THE BONE MARROW\*

By GULLI LINDH MULLER, M.D.†

IN the experimental work undertaken to obtain a biological test for the potency of material effective in pernicious anemia, one fundamental principle has hitherto not been emphasized namely, that the reticuloocyte response in the peripheral blood may represent at least two fundamentally divergent reactions of the bone marrow. This is not a question of theoretical interest only, but a vital problem as a method must be found which will differentiate the response to the administration of the principle effective in pernicious anemia, and that of other substances closely associated with this principle but without affecting in a desirable manner blood formation in the specific disease in man. That a reticuloocyte response may be obtained in experimental animals which bears no relation to the response obtained with substances potent in pernicious anemia, is the subject of this paper.

In 1927 shortly after the introduction of liver therapy in pernicious anemia, it was noted that

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the blood and the bone marrow of the pigeon were peculiarly susceptible to liver feeding<sup>1</sup>. In the autumn of 1929 comparatively pure sources of the principle effective in pernicious anemia were available and it was shown, that material capable of causing a reticuloocyte response with rapid blood regeneration in pernicious anemia also produced a reticuloocyte response in healthy, grain fed pigeons kept under standard laboratory conditions<sup>2</sup>. This has been confirmed by Edmunds and coworkers<sup>3</sup> and Peabody and Neale<sup>4</sup>. Wills<sup>5</sup> and Heermann<sup>6</sup> Connery and Goldwater<sup>7</sup> found that the reticuloocyte percentage of all their birds showed large fluctuations and that no significant change occurred in the control animals and those which had liver extract. In a recent communication Gurd<sup>8</sup> suggested that these differences may be due to the method of staining and counting reticuloocytes. He found that the concentration of the brilliant cresyl blue exerted a marked influence on the number of reticuloocytes in the pigeons' blood and that when a sufficiently strong solution was used some stained granular material was found in practically all the cells.

The variations in experimental results obtained by various observers using different techniques may be explained by a consideration of the sensitivity of the hematopoietic organs of the pigeons. Lack of food or inadequate diet may deplete the bone marrow even to the point of aplasia<sup>1</sup>, and infection exerts a powerful influence<sup>8</sup>. Consequently in our comparative work on the effect of various substances on the hematopoietic organs of the pigeon over a period of years, the experimental conditions have been kept as identical as possible. Birds showing unexplainable variations in weight and in the blood during the control period were discarded. The pigeons were kept in small individual cages with space sufficient only for movement of the wings, and they were fed, and blood examinations made at the same time of day avoiding all undue excitement by rolling the animal in a towel. Great care was taken to avoid bleeding as in small animals the loss of several drops of blood may cause bone marrow changes. Also as was pointed out by Vaughan, Muller and Zetzel<sup>2</sup> more brilliant cresyl blue was used in the preparation of the blood smear than is necessary for mammalian blood by making thicker films using 0.5 per cent alcoholic solution of brilliant cresyl blue on both coverslips used for the smear. In counting the cells the fact was not emphasized in former communications that a few dust-like fine granules in the red blood cells were not considered as reticulums. Since the young cells of the birds' blood, as a rule, show heavy reticulation, the qualitative differences after the administration of certain substances were as striking as the quantitative change. In all our experiments the same technique was always employed, and the results obtained, therefore, may be considered significant. Reticulocyte responses accepted as positive were always in the form of a definite progressive rise rather than fluctuations back and forth between normal and higher levels. In addition, the response in the peripheral blood has been checked in most cases by microscopical examination of the bone marrow. Differences, therefore, found by some observers may be due to variations in the experimental conditions, and, as has been suggested by Gurd<sup>7</sup> to the staining and standard employed in counting the reticulocytes.

The megaloblastic character of the bone marrow in pernicious anemia and allied conditions is well established. Apparently, so far as is known, it is this type of bone marrow alone that responds to material effective in pernicious anemia. The quantitative and qualitative changes which occur in the bone marrow of patients receiving liver therapy have been described by Peabody<sup>9</sup>.

The bone marrow of the healthy adult pigeon likewise is characterized by an abundance of megaloblastic tissue. The administration of liver, or liver extract, potent for pernicious

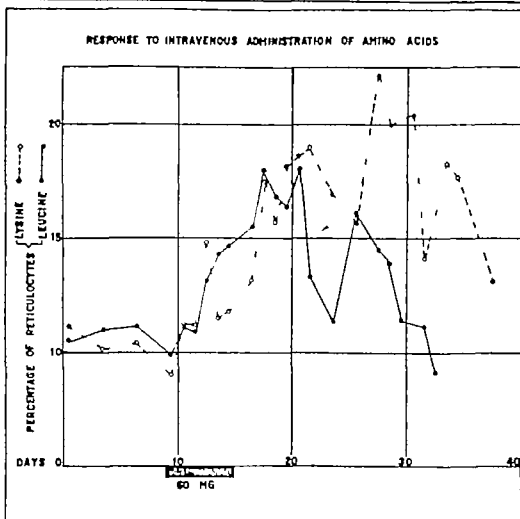
anemia, produced a reticulocyte response and changes in the bone marrow of the pigeon<sup>1, 2, 8</sup> similar to those observed by Peabody in man.

As no demonstrable effect had been obtained at that time in other laboratory animals with the principle effective in pernicious anemia, it was thought that this reticulocyte response in pigeons might furnish a convenient test for the potency of the principle effective in the disease. Further work demonstrated, however, that although most clinically inert fractions of liver elicited no reticulocyte response in the birds, one fraction, clinically tested and found ineffective, caused a reticulocyte response in pigeons. This fraction was a comparatively pure preparation of the amino-acid, leucine<sup>2</sup>, the preliminary work on leucine has been repeated and verified.

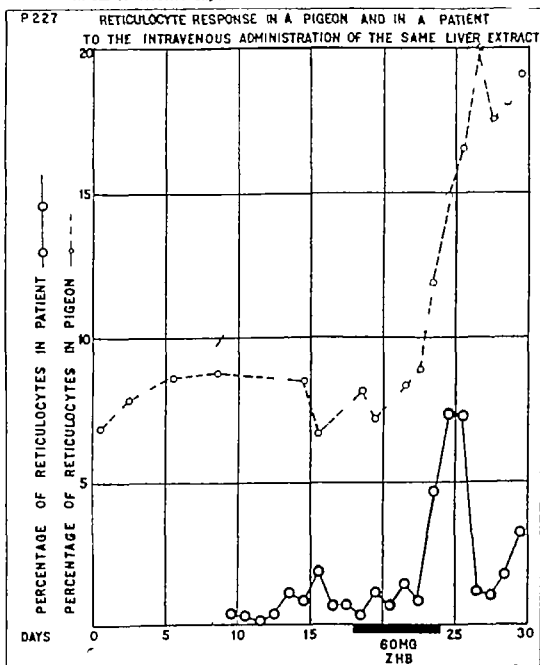
To find out whether commercial preparations of pure amino-acids, which are known constituents of red blood cells, produced a reticulocyte response in the peripheral blood of pigeons, three other amino-acids, lysine, arginine, and histidine have been tested. The experimental methods were identical with those previously employed<sup>2</sup>. Ten milligrams, and in some instances 20 milligrams of the amino-acid was administered intravenously on six consecutive days to several birds.

In chart I the reticulocyte responses to lysine and leucine are illustrated and in chart II the response to a comparatively pure fraction of liver extract injected intravenously. The reticulocyte reaction to the principle effective in pernicious anemia usually was a moderate one, only occasionally exceeding 20 per cent. Similar reticulocyte responses were obtained with both leucine and lysine. When larger doses of lysine were employed (20 mg.) there was an outpouring of reticulocytes in the peripheral blood of the pigeon in some instances reaching values of 30 to 35 per cent. The two other amino-acids tested, arginine and histidine, gave indefinite or no reticulocyte responses.

An explanation for the rise of reticulocytes in the peripheral blood of pigeons to substances which are not effective in pernicious anemia was found by the examination of the bone marrow. As has been pointed out previously<sup>1, 8</sup> the radial bone marrow in the normal pigeon has been found to be mainly fatty with some cellularity at the edges. The femoral marrow on the other hand was found to be hyperplastic and contains red blood cell islands consisting of a mixture of cells ranging from megaloblasts to mature red blood cells with a considerable proportion of the cells in the megaloblastic or early erythroblastic stage. Often mitotic figures are present. Occasionally the radial marrow is hyperplastic which occurs when the femoral marrow, for some unknown reason, has been replaced by cancellous bone. Hyperplasia, therefore, of the



I. Reticulocyte response in the peripheral blood of pigeons to the intravenous injection of 10 mg. of lysine and leucine on six consecutive days.



II. Reticulocyte response in a pigeon following the injection of 10 mg. of an effective liver preparation on six consecutive days and the reticulocyte response in a patient with pernicious anemia who received a total of 1.8 grams of the same liver preparation. The patient's red cell level was 2,700,000 per cmm.

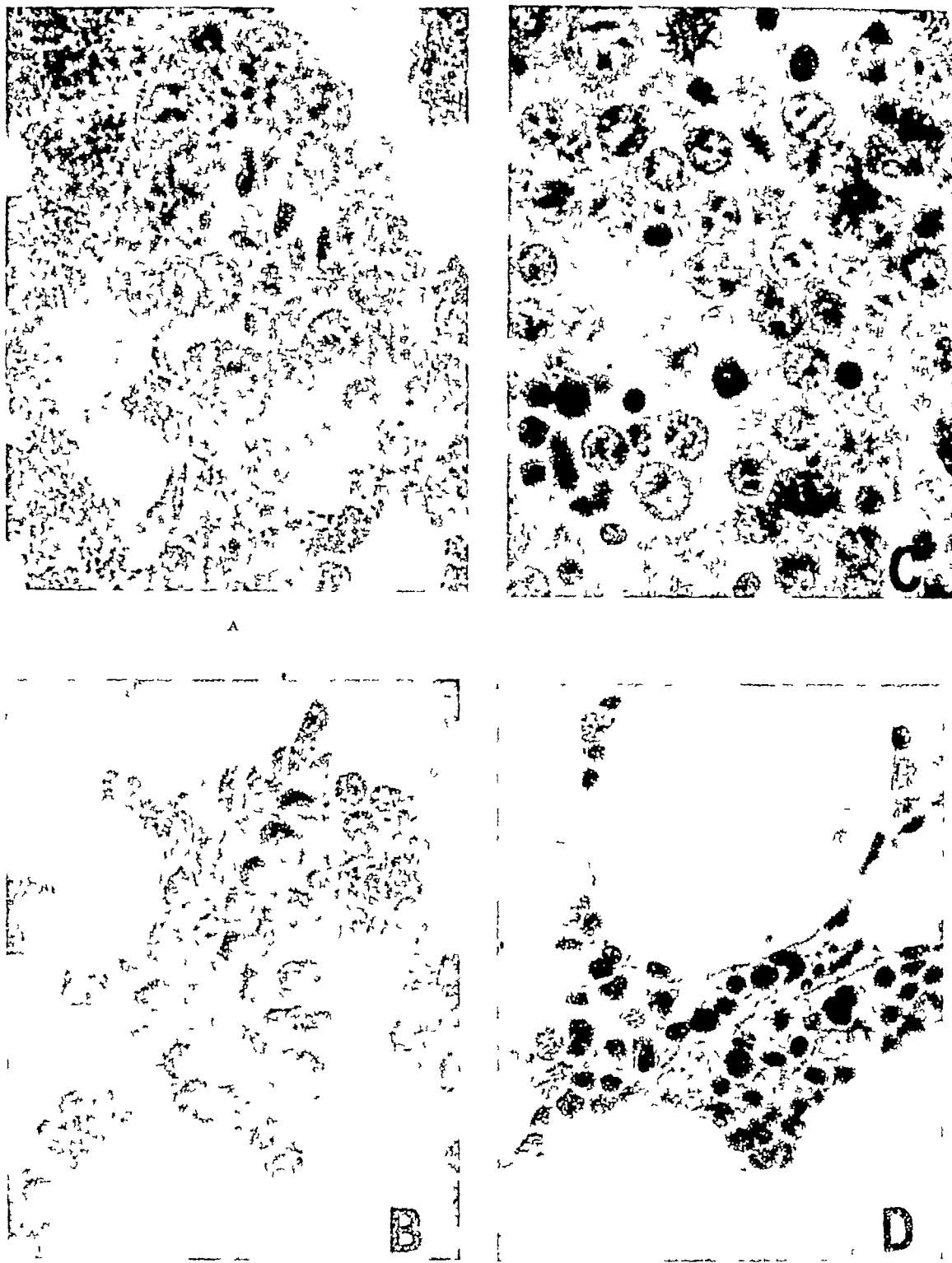


FIGURE 1 Bone marrow from pigeons and a patient with pernicious anemia before and after the administration of liver extract

- a Normal femoral marrow of pigeon Note the megalo-blasts at the periphery of the island of erythrocytes and the adult cells in the center  $\times 1500$
- b Femoral bone marrow of a pigeon after the administration of liver extract The island consists of practically mature cells  $\times 1500$
- c Tibial bone marrow from a patient with pernicious anemia in relapse  $\times 1000$
- d Tibial bone marrow from the same patient as (c) in a remission produced by the administration of principles effective in pernicious anemia  $\times 750$

radial marrow, as a rule, indicates growth and thus extension of the blood forming tissue

In fig 1a the appearance of the normal femoral bone marrow of a pigeon under the standard laboratory conditions is illustrated, and in fig 1b the femoral bone marrow after the administration of "liver extract." A marked change in the erythrocytic centers is discernible. The marrow obtained after the administration of liver extract, at a time when the peak of the reticulocyte response had passed showed a qualitative change of the red blood cells. The

In figs 2a and b is shown the *radial* marrow of a pigeon injected intravenously with lysine. The extension of erythrocytic centers and the hyperplasia of this normally practically fatty marrow and the activity, as evidenced by mitotic figures, is unmistakable. The reticulocyte response to lysine, therefore, and other substances examined giving the same bone marrow reaction, is thus easily explainable. New formation of erythrocytes in the femoral bone marrow, and more especially extension to the radial marrow accounted for the reticulocyte response both



FIGURE 2. Radial bone marrow of pigeon injected intravenously with 70 mg. of lysine for ten consecutive days and killed sixteen days after the first injection.

- a. Hyperplasia of erythroblastic tissue in a normally fatty marrow. X500  
b. Large erythroblastic center from fig. a showing megakaryoblasts and several mitotic figures. X1500

erythrocytic centers were small and shrunken and consisted mainly of cells in the late erythroblastic and normoblastic stage. Quantitatively there appeared to be a decrease of erythropoietic tissue. Thus the outpouring of the reticulocytes occurred without microscopic signs of activity and without extension of erythropoietic tissue into the radial marrow.

The similarity of this response in the birds bone marrow to the one obtained in patients with pernicious anemia is striking. This is illustrated in figs 1c and d. The former shows a section of the tibial bone marrow of a patient with pernicious anemia in relapse and the latter the marrow from the same patient, both obtained by biopsy after the administration of substances effective in pernicious anemia.

qualitatively and quantitatively. The reticulocyte response to the principle effective in pernicious anemia however seemed to be commensurable with the amount of megakaryoblastic tissue present and there was no stimulation of the bone marrow if with stimulation we postulate new formation of megakaryoblasts and extension of the erythropoietic tissues.

From the above, one is justified in concluding that a reticulocyte response in the peripheral blood may depend upon at least two diametrically opposite reactions. In one a megakaryoblastic marrow as is found in patients with pernicious anemia and allied conditions and in the normal pigeon is essential. This type of marrow is influenced in a specific manner by the principle effective in pernicious anemia. The other type

of reticulocyte response produced by leucine and lysine in this study, is caused by a stimulation and proliferation of red blood cells and an extension of blood-forming tissue. Qualitatively and quantitatively the reticulocyte response in the pigeon to substances causing a stimulation and extension of erythropoietic tissue cannot be differentiated from that due to the specific effect of "liver extract". It is obvious, therefore, that this reaction alone cannot be used as a measure of the potency of unknown principles as to their effectiveness in pernicious anemia. However, in the hands of the experienced observer, the reticulocyte response in the peripheral blood of the pigeon, correlated with the histological appearance of the bone marrow might become a valuable, although not ideal, biological indicator of the hematopoietic potency of substances effective in pernicious anemia. Recently a test for the potency of liver extract has been proposed by Jacobson<sup>10</sup>, namely, the reticulocyte response in particularly selected guinea pigs. A mammalian test animal has many advantages over the avian, but whether the guinea pig responds to other substances with a reticulocyte increase in the peripheral blood and hyperplasia and extension of the erythropoietic tissue has not been reported.

#### SUMMARY AND CONCLUSION

1 Previous work has been confirmed that the injection of comparatively pure liver extracts effective in pernicious anemia causes reticulocyte responses in the pigeon under standard conditions.

2 Similar reticulocyte reactions were obtained by the intravenous injection of lysine and leucine, while arginine and histidine gave but indefinite responses.

3 These reticulocyte responses in the peripheral blood were accompanied by two histologically different reactions of the bone marrow

a. After the administration of liver extract the megaloblasts of the bone marrow were transformed to more adult red blood cells. This occurs also in the bone marrow of pernicious anemia patients after liver therapy.

b. After the administration of lysine and leucine the bone marrow showed an increase and extension of erythroblastic tissue. Numerous megaloblasts and many mitotic figures were present.

4. A reticulocyte response in the peripheral blood, therefore, may be due either to a principle effective in pernicious anemia acting on a megaloblastic marrow, or to other substances such as lysine or leucine, which produce a growth and thus extension of erythrogenic centers. This dual reaction is a factor to be considered in any work undertaken for a biological test of the principle effective in pernicious anemia, as the peripheral reticulocyte response may be produced by two diametrically opposite bone marrow reactions.

#### REFERENCES

- 1 Muller G L. Experimental bone marrow reactions in fluence of liver and meat diets on bone marrow and regeneration of red blood cells and hemoglobin. *Am J Physiol* 82: 269 (Oct.) 1927.
- 2 Vaughan, J M. Muller G L and Zetzel L. The response of grain-fed pigeons to substances effective in pernicious anaemia. *Brit. J Exper Path* 11: 466 (Dec) 1930.
- 3 Edmunds C W. Brueckner H. H. and Fritzell A. L. On laboratory test for liver extract. *J Am Pharm. A.* 22: 91 (Feb) 1933.
- 4 Peabody W A and Neale R C. The pigeon as a hematopoietic test animal. *J Am. Pharm. A.* 22: 1231 (Dec.) 1933.
- 5 Wills L. Spontaneous fluctuations in reticulocyte count in pigeons blood. *Brit. J Exper Path* 13: 172 (April) 1932.
- 6 Helmann H. Connery J B and Goldwater L J. Lack of effect of liver treatment on the circulating reticulocytes in the pigeon. *Am J M. Sc.* 188: 343 (Sept.) 1934.
- 7 Gurd M. R. The use of grain fed pigeons in the biological assay of liver preparations. *Quart. J Pharm & Pharmacol* 8: 39 (Jan-March) 1935.
- 8 Muller G L. Influence of liver extract and acute infection on reticulocytes and bone marrow of pigeons. *Arch Path* 14: 774 (Dec) 1932.
- 9 Peabody F W. The pathology of the bone marrow in pernicious anemia. *Am. J Path* 8: 179 (May) 1927.
- 10 Jacobson B M. Response of normal guinea pig to administration of liver extracts. *Science* 80: 211 (Aug) 1934.

## SPINAL ANESTHESIA\*

### Agents, Methods and Indications

BY MEYER SAKLAD, M D †

WITHIN the past few years there have been added to the field of spinal anesthesia new methods and agents. This paper is offered as a review of the subject with an attempt to consider and contrast the more important agents, methods and the theories underlying their usage.

#### AGENTS

In considering agents employed in any field of usefulness to accomplish a given purpose it

is logical to investigate first their relative toxicity.

Some may argue that the toxicity of an agent employed in spinal anesthesia is not important since the dose necessary to accomplish a therapeutic result is so small that the danger from toxic absorption into the blood stream is negligible. Witness the statement of Babcock<sup>1</sup> who speaks of the successful use of cocaine intraspinally in the General Hospital of Mexico City. It is his feeling that "the danger lies more in the technique of the user than in the drug."

Nevertheless, if a difference in toxicity between agents does exist, it is important that we know and benefit by it. Toxicity of an agent

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employed in spinal anesthesia may manifest itself by absorption from the subarachnoid space with action on the body as a whole or secondly by its action on the structures with which it comes in direct contact.

First, its action on the body as a whole. A rather complete study of all available English literature on the subject failed to produce an investigation on the relative action of the several agents employed in spinal anesthesia determined through this method.

Marvin<sup>27</sup>, in considering the present status of various spinal anesthetics, quotes the work of Nowak in determining the comparative fatal intravenous dose of the various anesthetics on cats. Nowak<sup>28</sup>, in a recent communication states his conclusions are in this regard unchanged.

Another investigation of the comparative fatal intravenous dose of the various agents is that of Wiedhopf<sup>18</sup>. This work was done on rabbits.

Their work is summarized in table 1. In the

TABLE 1  
COMPARATIVE FATAL INTRAVENOUS DOSE

	Avg Fatal Dose Mgm/kgm	Ratio (Com pared to Pro- caine)	Dose Ratio	Cor rected Tox icity Ratio (Com pared to Pro- caine)
<b>Cats (Nowak)</b>				
Procaine	49.6	1.0	1.0	1.0
Metycaine	28.8	1.7	0.8	1.36
Pantocain	8.6	5.8	0.1	0.58
Nupercaine	3.5	14.2	0.05	0.71
<b>Rabbits (Wiedhopf)</b>				
Procaine	57.5	1.0	1.0	1.0
Pantocain	8.0	7.18	0.1	0.71
Nupercaine	3.0	19.16	0.05	0.958

In the first column we see the average dose in milligrams per kilogram necessary to kill the animal. In the second column we note the toxic ratio of the various agents compared with procaine. Thus, giving procaine unity we find, in Nowak's work, that metycaine is 1.7 times as toxic as procaine, pantocain 5.8 and nupercaine 14.2 as toxic. In Wiedhopf's work metycaine was not considered. Here we find pantocain 7.18 times and nupercaine 19.16 times as toxic as procaine.

These studies up to this point show the relative absolute toxicities of the drugs. To stop here would be unfair to the different agents and would not be truthful. To approach the truth a bit closer it would be necessary to consider another factor—that of relative dosage.

Marvin<sup>27</sup> gives us the relative dosage of the agents. Table 2. To his list of relative dosage

TABLE 2  
RELATIVE DOSAGE  
(Marvin)

	Mgm	Ratio
Procaine	200	1.0
Metycaine	160	0.8
Pantocain	20	0.1
Nupercaine	10	0.05

I have added the dose ratio. Giving procaine unity we find that metycaine is effective in 0.8 the dose, pantocain 0.1 and nupercaine 0.05 the dose of procaine. Transposing this dose ratio to table 1 and correcting the ratio of absolute toxicity we arrive at a corrected toxicity ratio. Here we find in Nowak's work that metycaine is 1.36 times as toxic as procaine, pantocain 0.58 and nupercaine 0.71 times as toxic as procaine. In Wiedhopf's work we see that pantocain is 0.71 and nupercaine 0.958 times as toxic as procaine. Here I wish to stress a very important factor. The work here quoted was not done on human beings. It is true that animal investigation is very helpful but we must not lose sight of the fact that animals are prone to react to drugs differently than is the human being.

Another reason why we should not accept this corrected ratio at its face value is the fact that the final ratio arrived at is dependent to a large extent on the dose ratio of the various agents. There exist in the minds of many anesthesiologists marked disagreements as to the relative dosage of the various drugs. Were we to accept the finding of Israels and MacDonald<sup>10</sup> that in intraspinal injection in the cat nupercaine is as effective as procaine in 1/40 of the dose instead of Marvin's feeling that it is as effective as procaine in 1/20 the dose, we can see the difference it would make in the corrected toxicity. As far as I have been able to determine no one has subjected a human being to the tests necessary to determine the relative dosage of the agents considered in preventing the passage of impulse in an exposed motor or sensory nerve.

In considering the toxicity of the agents we should not depend entirely on laboratory findings. The clinical aspect is equally important. Lund<sup>22</sup>, in speaking of the advantages and disadvantages of the various anesthetic agents, divides them into two groups from the standpoint of immediate results:

1 Those in which there is little if any margin of safety between failure of the respiration and failure of the heart.

2 Those in which there is a wide margin of safety between failure of respiration and failure of the heart.





## METHODS

The methods employed in spinal anesthesia are essentially attempts to place an anesthetic fluid subdurally about nerve roots. A knowledge of the anatomical relationship between the lower spinal vertebrae and segments of the cord is necessary.

A solution deposited at one point subdurally may be transferred in part to another location about the cord by one or usually by a combination of the following factors

1 *Diffusion* Diffusion may be controlled by—

a *Dosage* A drug in solution placed intraspinally will very soon begin to lose its original concentration, becoming diluted with the medium in which it finds itself. This increasing dilution will occur in all directions. Any nerves exposed become affected in proportion to the concentration of the drug surrounding it. Nerves at a distant point may not receive a solution sufficiently strong to alter their action. Thus, the greater the original concentration the more widely will the action of the drug be effective. This factor may be spoken of as molecular diffusion.

b *Volume* Of two volumes of an anesthetic solution of like strength, the larger will occupy a greater area within the subarachnoid space and the smaller a less. In each case they involve an area in proportion to the amount of fluid injected. Whether we begin the injection with 2 cc of a solution and by barbotage increase it to eight or whether our original dose is immediately dissolved in eight cc and injected with no barbotage, it is an attempt to deliver the drug to a site within the subarachnoid space distant to the point of needle entrance, by diffusion. The difference is slight but it is there. Employing barbotage, we are continually injecting solutions of diminishing concentration whereas, in the absence of barbotage we are injecting a solution of definite characteristics the nature of which we know beforehand. Because of the difference in the characteristics of the solutions, varying results may be expected.

2 *Site of Injection* As readily seen by varying the level at which the anesthetic solution enters the dural canal one can approach a point closer or more distant to the nerve roots to be blocked.

3 *Speed of Injection* Likewise readily seen is the fact that a solution forcibly injected would reach a point farther from the site of needle entrance than had the solution been gently introduced.

4 *Specific Gravity* Considerable has been said relative to the importance that specific gravity plays in determining the height of anesthesia. Table 6 is a list of the different specific

TABLE 6

## SPECIFIC GRAVITY OF SPINAL FLUID

Hoppe	1001 1005
Halliburton	1007 1008
Kaska	1002 1008
Zdareck	1007
Polanyi	1005-1007
Mestrezat	1007
Nawratz	1008
Penda	1007 1010
Borelli and Data	1007 1009
Williamson	1005-1009
Hammerstein	1007 1008
Eskuchen	1006-1007
Levinson	1003-1007

gravities of spinal fluid as determined by various workers. This is a table from an article by Jones.<sup>1</sup> It is very important to note the wide variation that occurs, from 1.001 to 1.010. Others give the specific gravity of spinal fluid as from 1.0012 to 1.0060<sup>25</sup> and from 1.006 to 1.008<sup>16</sup>.

TABLE 7

## SPECIFIC GRAVITY OF AGENTS USED IN SPINAL ANESTHESIA

	Specific Gravity
<i>Procaine</i>	
1 10 in spinal fluid	1.005
1 20 (200 mgm in 4 cc.)	1.013
1 40 (200 mgm in 8 cc)	1.008
<i>Metycaine</i>	
1 20	1.020
1 10	1.036
<i>Pantocaine</i>	
1 100 in saline	1.0068
1 400 in saline	1.002
<i>Nupercaine</i>	
1 200 0.5% saline	1.0046
1 1500 0.5% saline	1.0030
1 1500 0.9% saline	1.0061
1 1500 in water	1.00005
10% Procaine in 1 200 Nupercaine	1.018

Table 7 lists the specific gravities of the various anesthetic solutions. The items in this table were taken from various sources.<sup>1 12 25 30 34 43 45</sup> To use the terms employed by Jones to represent solutions with a specific gravity heavier than, the same as, or lighter than spinal fluid hyperbaric, isobaric or hypobaric—and, considering the extremes in specific gravity which spinal fluid might have, we find that the same agent in the same dilution may at different times assume any of the above relationships to spinal fluid.

Thus pantocaine, 1 per cent in saline, with a specific gravity of 1.0068 may be hyperbaric to a spinal fluid of less specific gravity, isobaric to a fluid of like specific gravity and hypobaric to one of greater gravity.

Solutions to be always considered hyperbaric

would have to have a specific gravity greater than 1.010. In this classification fall most of the procaine or metycaine solutions. Solutions to be consistently hypobaric would have to have a specific gravity of less than 1.001. Under this heading would be the 1.1500 solution of nupercaine in water.

Romberger<sup>30</sup> employs a small bulk concentrated solution of high specific gravity. He feels that a greater degree of control is thus obtained. It is his feeling that the rate of diffusion is fixed and certain and that gravitation can be regulated by the level or plane of the spine. Jones<sup>12</sup> attempts to create within the dura a long or short column of anesthetic fluid depending on the height of anesthesia desired. To this end he employs a 1.1500 solution of nupercaine with a specific gravity of 1.003. This "hypobaric" solution if introduced into a spinal canal the fluid of which has a specific gravity of 1.001 becomes actually a hyperbaric solution. Under this condition, employing Trendelenburg position, an anesthesia higher than that expected will occur.

It is difficult for many to believe that a small difference in specific gravity between the agent and spinal fluid is important, especially since the agent and spinal fluid are so readily soluble in one another.

The higher area of sensory anesthesia over motor which occurs under spinal anesthesia we have been led to believe is a result of the greater selective affinity of sensory over motor nerves for local anesthetics, particularly in weak solutions. Jones<sup>12</sup> offers an added explanation for the phenomenon. He reasons that to depend on gravity to give proper anesthesia and muscular relaxation, employing a hyperbaric solution, results in higher sensory anesthesia than motor since the posterior roots are bathed over a larger area than are the anterior (Figure 1A).

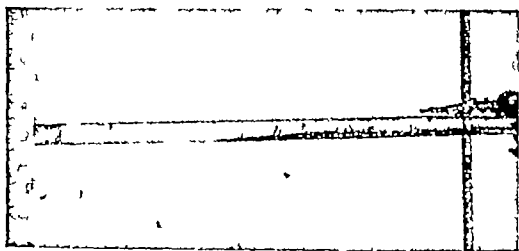


FIG 1A. Dye represents a solution of greater specific gravity than spinal fluid.

In employing a hypobaric solution the opposite occurs—a higher motor than sensory anesthesia. This is the result of a more widespread anterior root action (Fig 1B). Thus in using solutions of lower specific gravity than spinal fluid paralysis of intercostal nerves may be more marked than with the other type of solution.

**5 Position of Patient** Changing the tilt of the table as employed in the various techniques of spinal anesthesia, is for one or both of the following reasons

a To place the anesthetic solution about some desired segments of the cord.

b To prevent or treat certain dangerous complications which may arise as the result of the fall in blood pressure accompanying the anesthesia.

Most workers using agents with a specific gravity higher than that of spinal fluid employ the Trendelenburg position at some point in their technique to increase the height of anesthesia. Those dealing with a solution of lighter

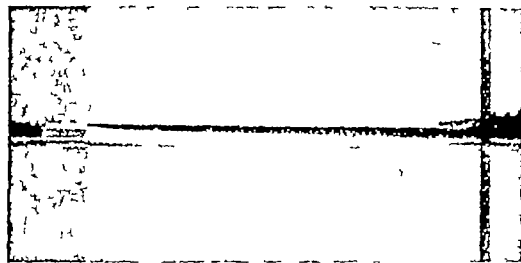


FIG 1B. Dye represents a solution of lower specific gravity than spinal fluid.

specific gravity place their patients in the same position to keep the solution low down in the canal. Occasionally, workers with a heavy solution will raise the head of the table to maintain the agent in the most dependent portion of the dural space. Thus Romberger<sup>30</sup> administering a concentrated procaine-nupercaine mixture uses Fowler's position to control height. He employs the Trendelenburg position later on as needed, but he warns that there is danger in the too early use of the head down position since nupercaine fixes slowly and in combination with procaine is heavier than spinal fluid. McCuskey also delays, for a period of fifteen to twenty minutes, assumption of the Trendelenburg position after the introduction of a pantocain-procaine combination, for the same reason as does Romberger. Rovenstine<sup>38</sup> in dealing with a procaine-dextrose solution, particularly in transurethral prostatic resections, recommends that the head and shoulders be elevated to maintain a low anesthesia. Etherington-Wilson<sup>46</sup> employs the sitting position for varying intervals following injection of a 1.1500 solution of nupercaine, allowing for rise of the agent in the canal.

Jones<sup>12</sup> feels that application of the Trendelenburg position to give height of anesthesia results not in moving a dose in high concentration to the most dependent part but to advance an ever-decreasing concentration over a distance which will be proportional to the amount of drug injected. Woodbridge<sup>47</sup> administering metycaine employs Trendelenburg in preference to barbotage to give height of anesthesia.

CoTui<sup>48</sup> in spinal anesthesia on dogs showed that in the head down position it takes less than one-half the dose to kill an animal than in the horizontal position. In the head up position it takes even more to kill the animal. The

above experiments were with procaine dissolved in 3 cc. of distilled water and injected in the first lumbar interspace. In the horizontal position it takes over 850 milligrams of procaine to cause death by respiratory paralysis in an average time of thirty minutes. In the head up position it takes from 900 to 1000 milligrams to result in death in an average time of fifty minutes. In the head down position 400 milligrams was followed by death in an average time of seventeen minutes. He concludes that the Trendelenburg position is not only useless but harmful. It must be remembered that CoTui was not dealing with therapeutic doses. The concentrations were tremendous and the specific gravity must of necessity have been extremely high.

Labat's theory behind the use of the Trendelenburg position to prevent certain dangerous complications incidental to the fall in blood pressure accompanying the anesthesia was to prevent cerebral anemia. His feeling was that with the tremendous vasodepression that occurs the one structure to suffer most was the brain. A fall in blood pressure, if severe would allow the cerebral blood vessels to collapse, since they have weak walls unsupported by musculature. A collapse of these walls would be followed by cerebral anemia. To prevent this collapse he felt that to maintain these channels patent would be to forestall any such disastrous occurrence and the best way to maintain patency most dependably was to take advantage of the increased blood flow to the brain that the Trendelenburg position would give. CoTui, in reaching his conclusion that the Trendelenburg position was both useless and harmful performed no experiments to learn if there was any basis of fact in Labat's theory.

Sise<sup>41</sup> feels that in this position the blood gravitates toward the vital nerve centers and hydrostatic action tends to maintain a higher pressure in them than is present in other parts of the body. He<sup>40</sup> agrees with many others that operations should always be done in this position as far as possible except when using a heavy solution. He<sup>41</sup> states as to the disadvantages of this position that if there are large masses of abdominal fat, the movements of the diaphragm may be impeded and respiration hampered. Woodbridge<sup>42</sup> institutes this procedure in the presence of a falling pressure. Stout<sup>42</sup> employs it as demanded to prevent cerebral anemia.

Tables 3, 4 and 5 represent summation of techniques by several workers with different agents. In the procaine series, table 3, we see that Labat employs 150 milligrams as a maximum dose, uses no ephedrine, varies the volume of the injected fluid but slightly, employs Trendelenburg position immediately, and varies the site of puncture. Evans using 120 milligrams as maximum, also employs no ephedrine,

substituting adrenalin, and applies the Trendelenburg position, if vasomotor collapse occurs or if the anesthesia is too high. He varies the volume injected much more than does Labat and keeps his punctures lower. Stout introduces more procaine into the spinal canal, administers ephedrine in varying doses, depending on the height of anesthesia, keeps the injected volume low, institutes Trendelenburg position if necessary and utilizes the same interspace for all levels of surgery. He modifies the duration of the injection depending on the level of anesthesia desired. Vohrs employs greater doses than any of the others here, administers no ephedrine, varies the dilution slightly, employs varying degrees of the Trendelenburg position and sites of puncture depending on height of anesthesia desired. Roventine's technique for transurethral surgery consists of moderate dosage plus dextrose solution, no ephedrine, reverse Trendelenburg position and low puncture.

Thus Labat depends on varying levels of puncture, changes in dosage and the Trendelenburg position for height of anesthesia. Evans, on varying dosage, volume and site of puncture. Stout on varying dosage and speed of injection, Vohrs, on varying dosage, volume and site of puncture.

In the nupercaine series, Table 4, we see that Keyes, using the 1.200 solution, employs an unvarying dose, site of puncture and position but varies the volume injected. His dosage is full for he<sup>18</sup> states that the maximum therapeutic dose may not be far from 2 cc. of a 1.200 solution. On occasion he recommends 50 milligram doses of ephedrine. Jones, administering the 1.1500 solution varies dosage, volume and site of injection as does Ehrlich. Wilson varies dosage and volume but not the site of injection. He injects his patients in the sitting position and varies the duration of this posture. Romberger blocks all cases for abdominal surgery to the nipple line with this nupercaine procaine mixture, varying dosage, volume slightly, position of patient and site of puncture. Recently he has increased his nupercaine dosage slightly.<sup>47</sup>

Table 5 Woodbridge with metycaine, varies dose, volume and position of the patient. Meeker and McCreary<sup>49</sup> with this drug use 100 milligrams for lower and midabdominal operations. They give no dosage for upper abdominal operations, utilize barbotage but do not state total dilution.

McCluskey with 1 per cent pantocain in saline, varies dosage, volume and site of puncture. He gives as dosage for pantocain<sup>50</sup> 1 milligram for each ten pounds of body weight plus 5 milligrams. The technique consists of diluting the 1 per cent solution with an equal quantity of spinal fluid so that the concentration as it enters the dural canal is 0.5 per cent. Since this

does not make much volume he advises higher punctures than when using procaine

#### INDICATIONS

In considering the indications of a method one of the best arguments against its use is unfamiliarity with either the agent or with the technique involved. When faced with choosing between two methods or agents the anesthetist is and should often be guided by this and administer the agent or procedure in which he has the greater confidence. An expertly administered ether anesthesia in the presence of a pulmonary condition may often be less disastrous than a spinal anesthesia poorly administered.

#### *Operative Site*

To list a column of indications for this method is not particularly satisfactory since so many factors enter into play. One can but generalize.

1 Operations on the lower extremity often indicate this method. Operations on the lower leg may be done under regional anesthesia, if the anesthetist is skilled in this latter method.

2 Operations on the perineum, rectum and external genitalia may be safely performed under either spinal or sacral anesthesia, depending again on the anesthetist.

3 All intra-abdominal surgery may also indicate the procedure.

4 Operations on the head, neck and thorax. Spinal anesthesia was suggested as possible for surgery in these areas by Koster and Kasman<sup>17</sup>. Their feeling was based on experiments carried out by them where neocaine was applied to the cervical cord and medulla of animals resulting in general anesthesia with no interference with respiration. CoTui<sup>5</sup>, however, was able to demonstrate that respiratory stoppage due to paralysis of the respiratory center does occur when procaine is introduced into the subarachnoid space in sufficient dosage. It is generally conceded that attempts to produce as high an anesthesia as is necessary for surgery of the thorax and higher are dangerous.

#### *Condition of Patient*

Lundy<sup>25</sup> feels that spinal anesthesia is contraindicated in all debilitated patients. Yet it does seem as though poor risk patients for perineal or lower extremity surgery do better than they would under other types of anesthesia.

Patients with advanced cardiac or vascular disease do not seem to do well, nor do patients with extremes in blood pressure. Where there exists a low functioning kidney condition and relaxation is necessary, spinal anesthesia often saves the added strain on this organ that might occur as result of ether anesthesia. Spinal anesthesia in place of ether in diabetics is very satisfactory.

The stout strong patient is often a better subject under spinal anesthesia than he would be under an inhalation method. The extremely apprehensive patient, unless heavily medicated, is usually a poor subject. CoTui<sup>2</sup> in animal experiments showed that, "pathologic states as dog pneumonia, postoperative infections and low blood pressure states produce a marked reduction in the lethal dose." He pointed out the possibility that anoxemia might be a responsible factor in reduction of the lethal dose.

Because of the relaxation produced by the method one is tempted to employ it under certain conditions. In intestinal obstruction spinal anesthesia is a great aid to the surgeon allowing better exposure and closure. In advanced intestinal obstruction where the operative field is to be limited as for ileostomy a simple field block would be the better choice of anesthesia. The surgeon must be familiar with the increased intestinal activity produced by spinal anesthesia and allow for intestinal drainage, where possible. Some workers feel that mechanical obstruction is a contraindication. Upper abdominal surgery, particularly in the healthy adult, is facilitated by this method. Because of the hyperperistalsis occasioned by spinal anesthesia it has been recommended in the treatment of paralytic ileus. Here splanchnic anesthesia, administered by the posterior route described by Kappis, is to be preferred<sup>34</sup>.

Patients suffering from shock or hemorrhage do not usually fare well under this procedure.

#### *Indications for the Drug*

Procaine should be the drug most often used under all ordinary conditions. The forthcoming article on metycaine by Woodbridge may result in replacing procaine, because of its slightly longer action.

When it is necessary to employ an agent to give a more lasting anesthesia than either of the above it is necessary to turn to either pantocain or nupercaine. It must be remembered that because of the greater action of pantocain on the respiratory mechanism its dose should be kept down as low as possible and that its use should be restricted to those cases where a safe dose of procaine will not produce anesthesia of sufficient duration<sup>30</sup>. Essex and Lundy feel that pantocain in a selected group of cases is the anesthetic of choice for long operations in the lower abdomen.

Nupercaine causes a lengthened period of induction of anesthesia. The addition of procaine, by method of Romberger, would shorten this. Nupercaine is claimed by some to have a greater tendency to cause postoperative headache than are the other agents.

In patients in whom it is desired to disturb the blood pressure as little as possible either pantocain or nupercaine may be indicated.

## SUMMARY

A review of the agents and methods of and in dications for spinal anesthesia is offered with an effort to contrast their several characteristics and an attempt to present the various views on some disputed aspects

## REFERENCES

1. Babcock, W. W. Fact and fancy in relation to spinal anesthesia. *Tr. Meet. Am. Soc. Regist. Anesth.* 1: 4 (April) 1932.
2. Coffey, F. W. Effect of pathologic states on minimum lethal dose of procaine intracranially. *J. Pharmacol. & Exper. Therap.* 80: 51 (Jan.) 1934.
3. Ibid. Effect of different narcotics and narcotic combinations on minimum lethal dose of procaine hydrochloride intracranially. *J. Pharmacol. & Exper. Therap.* 48: 25 (June) 1932.
4. Ibid. Further studies in subarachnoid anesthesia. *Anesth. & Analg.* 13: 113 (July-Aug.) 1934.
5. Ibid. Experimental studies on subarachnoid anesthesia: effect of procaine hydrochloride on respiratory center. *New York State J. Med.* 33: 391 (Oct. 16) 1933.
6. Ibid. Further studies in subarachnoid anesthesia. *Anesth. & Analg.* 13: 153 (Sept.-Oct.) 1934.
7. Davis, L., Haven, H., Ghivens, J. H. and Emery, J. Effects of spinal anesthesia on spinal cord and on meninges. Experimental study. *J. A. M. A.* 97: 111 (Dec. 12) 1931.
8. Ehrlich, S. D. Spinal anesthesia with hypobromite of nupercaine. *Anesth. & Analg.* 13: 240 (Nov.-Dec.) 1934.
9. Egan, H. B. and Lundy, J. S. Experiment with anesthetics: I. A method of testing local anesthetic by intracranial injection of frogs. *Proc. Staff Meet. Mayo Clin.* 6: 7 (April 18) 1931.
10. Israel, M. C. G. and MacDonald, A. D. The pharmacology of procaine. *B. M. J.* 3: 356 (Nov. 24) 1931.
11. Jarman, R. A. Experiences with spinal anesthesia. *T. Am. Soc. Regist. Anesth.* (Oct. 9) 1934.
12. Jones, W. H. Procaine, new regional and spinal agents with special reference to high thoracic nerve root block and new technique. *Anesth. & Analg.* 9: 18 (Sept.-Oct.) 1930.
13. Ibid. Subarachnoid block: general anesthesia, spinal anesthesia, respiratory paralysis, fatalities and methods. *Anesth. & Analg.* 11: 24 (Sept.-Oct.) 1932.
14. Kemp, W. A. A résumé of spinal anesthesia. *Am. J. Surg.* 10: 534 (March) 1932.
15. Keyes, E. L. and McCallan, A. M. Further experiences with nupercaine. *J. A. M. A.* 96: 585 (June 24) 1931.
16. Kolm, J. A. Approved Laboratory Techniques. New York: D. Appleton Company, 1931. p. 216.
17. Koster, H. and Kasman, L. P. Spinal anesthesia for the head, neck and thorax: its relation to respiratory paralysis. *Burg. Gynec. Obst.* 49: 617 (Nov.) 1919.
18. Ibid. Histologic studies of spinal cord following spinal anesthesia. *Am. J. Surg.* 55: 277 (Aug.) 1934.
19. Labat, G. Regional Anesthesia: Its Technique and Clinical Application. Philadelphia: W. B. Saunders Company, 1924.
20. Lindemulder, F. G. Spinal anesthesia: its effect on the central nervous system. *J. A. M. A.* 99: 310 (July 16) 1932.
21. Lundy, J. S., Egan, H. B. and Karnohan, J. W. Experiments with anesthetics: IV. Lesion produced in the spinal cord of dogs by a dose of procaine hydrochloride sufficient to cause permanent and fatal paralysis. *J. A. M. A.* 101: 1446 (Nov. 11) 1932.
22. Ibid. Advances in anesthesia from the standpoint of the anesthetist. *J. A. M. A.* 98: 943 (Sept. 17) 1932.
23. Ibid. Outline of some of the advantages and disadvantages of various agents used in anesthesia. *Minnesota Med.* 18: 219 (April) 1933.
24. Lundy, J. S., Egan, H. B. and Karnohan, J. W. Experiments with anesthetics: lesion of spinal cord in dogs produced by dose of procaine sufficient to cause permanent and fatal paralysis. *Proc. Staff Meet. Mayo Clin.* 8: 38 (Feb. 3) 1932.
25. Lundy, J. S. General local spinal and balanced anesthesia. *Minnesota Med.* 18: 57 (Sept.) 1933.
26. Marvin, P. W. Pantocaine in spinal anesthesia. *New Eng. J. Med.* 207: 368 (Aug. 25) 1932.
27. Ibid. Present status of various spinal anesthetics and their clinical usefulness. *J. A. M. A.* 101: 1475 (Nov. 4) 1932.
28. Maxson, L. H. Spinal anesthesia: technique, records and results. *Anesth. & Analg.* 13: 6 (Jan. Feb.) 1934.
29. Meeker, W. R. and McCrea, J. P. L. Metcaine in spinal anesthesia. *Am. J. Surg.* 24: 135 (April) 1934.
30. McCrea, J. P. L. Pantocaine as spinal anesthetic. *Anesth. & Analg.* 13: 116 (May-June) 1932.
31. Middleton, W. B. and Chen, K. L. Ephedrine: a clinical study. *Arch. Int. Med.* 20: 345 (March) 1932.
32. Nonne, M. and Demme, H. Degenerative Myelitis nach Spinal-Anästhesie. *Wien. klin. Wchnschr.* 41: 1092 (July 1) 1929.
33. Nowak, S. Personal Communication.
34. Ochsenrath, A. and Cutting, R. A. The treatment of ileus with epinephrine and spinal anesthesia. *Anesth. & Analg.* 8: 81 (March-April) 1930.
35. Phelps, A. E. Evaluation of cardiac and circulatory stimulants for surgical patients. *Ann. Surg.* 91: 4 (Jan.) 1930.
36. Romberg, F. T. Combined novocaine-nupercaine spinal anesthesia. *Am. J. Surg.* 11: 471 (March) 1931.
37. Ibid. Personal Communication.
38. Rovantini, D. A. Anesthesia for transurethral prostatic resection: comparative study of transsaracal and spinal block. *J. Urol.* 31: 433 (July) 1934.
39. Rudolf, R. D. and Grant, J. Notes on sulphates of ephedrine. *Am. J. M. Sc.* 173: 359 (March) 1927.
40. Sise, L. F. Spinal anesthesia: fatalities and their prevention. *New Eng. J. Med.* 200: 1074 (May 3) 1929.
41. Ibid. Voluntary depression of spinal anesthesia. *Clin. of North America.* 8: 1248 (Dec.) 1929.
42. Stout, R. H. Spinal anesthesia: volume control technique. *Am. J. Surg.* 71: 57 (July) 1929.
43. Thomson, H. T. Spinal anesthesia. *Edinburgh M. J.* April 1931.
44. Veborg, R. R. Spinal Anesthesia. Technique and Clinical Application. St. Louis: C. V. Mosby Company, 1931.
45. Wiedhopf, O. Pantocaine, ein neues Lokalanästhetikum. *Deutsche Med. Wchnschr.* 57: 13 (Jan. 2) 1931.
46. Etherington, Wm. W. Spinal anesthesia: nerve root block: some contributions and a new technique. *Brit. J. Anesth.* 11: 42 (Jan.) 1934.
47. Woodbridge, P. D. Spinal anesthesia: preliminary clinical report. *Anesth. & Analg.* 11: 177 (July-Aug.) 1932.
48. Ibid. Personal Communication.

## A COMPARISON OF POSTOPERATIVE COMPLICATIONS FOLLOWING GENERAL AND SPINAL ANESTHESIA

BY DORIS RAPOPORT, M.D.\*

IN spite of recent advances in anesthesia postoperative pulmonary complications are attributable to the anesthetic agent still form a perplexing problem. For a time it was believed that spinal anesthesia would solve this troublesome condition because either pneumonia or inhalation pneumonia and pulmonary atelectasis due to mucus plugs in any part of the bronchial tree were entirely associated with the administration of general anesthesia. Experience, however, has compelled us to change our views in this matter. We have learned that there are many other factors besides the anes-

thesia, which are conducive to postoperative complications. Statistics have proved beyond doubt that spinal and local anesthesia do not render the patient immune against such complications.

King<sup>1</sup> reported a series of cases from the surgical service of the Massachusetts General Hospital and came to the conclusion that statistically the type of anesthesia bore no relation to the development of complications. McKittrick, McClure, and Sweet<sup>2</sup>, who published a review at some previous date from the same hospital, of postoperative pulmonary complications following spinal anesthesia as compared with general, proved that the percentage of complications increased with spinal anesthesia. On

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the other hand, Brunn and Brill<sup>3</sup> reported a number of cases where the pulmonary complications after operation were three and a half per cent larger under general anesthesia than under spinal. Judging from these varied reports it would seem that no two clinics agree as to percentage of complications under various anesthetics.

The practice of spinal anesthesia since its inception about thirty-five years ago has been marked by cycles of undue enthusiasm mixed with periods of criticism and censure. It is a well-known fact, however, that a well-developed method and a familiar drug in the hands of

neither condition should rule out this valuable method of anesthesia, since in numerous cases spinal anesthesia has been administered by me to patients with systolic pressures as low as 80 and as high as 250 without any bad effects.

As a rule, given a perfectly well patient having to undergo an operation of moderate severity, spinal anesthesia will cause very few complications. It is only in the sick patient or the severe operation that spinal anesthesia contributes its share of complications. But that share is much smaller than under general anesthesia, as will be shown in the following tables.

#### COMPLICATIONS FOLLOWING GENERAL ANESTHESIA

	No of Cases	Complications		(Pulmonary Comp)		Deaths	
		No	Per Cent	No	Per Cent	No	Per Cent
Gall Bladder operations	42	8	(19%)	6	(14.3%)	3	(7.1%)
Hysterectomy	95	11	(11.5%)	7	(7.3%)	1	(1%)
Herniorrhaphy	50	5	(10%)	2	(4%)	2	(4%)
Kidney operations	14	1	(7%)	0		0	
Appendectomy	94	9	(9.5%)	7	(7.6%)	4	(4.2%)
Total	295	34	(11.5%)	22	(7.4%)	10	(3.4%)

#### COMPLICATIONS FOLLOWING SPINAL ANESTHESIA

	No of Cases	Complications		(Pulmonary Comp)		Deaths	
		No	Per Cent	No	Per Cent	No	Per Cent
Gall Bladder operations	104	13	(12.5%)	8	(7.7%)	5	(4.4%)
Hysterectomy	50	2	(4%)	0		0	
Herniorrhaphy	83	7	(8.4%)	6	(7.2%)	2	(2.1%)
Kidney operations	80	4	(5%)	4	(5%)	3	(3.7%)
Appendectomy	13	1	(7.6%)	1	(7.6%)	0	
Total	330	27	(6.5%)	19	(5.7%)	10	(3%)

a few cannot always prove successful in the hands of the many. We must also take into consideration that the reported statistics do not take into account the condition of the patients before operation and the number of cases which had to be supplemented with a general anesthetic. A certain small percentage of deaths from anesthesia is unavoidable. It cannot be denied, however, that spinal anesthesia has in most cases been beneficial to all concerned: surgeon, anesthetist and patient. Also that many difficulties in patients with pulmonary conditions, nephritis, diabetes, and in some cases even cardiac diseases were easily solved by the administration of spinal anesthesia.

There is practically no contraindication to spinal anesthesia. More than half of all operations below the diaphragm can be performed with as low as 50 to 100 mgm of novocain, which is considered a safe dose. Formerly it was believed that patients with a low blood pressure should not be operated upon under spinal anesthesia. Now the tendency is to consider hypertension as a contraindication. It seems, however, from actual experience that

These tables comprise the records of five types of major operations performed at the Beth Israel Hospital, Boston during the years 1931 and 1932. The operations selected are the following: appendectomies, hysterectomies, herniorrhaphies, cholecystectomies and kidney operations. In the latter group the year 1933 was also included. These operations were chosen as both types of anesthesia were in nearly equal numbers represented in the total series. Patients under fifteen years of age were excluded, since spinal anesthesia was not administered to children. A total of 625 cases were studied consecutively: 238 males and 387 females, general anesthesia 295, spinal 330.

By comparing the two tables it can readily be seen that patients operated upon under spinal anesthesia fared much better than those under general. While the complications under general anesthesia were 11.5 per cent (pulmonary 7.4 per cent), those of spinal anesthesia comprised only 6.6 per cent (pulmonary 5.7 per cent). The percentage of deaths under general was 3.4 per cent, while under spinal it was 3 per cent. At the same time we must also take

into consideration the fact that, while the percentage of medical ailments before operation in patients operated under general anesthesia was only 7 per cent, those done under spinal amounted to 25.5 per cent.

There is no dispute, even among those opposed to spinal anesthesia, that for relaxation and absence of aftereffects there is no equal to it. Genito-urinary and orthopedic operations lend themselves more conveniently to spinal than does abdominal surgery. Lower abdominal surgical procedures are much more successfully accomplished than upper abdominal. The chances of successful anesthesia in surgery of the chest, neck and head, is greatly reduced in spite of the number of cases reported, while the element of danger is markedly increased. It is therefore wise to limit spinal anesthesia to operations below the diaphragm.

The only drawbacks of spinal anesthesia are the limited time to which the surgeon is confined for the completion of the operation and the nausea and vomiting which frequently hamper its progress. Both of these difficulties, however, can be materially aided by appropriate preliminary medication. Sodium amytal and nembutal in balanced doses have a tendency to suppress the vomiting reflex and to diminish the patient's sensitivity to pain. These drugs, which are given by mouth about an hour and a half before operation, may be augmented by morphin hypodermically half an hour before. The employment of a solution of pantocain has in many cases given a much longer and deeper anesthesia than the crystals. It seems, however, that it is slightly more dangerous than the latter, since it has a greater tendency to paralyze the muscles of respiration.

The question of supplementary anesthesia after the spinal anesthesia wears off has been troublesome. Where no relaxation is required gas-oxygen serves as a good adjunct. In abdominal operations, however, no relaxation can be obtained from the addition of gas-oxygen and the greatest difficulty is met with during the closure of the peritoneum. In these cases injection of novocain into the abdominal muscles at the sides of the wound by the surgeon facilitates greatly the suturing of the abdominal wall. This can also be augmented by slow drop ether on an open mask, sufficient to daze the patient, but not pushing the ether to the point of complete relaxation.

We must not, however, overlook the fact that sudden fatalities, chiefly soon after the injection of the anesthetic solution, do occur. Some of these seem to be caused by respiratory paralysis and others may be due to cardiac failure. The theory of toxic absorption of novocain described by Nowak in his experiments, seems reasonable only in cases where after fifteen or twenty minutes a severe reaction sets in, mani-

fested by a marked drop in blood pressure, slowing of pulse, nausea, vomiting, restlessness, and profuse perspiration with pallor. This, however, does not explain the immediate reactions manifested by respiratory or cardiac embarrassment, which must be due either to direct action of the drug on the respiratory centre or to the innervation of the heart.

Since my last report (in June, 1931\*) of 1875 operations performed at the Beth Israel Hospital under spinal anesthesia we have added 1402 more operations under the same anesthetic. In this last series we had two deaths in which the spinal anesthesia was to all appearances the sole causative factor.

**CASE 1** A fifty-six year old female patient with myocarditis, slightly enlarged heart and blood pressure of 180/100 was to undergo an operation on the knee joint. The injection was done in the third lumbar interspace with the patient in the sitting position using an ephedrin novocain solution as a local anesthetic. One hundred and twenty-five mg. of novocain crystals were employed for the spinal anesthesia. The patient was put on her back in slight Trendelenburg position. About two minutes after the injection of the solution the patient began to complain of a "weakness of the heart." She soon became pulseless but still kept on breathing slowly for about one minute and died. Heart stimulants and artificial respiration were of no avail.

**CASE 2** A male patient, aged sixty-seven. Physical examination revealed hypertension with weak heart sounds, rales at the left base with a question of old tuberculois and a slight trace of albumin with casts in the urine. He was to undergo a second stage prostatectomy, the first stage having been done under spinal anesthesia about ten days previously. The injection was done in the fourth lumbar interspace with the patient in the sitting position. As in the first stage 75 mg. of novocain crystals were used. The patient began to complain of difficulty in breathing soon after he was placed on his back. The anesthesia did not extend above the umbilicus. His blood pressure remained practically the same 165/90 and his pulse rose from 84 to 108. There was no cyanosis. In view of the patient's good general condition it was decided to go on with the operation which lasted about fifteen minutes. Soon after the operation the patient became cold and clammy and his finger tips were cyanosed. His pulse and blood pressure did not as yet undergo any material change. He was put to bed and given 500 cc. of ten per cent glucose in saline intravenously. His respiration became more embarrassed, cyanosis increased and his pulse began to show slight weakness and irregularity. The blood pressure dropped to 115/75. Stimulants were administered and for a while he rallied. However he soon became more cyanosed, gasping respiration developed and he lapsed into unconsciousness and died. Death occurred about one and one-half hours after the spinal anesthesia was induced.

In the first case it was apparent that the cardiac factor was the more pronounced in the fatal termination, while in the second case respiratory embarrassment was more manifest as a cause of death. Since these two catastrophes the sitting position for the administration of spinal anesthesia has been abandoned and in the last 750 cases we have had no fatality.



So far the ideal drug, which should give a lasting and safe spinal anesthesia, has not been discovered. But, with proper technique, careful selection of the patient, gradation of the dose of the least dangerous drug, and the right care during and after operation, the mortality from this procedure should be reduced to a minimum and the complications brought down much below those of general anesthesia.

#### SUMMARY

- 1 The postoperative complications following spinal anesthesia are greatly exaggerated, when compared with those of general anesthesia
- 2 In certain cases, where a general anesthetic would present some difficulties or danger, spinal anesthesia offers the best solution
- 3 Effective preliminary medication suppresses

vomiting and allays the patient's apprehension. It also aids in prolonging the anesthesia.

- 4 Should the anesthesia wear off before the operation is completed, then gas-oxygen serves as a good supplement in cases where no relaxation is required. In abdominal operations, the injection of novocain into the muscles at the sides of the wound facilitates the closure of the peritoneum.

#### REFERENCES

- 1 King D S Postoperative pulmonary complications. II Carbon dioxide as a preventive in a controlled series J A M. A. 100: 21 (Jan. 7) 1933
- 2 McKittrick L S McClure W L and Sweet R. H. Spinal anaesthesia in abdominal surgery Surg Gynec & Obst 52: 898 (April) 1931
- 3 Brunn H. and Brill S Observations on post-operative pulmonary atelectasis Ann. Surg 92: 801 (Nov.) 1930
- 4 Nowak S J G Urinary excretion of novocain after spinal anesthesia and theory of toxic absorption Anesth & Analg 12: 232 (Nov.-Dec) 1933
- 5 Rapoport B Observations on spinal anesthesia with report of 1875 cases New Eng J Med 204: 1264 (June 11) 1931

## MEDICAL PROGRESS

### PROGRESS IN NEUROLOGY IN 1934

BY JULIUS LOMAN, M.D.\*

ONE of the most important contributions to the neurological literature of 1934 is Brodie and Elvidge's<sup>1</sup> experimental work on poliomyelitis establishing the portal of entry and neurogenic distribution of the virus. Petersen's<sup>2</sup> studies on the effect of weather in nervous and mental diseases are intriguing and may open a new field for interpreting many of the symptoms of such diseases as migraine, multiple sclerosis, and tabes. Interesting physiological studies on epilepsy, migraine, and studies on the chemistry and treatment of the muscular dystrophies continue. The results of the intensive investigations on the 1933 St. Louis epidemic of encephalitis with important data of etiology, epidemiology, and pathology are reported. In addition, the neurological literature of 1934 contains many interesting descriptions of clinical conditions and a few new therapeutic procedures.

#### EPILEPSY

##### *Experimental Studies*

Gibbs, Lennox and Gibbs<sup>3</sup> have investigated the possible etiological rôle of vascular spasm with consequent cerebral anemia in epilepsy. By means of a thermoelectric blood flow recorder, inserted through a hollow needle into the internal jugular vein of epileptic patients, the cerebral blood flow could be observed before and during seizures. In none of the ten patients studied was there a significant reduction in blood flow immediately preceding the attacks. During several convulsions the blood flow in-

creased markedly. It was concluded that this change is the result of, rather than a cause of, the seizures. These experiments strongly indicate that vascular spasm is not the important precipitating factor in cases of epilepsy.

Experiments by Finesinger and Cobb<sup>4</sup> tend to corroborate the above authors' results. Using the skull window technique of Forbes and measuring the diameter of the pial vessels following the administration of convulsants, Finesinger and Cobb observed in cats that large intravenous injections of caffeine caused marked convulsions which were preceded by vasoconstriction, a fall in systemic blood pressure and a decrease in cerebrospinal fluid pressure. Similar changes were noted following intravenous injections of absinth and homocamphor. On the other hand, monobromated camphor convulsions were preceded by dilatation of the pial vessels. The authors conclude that since fits caused by drugs are produced in the presence of either vasoconstriction or vasodilatation, the state of the blood vessels is not the essential factor. The authors believe that the drugs probably cause the convulsions by direct action on the nerve cells in some way as yet unknown.

In studies on mineral metabolism in young epileptics, Engel, McQuarrie and Ziegler<sup>5</sup> point out the dependence of epileptic attacks on water and mineral metabolism. To illustrate this dependence, two interesting cases are cited. In the first case, a child who was given pituitrin to create a positive water balance, the amount of urine excreted became diminished and in the pituitrin-free periods, the amount of urine excreted became greater than that of the fluid taken in. Furthermore, under the influence of

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pituitrin, the amount of chlorides excreted was considerably greater than the amount taken in. Sodium followed a similar but less striking course. Potassium, too, was increased in the urine under the influence of pituitrin. Usually calcium and magnesium were uninfluenced. Such disturbances in water and salt balance following pituitrin injections occur both in normal and in epileptic patients, but only in the latter are attacks produced. The above authors also showed that when the mineral loss is balanced by the addition of sodium chloride a much greater retention of water with much more pituitrin is required to bring on an attack. On the other hand if the diet is restricted as to sodium chloride, the pituitrin experiment acts much more quickly in producing an attack. In the other case, the diet was kept as low as possible in sodium chloride and potassium. After three days no more attacks occurred. Then when sodium chloride was added in large amounts, the body weight rose and one severe attack occurred on the same day. Here the retention of salt water precipitated the attacks. In the first case cited the great loss of minerals with the simultaneous retention of water precipitated the attacks.

Since it has been demonstrated that retention of fluid in the body tends to induce seizures, Jacobsen<sup>8</sup> has used the following test to confirm or exclude the diagnosis of epilepsy. To produce a positive water balance Jacobsen gives 300 cc of water every two hours and an injection of pitressin (containing the antidiuretic principle of pituitrin without smooth muscle stimulating principle) every four hours—0.2, 0.3, 0.4 cc and thereafter 0.5 cc until a seizure occurs or until eight to ten doses have been given. Jacobsen has found the test reliable in a series of forty cases. If the condition is epilepsy, a typical seizure will occur when sufficient fluid has been retained to raise the body weight by three to six per cent.

#### MIGRAINE

##### *Physiological Studies*

In his studies on the "patient and the weather", Petersen<sup>9</sup> associates migraine (and headache in general) with a sudden alkalosis (increased Ph with a reduction of CO<sub>2</sub> content of the blood) with vascular spasm, and in some cases with a "potassium leakage of the blood". He points out that the migraine equivalent is also associated with similar chemical and spastic states. Petersen also found that the onset of the attacks is meteorologically conditioned, occurring in most instances with great regularity, with polar infalls (inflow of cold polar air which occurs in frequent intervals in the region of the American storm tracks). In some instances, the headache occurs with a barometric down turn from a high stable barometric pressure or sometimes at the first up-turn of the barometric pressure from a barometric low.

##### *Relationship between Migraine, Epilepsy and Some Other Neuropsychiatric Disorders*

Paskind<sup>7</sup> points out very strongly, after a review of the literature, that the studies of those who have stressed an epilepsy migraine relationship are largely vitiated by the lack of controls. This author compared the incidence of migraine among patients with epilepsy, among patients without neuropsychiatric disorders and those with manic-depressive psychosis, trigeminal neuralgia, psychasthenia, dementia praecox, constitutional inferiority and paranoid states. The records of 3,326 patients were studied. The findings were as follows. In the group with non-neurologic disorders migraine was found in the family in 14.4 per cent of cases, in the parent in 10.2 per cent and in the patient in 3.3 per cent. In the group of epileptic patients, the percentage of migraine was much higher being found in the family in 35.2 per cent, in the parent in 30.8 per cent, and in the patient in 8.4 per cent. There was however, even a greater association between migraine and trigeminal neuralgia being found in 37.7 per cent, 30.1 per cent and 20.3 per cent in the family, parent, and patient respectively. Again, there was a greater incidence of parental migraine in tic and in constitutional inferiority than in epilepsy. Thus, it is concluded that there is no special relationship between migraine and epilepsy; that migraine occurs as evidence of a familial neuropathic trend in other neurologic conditions.

##### *Treatment of Migraine*

Lennox<sup>8</sup> studied the effect of ergotamine tartrate (gynergen) on thirty-nine men and six women. In forty of the cases abrupt termination of the headache occurred, in three there was no relief, and in two an apparent shortening of the attack occurred. In most instances, before the headache began to be lessened nausea and vomiting or both occurred. When the drug was given intravenously relief occurred in fifteen to thirty minutes, when given subcutaneously in one to two hours and when given orally in one to three hours. Relief of severe headaches was rare when the drug was given orally. The mechanism by which ergotamine relieves migraine is unknown. Many authors accept the theory of vascular spasm and assume that the drug paralyzes the motor sympathetic fibers, thereby relieving the spasm and pain.

The experiments of Lennox, Gibbs and Gibbs<sup>9</sup> throw light on the above theory. By means of a thermo-electric blood flow recorder inserted into the internal jugular vein injections of ergotamine tartrate in unanesthetized patients were observed to cause a moderate increase in cerebral blood flow which is readily explained by the concomitant increase in systemic blood pressure. Since ergotamine which relieves headache increases blood flow only moderately,

strate the advisability of slow removal and careful pressure for pressure replacement of air in encephalography and ventriculography

#### ENCEPHALITIS

##### *Etiology, Epidemiology and Pathology*

Further studies on the St. Louis epidemic of encephalitis were reported in 1934. Muckenfuss, Armstrong and Webster<sup>20</sup> were able to isolate a number of strains of a virus that seem to be the etiological agent of the 1933 epidemic. The virus acted on monkeys and white mice and appeared to be distinct from other previously known viruses. It was found that the number of strains of similar characteristics isolated and the neutralization of the virus by serum of individuals already recovered from the encephalitis in this epidemic but not by the serum of patients recovered from other diseases, justified the conclusion that it is the etiological agent of the recent epidemic.

Webster and Fite<sup>21</sup>, as a result of bacteriological studies, conclude that the active agent of epidemic encephalitis is a specific virus. Gay and Holden<sup>22</sup> present evidence tending to incriminate a neurotrophic strain of the virus of herpes simplex as the causative agent of epidemic encephalitis. They were able to isolate the herpes virus from five cases of encephalitis.

Leake, Musson and Chope<sup>23</sup>, studying the epidemiology of the 1933 St. Louis encephalitis epidemic, point out that individual susceptibility, in which age plays a part, appears to be more important than contagion. There were few multiple cases in the same family. Water, milk and the mosquito were eliminated as the means of transmission.

Pathologically, according to McCordock, Collier and Gray<sup>24</sup>, the only constant macroscopic alteration in the central nervous system of twenty-eight cases was vascular congestion of varying degrees. Microscopically, intense congestion of the vessels down to the finest capillaries was present. Small arachnoid hemorrhages and occasionally extravasation of blood into the perivascular spaces and into the substance of the brain, or petechial hemorrhage in the brain tissue were found. Both perivascular, diffuse, or focal collections of various types of inflammatory cells were found. Various degrees of pathology were seen in the nerve cells.

##### *Treatment of Epidemic Encephalitis*

Neal<sup>25</sup> gives her experience in the case of a formalized herpes virus. In controlled experiments of a year, much better results were obtained with this virus than with a vaccine prepared from normal rabbit serum. In twenty-eight cases treated with the vaccine the mortality was lower than in the control group. The least percentage of improvement was found after use of Rosenow's serum. The author warns

against the use of malarial therapy as being dangerous and considers other fever methods of little value. Bulbocapnine was found too toxic.

Mutch<sup>26</sup> recommends calcium aspirin in all forms of chorea on the following basis. The drug supplies calcium (which has been considered to be deficient in the body in chorea), it produces a sedative effect on the brain and combats the causes for the rheumatic disorder. The neutral solution (1 Gm dissolved in 5 cc of water) may be given intravenously, subcutaneously, rectally, or orally. It is tasteless and is not irritating to the kidney or stomach. Mutch treated nineteen patients who were kept in bed. The average daily dose of the drug varied up to forty-five Gm for a child of twelve. The average time taken to control the chorea was seventeen days with limits from seven to forty-six days respectively.

##### *Fate of Encephalitics*

In a follow-up investigation of forty encephalitics who had survived the acute stage, Sauter<sup>27</sup> found that six had died in the interim, six were not heard from, thirteen cases were affected with parkinsonism, seven were in a pseudo-neurasthenic state, four showed subsequent disease (2 bradypnea, 1 character alteration and 1 epilepsy). The pseudo-neurasthenics were able to work and showed only slight signs of encephalitis. In most of the cases the memory was more or less affected. The disease was stationary in one-half of the cases.

#### MULTIPLE SCLEROSIS

##### *Etiology*

An attractive theory of this disease has been proposed by Petersen<sup>2</sup> in his discussion on the patient and the weather. He regards multiple sclerosis as meteorologically induced, primarily due to vasomotor spasm in tissues in which anoxemia leads promptly to injury. In unstable individuals living in the northern latitudes, particularly in the region of the storm tracts. This concept would explain the clinical symptomatology, its transient and variable nature, the exacerbations and remissions. It also explains why such agents as nicotine, lead, ergot, cold, chilling, and dampness which may accentuate spasm, have been incriminated as etiological factors in multiple sclerosis.

##### *Therapy*

Weinberg<sup>28</sup> reports his results with lecithin treatment in multiple sclerosis. This treatment is based on the theory advanced by Marburg (in 1906), who believed that multiple sclerosis might be related to a disturbance in the fat metabolism of the nervous tissue. Weinberg treated twelve patients who had been resistant to other procedures. The therapy consists of four intraspinal injections, in ten to twelve day intervals, of 2 cc of lecithin mixed in four

cc of warm normal saline solution diluted with an equal amount of the patient's spinal fluid. The author states that in nine of the twelve cases, there was greater or less improvement. Three of the severer cases showed particularly gratifying results. The method is harmless although headache and a rise in temperature followed the injections.

By means of diathermy, radiotherapy or the electric blanket, Neymann and Osborne<sup>23</sup> have treated twenty five cases of multiple sclerosis. Treatments were applied biweekly. A temperature curve with a quick rise to 103.5°F and a high plateau ranging between 103° and 105.5°, was considered the optimum of the therapeutic requisition. The temperature was maintained by enveloping the patient in airtight bags. In four mild cases, improvement occurred to a point where without the history the clinical diagnosis would be difficult. In eleven advanced cases only two attained a practically normal gait. The other nine showed improvement in their gait but retained spasticity. Four returned to work and seven lived at home in a semi invalid state. Four of six bedridden cases regained the use of their upper extremities. Of the entire advanced group two were much improved and four lost some of their more troublesome symptoms. The cases were observed for a period of a few weeks to eighteen months following treatment. The authors conclude that it is too soon to evaluate the results of the treatment.

#### THE MENINGITIDES

##### *Acute Lymphocytic Meningitis*

This syndrome which is believed by many authors to be related to either poliomyelitis or epidemic encephalitis is discussed by Abramson<sup>24</sup>. Following a period of one to two weeks during which time symptoms of an upper respiratory infection may be present there occurs a sudden onset of headache vomiting mild fever, and a varying degree of rigidity of the neck and a mild Kernig sign. In adults blurring of the discs is fairly common. The spinal fluid characteristically shows a marked lymphocytosis varying from a few hundred to thousands. The fluid is clear. The illness is relatively short and the prognosis is good.

A similar syndrome is described by Viets and Watts<sup>25</sup> who report four cases. The onset in these cases was acute with meningeal signs and with lymphocytosis of the spinal fluid. The sugar and chlorides were found to be all ways normal which differentiates the disease and tuberculous meningitis. Rarely coma and convulsions occur which disappear after the first or second withdrawal of the spinal fluid.

##### *Cases of "Fatal" Meningitis with Recovery*

Reports of recovery from various types of meningitis are given by several authors. Fel-

sen and Osofsky<sup>22</sup> cite a case of streptococcus (viridans) meningitis which followed a head injury with laceration of the scalp. The spinal fluid contained 5,000 cells, ninety six per cent of which were polymorphonuclear leukocytes. The sugar content was 16.6 mg per cent, total protein 43 per cent. Because smears of the fluid showed cocci and a gram positive bacillus, suggestive of the anaerobic group, gas gangrene serum was given intraspinally. Further bacteriological studies revealed pure culture of streptococcus (viridans). The serum was continued since improvement occurred. Four doses of five cc each were given. The patient had a rapid convalescence. Immunologic studies showed that the gas gangrene serum by increasing the degree of phagocytosis inhibited the growth of the strains of streptococcus (viridans) isolated from the patient's spinal fluid and from his throat.

A case of recovery from cerebrospinal fever by treatment with intravenous injections of urotropin is reported by Chopra<sup>26</sup>. After injections of antimeningococcal serum was used with insufficient effects five cc of urotropin (40 per cent strength) was injected intravenously for twelve days. Improvement seemed to follow each injection. The patient was cured after about six weeks.

A case of Type IV pneumococcus meningitis, which recovered following continuous cisternal drainage frequent lumbar punctures cisternal-lumbar irrigations, cisternal irrigations, and periodic cerebral dehydration with hypertonic dextrose, is reported by Bedell<sup>27</sup>. Approximately 200 cc of spinal fluid was drained from the cisterna magna every twenty four hours.

Reveno and McLaughlin<sup>28</sup> report a case of pneumococcus meningitis Types I and II which recovered after intravenous and intraspinal injections of 120,000 units of stock Felton's anti-pneumococcus serum. Recovery occurred after seven days of treatment.

Spontaneous recovery from tuberculous meningitis in a fourteen year old girl was observed by Parry<sup>29</sup>. Only one lumbar puncture, which showed the characteristic changes of tuberculous meningitis including the presence of tubercle bacilli was done. The patient remained well in every way. Her case was followed for four years.

#### SPINAL CORD

##### *Anterior Poliomyelitis*

By means of the following unique experiments on the Macaca rhesus monkeys, Brodie and Elvidge<sup>3</sup> demonstrated the portal of entry and pathway of the poliomyelitis virus into the brain. Nasal installations of cord containing virus failed to infect monkeys in whom by lateral section and partial removal of the olfactory bulb and tract were carried out where as control monkeys were paralyzed after single

nasal installations of the virus. Furthermore, it was demonstrated that although the nasal mucosa is innervated by the V and VII cranial nerves, as well as by the olfactory nerve, only the last named nerve transmits the virus to the central nervous system, for no infection occurred when the olfactory tract was cut. These animals received nasal inoculations over a period of three weeks, during which time much must have dribbled into the gastrointestinal tract, yet no infection occurred. This observation would tend to eliminate the gastrointestinal tract as a portal of entry. In another set of experiments, Brodie and Elvidge demonstrated that the spread of the poliomyelitis virus to the central nervous system is by way of the nerve tracts rather than by way of the cerebrospinal fluid.

Geiger, Becker and Gray<sup>87</sup> analyzed the records of eighty-four cases of acute poliomyelitis which occurred in San Francisco during May, June, and July of 1934. The percentage of fatalities was 95 per cent. Seventy-one per cent of the cases were from four to fifteen years of age. Initial symptoms referable to the nervous system were the most frequent. In thirty-four out of the eighty-four cases, paralysis of one or more types occurred. Paralysis was more common in the sixteen to twenty-five year age group.

#### *Cord Bladder*

In a series of 250 cases in which disturbances of bladder function caused by lesions of the nervous system were studied, Lendrum and Moersch<sup>88</sup> found that the diagnosis was central nervous system lues in 106 cases, developmental defect of the caudal end of the spinal cord in fifty-two, arteriosclerosis of the central nervous system in fourteen, and traumatic injury to the spine with or without fracture in thirteen cases. In thirty-two cases various other neurological conditions caused the cord bladder. In thirty-three cases neurologic findings were negative.

#### *Rupture of the Intervertebral Disc*

Mixter and Barr<sup>89</sup> report a series of cases of rupture of the disc with herniation of the nucleus pulposus into the spinal canal. These authors point out that this condition should be kept in mind when orthopedic abnormalities of the spine do not respond to appropriate treatment. The symptoms depend on the location and size of the lesion and are similar to those due to any cord tumor. X-ray may show a narrowing of the disc, which is usually significant of migration of the nucleus pulposus, not necessarily but possibly into the spinal canal. Lumbar puncture or combined puncture with lipiodol injection are of aid in diagnosis. A partial or complete block may be demonstrated. Total protein is moderately elevated. By laminectomy the tumor is easily removed unless

very small, when it may be very difficult to find.

Peet and Echols<sup>40</sup> also discuss herniation of the nucleus pulposus as a cause of compression of the spinal cord. They report two cases operated on in 1927 and 1928 at which time the tumors removed were considered to be chondromas, but which finally proved to be herniations of the nucleus pulposus.

#### *Neurologic Complications in Pernicious Anemia*

Grinker and Kandel<sup>41</sup> studied the effect of liver therapy on the neurologic symptoms in fifty cases of pernicious anemia over a period of several months. They make the following conclusions:

(1) Liver therapy is not efficacious in improving or preventing degeneration in the central nervous system complicating pernicious anemia.

(2) Liver improves the general strength of the patient with combined degeneration of the cord by increasing the number of red cells in the circulating blood or by some obscure direct action. Weakness may closely imitate the effects of damage to the spinal cord.

(3) Liver cures the mental symptoms of pernicious anemia which are usually caused by the anemia.

(4) The peripheral nerve complications of this disease, consisting of dysesthesia, atrophic changes in the skin, and perhaps other dissociated sensory defects are alleviated by the recession of the anemia. Such complications are much more frequent than they are usually believed to be.

(5) The majority of cases of combined degeneration of the cord develop rapidly at the onset, they then progress slowly no matter what therapy is employed. Gradual progression of signs may be falsely interpreted as signifying improvement.

(6) Combined degeneration of the cord develops not infrequently before the anemia and should be diagnosed by the character of the cord syndrome, the achlorhydria, glossitis, and the blood smear.

(7) Liver therapy in pernicious anemia should be controlled by the height of the blood count. Quantities of liver in excess of that necessary to maintain a normal blood level are wasted.

#### *Syringomyelia*

The postoperative results of seventy-eight cases of syringomyelia collected from the literature and including four of his own are recorded by Ley<sup>42</sup>. Immediate results were 68.9 per cent improved, 12.9 per cent unimproved, 18.2 per cent worse (six deaths). Late results, (for only sixteen cases) were 64.7 per cent improved, 11.8 per cent unimproved, 23.5 per cent worse. The symptoms responding best to surgical treatment are as follows: objective sen-

sory changes, trophic disturbances, and signs of compression. In some cases there may be improvement in sphincter disturbances. Providing other conditions which may cause a syringomyelic syndrome (syphilis, cervical ribs, vertebral lesions and other external causes) are excluded, the indication for operation is a partial or complete spinal block. In other cases, radiotherapy should be employed. If, however, in these cases there is no improvement after radiotherapy, surgery may be indicated. In serious cases, in which marked trophic disturbances are present or in which rapid progression of symptoms occur, surgical intervention should not be delayed.

#### NEUROSYPHILIS

##### *Asymptomatic Neurosyphilis*

O'Leary<sup>42</sup> points out that asymptomatic neurosyphilis is the forerunner of clinical neurosyphilis and the prevention of the latter type depends on the early treatment of the former type. The diagnosis of asymptomatic neurosyphilis can be made only by examination of the spinal fluid. The increase in the number of lymphocytes and particularly in the number of polymorphonuclear leukocytes means activity of the process and indicates also a more serious type of involvement. A negative spinal fluid, obtained after the second year of primary infection, suggests that clinical neurosyphilis will not develop subsequently. O'Leary states that in 90 per cent of the cases, arsphenamine, bismuth and mercury will control the disease. However lymphocytosis of the spinal fluid and the presence of the paretic types of colloidal benzoin curve require other measures such as intraspinal therapy, which is now rarely used or malaria. These measures will prevent the development of asymptomatic neurosyphilis into clinical neurosyphilis in fifty per cent of the cases in which specific therapy has failed.

##### *The Weather and Neurosyphilis*

Petersen<sup>44</sup> has included tabes and paresis in his study of the effect of weather on disease. He associates the meteorological disturbances (infall of cold and polar air) with undue damage to the cord and brain, which is to be found in the region of the storm tracks. Thus, although lues is common in the southern states, tabes and paresis are rare.

##### *Therapy and Neurosyphilis*

In a report on twenty-five cases, including various types of neurosyphilis, Spiegel<sup>45</sup> concluded that acetarsone (stovarsol) is a valuable addition to the remedies used in neurosyphilis. In most of the cases observed for seventeen months, there was marked serological improvement in the spinal fluid. The blood Wassermann reaction was, however, less favorably influenced in most cases. There was also marked decrease in

cell content, normal counts being obtained after from six to ten injections of acetarsone (25 or 5 Gm. intravenously once a week). The protein also approached normal figures. No visual disturbances, such as seen after trypanamide therapy, occurred in any of the cases.

Glande and Masquin<sup>46</sup> make a comparison of the early and late effects of malarial therapy in 327 male cases of paresis treated between 1924 and 1932. An analysis of the immediate effect of the treatment showed 13.2 per cent greatly improved, 21.2 per cent moderately improved, 28.4 per cent slightly improved, 32.8 per cent unimproved, and 4.4 per cent died in the course of the treatment. Of 260 survivors (1932) there were 23.6 per cent greatly improved, 17.6 per cent moderately improved, 17.0 per cent slightly improved, 18.0 per cent unimproved, 23.8 per cent died in the course of the treatment.

In thirty-two cases of tabes treated with malaria and twenty-four cases treated with arsenic, mercury and bismuth over a period of five years, Yates<sup>47</sup> found that 34 per cent showed improvement by the former therapy and 45 per cent by the use of the latter remedies. Subjective symptoms were used as the basis for evaluating treatment. It was shown that malaria has a definite effect on the spinal fluid cell count and the globulin count. The prognosis was found to be much better when the disease is of shorter duration with a high cell count and globulin, than when the duration is longer with a lower cell count and globulin, whether under malaria or other therapy.

Kuhns<sup>48</sup> gives his experience in the use of the electric blanket for general paresis. Of 230 patients treated by this method at the State Psychopathic Institute of Elgin, Illinois for the past four years, seventy-two per cent were definitely improved, thirty per cent were discharged, and fourteen per cent are on parole. Ten have remained stationary, seven per cent have deteriorated, and eleven per cent have died. With the exception of improvement in speech in eighteen per cent of the cases and in gait in eight per cent, there was little alteration in the other neurological signs. The Wassermann and Kahn tests on the spinal fluid remained the same. The cell count and the colloidal gold test on the spinal fluid often showed marked improvement. Kuhns regards the electric blanket method the safest and simplest form of fever therapy.

#### CRANIAL AND PERIPHERAL NERVES

##### *Treatment of Trigeminal Neuralgia*

Dandy<sup>49</sup> recommends section of the posterior half of the sensory root of the gasserian ganglion for this type of neuralgia. By this procedure not only is the pain abolished but sensation of the face is unaffected. In 300 operations the neuralgia recurred in only eight cases probably

due to inconsistency of the arrangement of the pain fibers

In addition to the trichlorethylene method of treatment for trigeminal neuralgia which relieves many cases, Caldwell<sup>50</sup> recommends the Moyer or castor oil treatment carried out as follows. One or more ounces of castor oil is administered three times a day for several days in succession until the pain is relieved or the treatment judged to have failed. Caldwell states that he has had several remarkable cessations of pain following this treatment.

Dyes<sup>51</sup> reports favorable results in the treatment of trigeminal neuralgia by means of deep Roentgen therapy. Only three out of twenty cases did not respond. Attacks were eliminated for periods varying from three and a half months to eleven years. In eight cases a single radiation or a series extending over several days relieved the attacks. In more chronic cases a repetition of series of treatment was found necessary. The x-ray technique used was 180 kv (tube), 5 ma, 0.5 mm. Cu, 20 mm. Al.

#### *Treatment of Contused Injuries of Peripheral Nerves*

Because of his experience with thirty-four cases of injury to nerves contused by such means as fracture, pressure from a cast or tourniquet, Brown<sup>52</sup> recommends early operation. For exploration of the injured nerve in every instance disclosed an intraneural scar between the nerve bundles sufficient to hinder passage of nerve impulses. Expectant treatment with massage, electricity or exercise continued for four to six months is unjustified, Brown feels, in view of the changes occurring in the involved parts during this period, in which the nerve function is absent. Continuous improvement with restoration of function, varying from fifty to one hundred per cent, occurred in Brown's cases. He advises that if no motor or sensory improvement has occurred within one month after injury or if partial involvement tends to become more advanced, operation should be performed.

#### *Facial Palsy*

Duel<sup>53</sup> reports very good results in traumatic facial palsy by excising a piece of the injured nerve in the aqueduct and bridging it with a freshly excised nerve graft. Either motor or sensory nerves are used. For filling large gaps the author chooses the anterior femoral nerve as a transplant. Following the operation, there was always a period of muscular inactivity before faradic stimulation elicited a response and then a return of spontaneous movement of the muscles occurred. Final regeneration depended upon whether the injury to the nerve was of recent or of long duration. The author stresses the advantage of immediate exploration of the site of accidental injury of the

nerve. In many, an almost perfect recovery will follow removal of a spicule of bone, the lifting of a fractured plate of bone, decompression or cleansing. On the other hand, if extensive damage of the nerve is observed, one should proceed with the transplantation operation. The author also advises early operation in most cases of Bell's palsy, for recovery is much earlier than when the paralysis is allowed to run its course.

#### *Local Anesthesia in the Treatment of Peripheral Nerve Manifestations*

Caron<sup>54</sup> states that by the use of local anesthesia many peripheral nerve conditions may be relieved without the necessity of operative procedures. The author has had good results with injections of novocaine, quinine urea hydrochloride, and alcohol in the following conditions. Certain neuritic conditions found in persons with an adipose tendency who, following trauma, develop troublesome tenderness, particularly over the internal aspect of the knees and ankles and the lumbar sacral regions. Spectacular relief may be obtained by injecting a few cubic centimeters of a one per cent solution of quinine urea hydrochloride into the subcutaneous fat. In severe cases of pruritus ani, Caron recommends injections of ten to fifteen cc of forty per cent ethyl alcohol under the itching area. Ten to twenty mm of forty per cent alcohol frequently relieves coccydynia. Visceral pain from the heart, gall-bladder, kidney, pelvis, or pain from other intra-abdominal origin can be temporarily relieved by subcutaneous infiltration of novocaine. For the pain of laryngeal tuberculosis, Caron uses two cc of a ninety-five per cent alcohol injected into the superior laryngeal nerve on each side. In six of every ten cases of sciatica, the author has had good results from single injections of one per cent quinine urea hydrochloride into the sheath of the sciatic nerve.

#### MUSCULAR DYSTROPHY AND MYASTHENIA GRAVIS

##### *Chemistry*

Nevin<sup>55</sup>, in his chemical studies of muscles, found that the phosphorus-holding compounds which play an important rôle in the chemistry necessary for muscular contraction were normal in myasthenia, whereas in pseudohypertrophic muscular dystrophy and in myotonia some alterations from the normal were found. In myotonia the total acid-soluble phosphorus was found to be below normal and the creatine phosphoric acid content slightly diminished. In contrast to the view held by Remen (who has observed improvement in myasthenia from glycine therapy) that in this disease creatine-creatine metabolism is primarily disturbed, Nevin holds to the theory that such disturbances in metabolism are secondary effects of the disease.

## Therapy

Kostakow<sup>54</sup>, studying three generations of a family comprising fifty five persons, forty seven of whom are living, found that fifteen of them developed muscular dystrophy. These were all males, the females acting only as transmitters. The author has treated seventeen cases with glycocoll (glycine). Two cases, treated for two months showed no improvement. Three were able to walk five km. without tiring. Seven were able to walk ten km. without tiring. Four were able to walk fifteen km. without tiring. The degree of improvement was found to be in direct ratio to the muscle volume still present and in inverse ratio to the duration and degree of involvement of the disease. The effect of medication depended in particular on the length of time it was given without interruption.

Tripoli and Beard's<sup>57</sup> experience with glycine and glutamic acid treatment for progressive muscular atrophy and progressive muscular dystrophy was found to coincide with that of other authors. Of sixty nine cases collected from the literature by these authors clinical improvement has been recorded in fifty-one cases.

Reinhold, Clark Kingsley, Custer and McConnell<sup>58</sup> found that glycine feeding in nine cases of progressive muscular dystrophy caused a definite regeneration of muscle as disclosed by biopsy. Clinical improvement however did not appear to coincide with the change in the composition of the muscle. Better clinical results were noted in children than in adults. One child, after three months of treatment regained the ability to stand for brief intervals when supported. Contractures of the hamstring muscles were ameliorated in another child, after a similar period of treatment. Although muscle function was not very encouraging, there was noted, particularly in children, improvement in mental and physical activity.

Guthbertson and Maclean<sup>59</sup> treated nine cases of various types of muscular dystrophy, most of which showed improvement in the power of some of the specific muscles affected. In two cases of muscular atrophy, some general improvement was observed. The authors believe that in most cases the changes noted were greater than might be expected to occur from hospitalization alone.

## Effects of Lightning and Electricity on the Central Nervous System

Oritchley<sup>60</sup> discusses the neurological manifestations of electrical injuries and lightning stroke. Pathologically the main effects were found to be (a) focal petechial hemorrhages scattered throughout the brain, especially in the medulla, and in the spinal cord, the anterior horn cells were particularly involved, (b) chromatolysis especially in the pyramidal cells

in the cells in the medullary nuclei, in the anterior horn cells and in the Purkinje cells of the cerebellum, (c) wide dilatation of the perivascular spaces, especially in the brainstem and cervical cord, (d) fragmentation and tortuosity of peripheral nerve axons with breaking down of the sheath of Schwann and infiltration of the epineurium with endothelial cells, (e) with unusually severe injury, the entire brain and parts of the cord are found to be swollen, softened, and even diffused.

Clinically, pain may be agonizing, unconsciousness may occur either from syncope or from immediate concussion. Late unconsciousness may result from cerebral edema. Deafness and visual disorders are common. Severe electrical injuries may cause great restlessness, irritability, and convulsions. Later effects may include (1) the syndrome of headache, dizziness, insomnia and forgetfulness, (2) spinal atrophic paralysis in certain muscle groups, (3) diffuse involvement called "electrotraumatic encephalomalacia", (4) peripheral nerve lesions, and (5) various psychoses.

## REFERENCES

- Brodi M and Elvidge A. P. Portal of entry and transmission of virus of poliomyelitis. *Science* 78: 35 (March 9) 1924.
- Petersen, W. P. The Patient and the W. W. W. Volumes I. Part I. Ann Arbor: Edwards Brothers, Inc., 1935.
- Gibbs, F. A. Lennox, W. G. and Gibbs, E. L. Cerebral blood flow preceding and accompanying epileptic seizures in man. *Arch Neurol & Psychiat* 32: 67 (Aug) 1931.
- Finegold, J. L. and Cobb S. Cerebral circulation: a study on the relation of the convulsant caffeine, alcohol, camphor and picrotoxin. *Arch Neurol & Psychiat* 50: 916 (Nov) 1933.
- Engel R. L., McQuarrie, I. and Ziegler M. Mineralhaushaltungen bei Jugendlichen Epileptikern. *Arch f exper Path u Pharmacol* 174: 565 (March 13) 1924.
- Jacobson, A. W. Pitressin test in epilepsy. *New York State J Med* 34: 806 (June 1) 1934.
- Paskind, H. A. Relationship of migraine epilepsy and some other neuropsychiatric disorders. *Arch Neurol & Psychiat* 32: 46 (July) 1934.
- Lennox, W. G. Use of ergotamine tartrate in migraine. *New Eng J Med* 210: 1661 (May 17) 1934.
- Lennox, W. G. Gibbs, E. L., and Gibbs, F. A. Effect of ergotamine tartrate on cerebral circulation of man. *J Pharmacol. & Exper Therap* 53: 113 (Jan) 1935.
- Brink, R. O., Sullivan, M. L. and Young, J. D. Effect of non-addictive drugs and other measures in migraine, with special reference to ergotamine tartrate. *Am J M. Sc* 188: 83 (Aug) 1934.
- Logan, A. H. and Allen, E. V. Treatment of migraine with ergotamine tartrate. *Proc. Staff Meet., Mayo Clin* 9: 546 (Sept. 26) 1934.
- Geiger, A. J. Purpura haemorrhagica with cerebrospinal hemorrhage: report of cases. *J A M A* 102: 1009 (March 7) 1934.
- Diamond, I. B. Leukemic changes in brain: report of 14 cases. *Arch Neurol & Psychiat* 32: 118 (July) 1934.
- Leary, T. Subdural hemorrhage. *J A M A* 101: 837 (Sept.) 1934.
- Munro, D. C. Diagnosis and treatment of a brain hemangioma: report of 62 cases. *New Eng J Med* 210: 1145 (May 31) 1934.
- Lyster, J. G. Management of acute craniocerebral injuries. *South. Med. & Surg* 46: 324 (July) 1934.
- Russell, W. R. After-effects of head injury. *Tr. Med. Chir. Soc. Edinburgh*, 1933-1934, p. 15 in Edinburgh M. J. (Sept.) 1934.
- Dyke, C. G. and Davidson, L. M. Recent advances in neurophysiology. *Radiology* 22: 451 (April) 1934.
- Masermann, J. H. Intracranial hydroxylation: central nervous system shock and edema following rapid fluid decomposition of ventricular-subarachnoid spaces. *J Nerv & Ment Dis* 128 (Aug) 1934.
- Muckenfuss, R. R. Aronson, C. G. and Webster, L. T. Etiology of 1933 epidemic of encephalitis. *J A M A* 103: 731 (Sept. 4) 1934.
- Ward, L. T. and Fife G. L. Virus encountered in study of material from cases of encephalitis in St. Louis and Kansas City epidemics of 1923. *Science* 78: 482 (Nov 37) 1933.



- 22 Gay F P and Holden M. Further evidence for presumed herpetic origin of epidemic encephalitis Tr A. Am Physicians 48: 16 1933
- 23 Leake J P Musson E K and Chope H D Epidemiology of epidemic encephalitis St. Louis type J A. M. A. 103 728 (Sept. 8) 1934
- 24 McCordock H A. Collier W and Gray S H Pathologic changes of St. Louis type of acute encephalitis J A. M. A. 103: 822 (Sept. 15) 1934
- 25 Neal J B Recent advances in treatment of epidemic encephalitis New York State J Med 34: 707 (Aug 15) 1934
- 26 Mutch N Medicinal treatment of chorea calcium aspirin. Brit M J 2: 246 (Aug 11) 1934
- 27 Sauter E Zum Schicksal der Encephalitiker Katamenistische Untersuchungen der an akuter Encephalitis lethargica erkrankten und an der Zürcher medizinischen Klinik hospitalisierten Patienten Schweiz med Wchnschr 64: 464 (May 19) 1934
- 28 Weinberg M. H. Lecithin treatment of some multiple sclerosis syndromes J Nerv & Ment Dis 79: 264 (March) 1934
- 29 Neymann C A and Osborne S L Treatment of some multiple sclerosis by electropexia J Nerv & Ment. Dis 79: 423 (April) 1934
- 30 Abramson J L Acute lymphocytic meningitis Arch Neurol & Psychiat 81: 1235 (June) 1934
- 31 Viets H. R. and Watts J W Acute aseptic meningitis J Nerv & Ment Dis 80: 253 (Sept.) 1934
- 32 Felsen J and Osofsky A. G Streptococcus (viridans) meningitis with recovery immunologic studies J A. M. A. 102: 2170 (June 30) 1934
- 33 Chopra B L Case of cerebro spinal fever successfully treated by intravenous injections of urotropine Indian M Gaz 69 263 (May) 1934
- 34 Bedell C C Pneumococcal meningitis report of case with recovery following cisternal drainage J A. M. A. 102 520 (March 17) 1934
- 35 Reveno W S and McLaughlin N Pneumococcal meningitis recovery with Felton's serum Ann Int. Med. 7 1026 (Feb) 1934
- 36 Parry C L Tuberculous meningitis with recovery Brit. M J 2: 859 (Nov 10) 1934
- 37 Geiger J C Becker G H. and Gray, J P Acute anterior poliomyelitis report on first phase of 1934 outbreak J A. M. A. 103: 842 (Aug 4) 1934
- 38 Leudrum F C and Moersch F P Neurologic diagnosis in 250 cases of cord bladder J A. M. A. 102: 658 (March 3) 1934
- 39 Mixer W J and Barr J S Rupture of intervertebral disc with involvement of spinal canal New Eng J Med. 211: 210 (Aug 2) 1934
- 40 Peet M. M. and Echols D H Herniation of nucleus pulposus cause of compression of spinal cord Arch Neurol & Psychiat. 32: 924 (Nov) 1934
- 41 Grinker R R and Kandel E Pernicious anemia results of treatment of neurologic complications. Arch Int. Med 54: 851 (Dec) 1934
- 42 Ley A El tratamiento quirurgico de la siringomielia. Rev de cir de Barcelona 7: 161 (March) 1934
- 43 O Leary P A Asymptomatic neurosyphilis Proc. Staff Meet. Mayo Clin 9: 756 (Dec. 12) 1934
- 44 Petersen W F Significance of American distribution of tabes and paresis Am J Syph & Neurol 18: 75 (Jan.) 1934
- 45 Spiegel L Treatment of neurosyphilis with acetarsone (stovarsol) given intravenously preliminary report. Am. J Syph & Neurol 18: 56 (Jan) 1934
- 46 Claude H et Masquin P Le devenir des paralytiques généraux malarisés expérience de neuf ans de malaria thérapeutique Presse méd. 41: 2005 (Dec 13) 1933
- 47 Yates A. G Some observations on treatment of tabes with malaria Lancet 2: 1335 (Dec.) 1934
- 48 Kuhns R H Treatment of general paresis by electropexia Arch Phys Therapy 15 725 (Dec) 1934
- 49 Dandy W E Diagnosis and treatment of lesions of cranial nerves Delaware State M J 6: 153 (July) 1934
- 50 Caldwell J A Trigeminal neuralgia and other painful conditions about face J Med 16: 7 (March) 1934
- 51 Dyes O Ueber die Behandlung der Trigeminalneuralgie. München med Wchnschr 81: 1603 (Oct. 19) 1934
- 52 Brown H A Contused injuries of peripheral nerves—value of early surgical treatment California & West. Med 41: 166 (Sept) 1934
- 53 Dyer A B Operative treatment of facial palsy Brit M J 2: 1027 (Dec 8) 1934
- 54 Caron R. P Application of principles of local anaesthesia to treatment of peripheral nerve manifestations Am. J Surg 23: 521 (March) 1934
- 55 Nevlin S Study of muscle chemistry in myasthenia gravis pseudohypertrophic muscular dystrophy and myotonia. Brain 57: 239 (Oct.) 1934
- 56 Kostakov S Die progressive Muskeldystrophie ihre Vererbung und Glykolysebehandlung Klin. Wchnschr 13: 219 (Feb 10) 1934
- 57 Tripoli C J and Beard H H Muscular dystrophy and atrophy clinical and biochemical results following oral administration of amino acids Arch Int. Med 53: 435 (March) 1934
- 58 Reinhold J G Clark J H. Kingsley G R Custer R. P. and McConnell J W The effects of glycine (glycocoll) in muscular dystrophy J A. M. A. 102: 261 (Jan 27) 1934
- 59 Cuthbertson D P and MacLachlan T K Treatment of muscular dystrophy with glycine Quart J Med 3 411 (July) 1934
- 60 Critchley M Neurological effects of lightning and of electricity Lancet 1: 68 (Jan 13) 1934

### THE NEXT STEP IN CANCER CONTROL

In the November Bulletin of the American Society for the Control of Cancer, the announcement of the plans for the instruction of the laity appears in these words

"The Society, therefore, proposes to turn the major portion of its energies, for the present, to a widespread and intensive campaign for informing the laity of the known facts concerning the prevention of cancer and the possible signs which may mean the presence of that condition or of a precancerous lesion

"It hopes and expects to enlist the services of organized medicine in every community to help it to keep the information given both accurate and up to date. It hopes to interest many thousands of persons in obtaining frequent complete physical examinations and in relying on the profession to advise them wisely as to treatment.

"It hopes and expects also that the medical pro-

fession will constantly bear in mind the extremely conservative attitude and continual reliance in the profession which our Society has shown. As a result of this the Society believes that the profession will completely understand and will cordially support in every possible way, the program of nationwide lay education which the Society now adopts.

"Cancer mortality can be cut. Ample clinical data support this conclusion. The profession will benefit by an organized lay effort in this direction. The cancer patient will be given the best possible chance for survival and for decreased suffering. The slogan, long in use by our Society — 'Fight Cancer with Knowledge' is about to be spread to millions now in ignorance of its value and truth. In this effort all should find a worthwhile outlet for humanitarian impulses. Within a few weeks more complete information of the general program will be made public. In the meanwhile volunteers both from professional and lay ranks are needed in the fight."

## CASE RECORDS

of the  
MASSACHUSETTS GENERAL  
HOSPITALANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

CASE 21511

## PRESENTATION OF CASE

A forty-five year old white Italian housewife was admitted complaining of pain in the head, and stiff neck.

Two days before entry the patient was suddenly seized with pain in the head, dizziness and stiffness of the neck. She did not fall but required assistance to her bed. The pain in the head and neck persisted and she vomited several times. She became drowsy, then semiconscious and remained in this state until her admission.

The patient had been moderately dyspneic after exertion for the past eight years. This had gradually become more marked during the two years preceding her admission. She had occasional epistaxis and her vision seemed to be failing gradually. For about three weeks before admission she had generalized headache of moderate severity. During this time she suffered a gripping pain over the heart which recurred approximately every three days, lasted for about five minutes and subsided spontaneously. There was no radiation. Causative factors were not recorded. She had frequent gaseous eructations following these episodes and occasionally vomited. Her diurnal urinary frequency had increased and there was a nocturia of two to three times. For about one year she had noticed a mass in her left lower quadrant which had gradually increased in size. Her abdomen occasionally became so large that she was unable to wear corsets. Her catamenia were normal.

The patient had been admitted to this hospital five years previously for pain in the chest and fever, following an acute upper respiratory infection which had begun eight weeks before. Pleural fluid removed at this time was thought to be consistent with tuberculosis although guinea pig inoculation and culture were negative. She had a febrile course and was discharged to a sanitarium after one month in the hospital. She remained in the sanitarium for eight months and left there much improved. Since that time she had no symptoms of respira-

tory disease. Because of hypertension (195/115), which had been recognized at her previous admission, her activities were restricted and she had adhered to a diet which caused the loss of thirty pounds.

Physical examination showed a rather obese, semicomatose woman. The neck was rigid. The fundi showed notching of the veins with slight thickening and tortuosity of the arterioles. The discs were normal. The heart was slightly enlarged to the left and the blood pressure was said to be high although no figures were recorded. The abdomen was distended and there was a hard rounded freely movable mass believed to be attached to the fundus of the uterus in the left lower quadrant. Bilateral positive Hoffman signs and left Babinski were elicited. The tendon reflexes were found to be more active on the left side.

The temperature was 95.5°, the pulse 60. The respirations were 25.

Examination of the urine showed a specific gravity of 1.028. There was a trace of albumin and a Benedict's test produced a green precipitate. The sediment was loaded with red blood cells and there were a few white blood cells. No casts were seen. The blood showed a red cell count of 4,350,000 with a hemoglobin of 90 per cent. The white cell count was 7,200, 87 per cent polymorphonuclears. A stool examination was negative. The nonprotein nitrogen of the blood was 50. A lumbar puncture showed an initial pressure of 500 millimeters and a final pressure of 200 millimeters. The cell count of spinal fluid showed 600,000 cells per cubic millimeter, practically all of which were red blood cells. An ammonium sulphate test was positive. The total protein was 261 milligrams. A spinal fluid Wassermann examination was negative.

The patient received five daily lumbar punctures, each of which showed decreasing amounts of blood. The pressure likewise diminished. On the second day the patient regained full consciousness. She improved generally but still had a severe headache and a stiff neck. She was discharged on the eighteenth day.

*Final Admission, twelve days later*

After her discharge the patient restricted her activity and felt fairly well. Four days prior to reentry she developed constant severe pain in the lower abdomen associated with nausea and repeated emesis. Her last normal bowel movement occurred three days before entry and she passed neither stool nor gas thereafter despite the administration of enemata.

Physical examination showed the patient to be quite ill and complaining of severe abdominal pain which was more tolerable when she sat up right. The skin of the extremities was cold and clammy. There was profuse perspiration. The pupils were constricted, equal and did not re-

act to light. The mucous membranes of the mouth were dry and red. The breath was foul. The heart was unchanged except for a pulse of 110. The blood pressure was 100/80. The lungs were clear. The abdomen was full and distended. Audible peristalsis was absent. No fluid wave was elicited. There was generalized tenderness with deep pressure and voluntary muscle spasm. In the lower abdomen a smooth, readily movable pumpkin-sized tumor was palpated, lying more on the right side. Pelvic examination showed a moderately lacerated high cervix. The fundus was not felt. The mass appeared to be separate from the uterus. The vaults were otherwise clear.

The temperature was 99.6°. The respirations were 20.

Examination of the urine showed a specific gravity of 1.030 with a trace of albumin. The blood showed a white cell count of 20,000, with a hemoglobin of 90 per cent. A lumbar puncture showed clear fluid with an initial pressure of 140 and a final pressure of 65. The nonprotein nitrogen of the blood was 77.

By means of a gastric tube about twenty ounces of brown fluid with a foul odor was removed from the stomach. The patient was treated supportively by intravenous fluids, morphin, the application of warmth, and constant duodenal drainage. Her general condition improved slightly but shortly thereafter the blood pressure dropped to 68/54, the pulse rose to 130, the temperature to 107°, and she expired about thirty-six hours after reentry.

#### DIFFERENTIAL DIAGNOSIS

DR. EDWARD L. YOUNG, JR. The past history gives the suggestion of hypertension and probably some accompanying chronic nephritis and the story of a mass in the lower abdomen which has gradually increased in size. Five years before that there was a story of prolonged upper respiratory infection with pleurisy and the belief that it was tuberculosis, so that she was put in a sanitarium for eight months and at that time she had a hypertension of 195/115. Following a diet she lost thirty pounds in weight.

"The urine showed a specific gravity of 1.028." That is rather high for chronic nephritis of any degree, although such a gravity might be explained by the presence of sugar, and there is a positive Benedict test.

It seems to me that the essential part of the picture on the first admission is a patient with hypertension and evidence of a cerebral accident.

"Four days prior to reentry she developed constant severe pain in the lower abdomen associated with nausea and repeated emesis." I think the time element may be important there.

"Her last normal bowel movement occurred

three days before entry and she passed neither stool nor gas thereafter despite the administration of enemata." I call attention to that because it is entirely possible that a carcinoma of the large bowel is present which has given no symptoms at all previously and has suddenly shut down. If that is true there would not be immediate vomiting. Obstruction of the large bowel is almost invariably followed by vomiting, not at once but two or three days later, and it is not an early prominent symptom. The immediate vomiting suggests a rather more serious accident than that and suggests that the blood supply of bowel is immediately compromised.

"The urine showed a specific gravity of 1.030 with a trace of albumin." Again suggesting the possibility of sugar, or if her bowels did not move she may have been taking magnesium sulphate and occasionally we get a high specific gravity of urine following magnesium sulphate where for some reason it is absorbed.

Her condition on admission was altogether too poor to justify any surgical interference, even if that were considered indicated at the moment.

There are two or three features about this case that I think we must mention, either to consider relevant or to rule out. First, is the tumor important? They say it is a tumor the size of a pumpkin. Of course there are various sizes of pumpkins but it does suggest a pretty large tumor. A malignant tumor of the ovary seldom gets to that size without causing more trouble from malignancy and more fluid. There was not enough fluid in the abdomen to be able to detect, in any event if it is malignancy from outside there should be evidence of carcinoma and, it seems to me, a slower shutting down of the obstruction. This was a very sudden catastrophe that she had. Secondly, is it possible that this is a chronic nephritis and that we are here seeing what we do see occasionally, the terminal stage of renal insufficiency? We do see those cases in which the abdominal symptoms are prominent, and it often happens that operation is undertaken in some of these cases for supposed acute abdominal emergency. It seems to me that we do not have sufficient evidence for a chronic nephritis of that severity to justify the belief that that is a probable diagnosis. That brings us back to the possible cause of an acute intestinal obstruction of sufficient severity so that immediate nausea and vomiting take place and the patient goes into shock. She was in shock on admission and died within thirty-six hours. Is it possible that her cardiac condition was such that it could account both for the cerebral accident four weeks before and for the present emergency presumably through embolism to a mesenteric artery? It is characteristic of mesenteric thrombosis that there is severe pain, that there is absent peristalsis at

the end of a relatively short time and that there may be perforation. The shock of a mesenteric embolus—I believe this sudden onset would be embolism rather than thrombosis—plus a perforation would have resulted in immediate death. Or did she suffer one of the other possible causes of sudden upper abdominal obstruction, an acute volvulus or a band both of which involved the small bowel and the mesentery and would result in the severe picture that she has? I have never made a diagnosis correctly before operation of mesenteric embolism or thrombosis and because I have everything to gain and nothing to lose I am going to say that that seems like the best bet to me, with volvulus second. I do not think the condition is connected with the tumor and I do not believe it is the end stage of a chronic nephritis.

DR. J. H. MEANS. I think the kind of cerebral episode is of some interest. The description here is almost the classical one of spontaneous subarachnoid hemorrhage. The patient was hypertensive and I suppose that the more usual kind of cerebral episode with hypertension is an ordinary form of apoplexy, not the so-called subarachnoid hemorrhage. I wonder if this may be the clue to some strange diagnosis in this case. I cannot suggest what it might be. I should be very much interested to find out what kind of cerebral hemorrhage it was. The picture is more that of subarachnoid hemorrhage than apoplexy with hemorrhage into the ventricle. I think the recovery is more in favor of the former.

A PHYSICIAN. Is there a possibility of there being a dissecting aneurysm there?

DR. MEANS. Dissecting aneurysm is a very good thing to have on the list of any differential diagnosis of cause of sudden death.

#### CLINICAL DIAGNOSES

Tumor of the ovary  
Intestinal obstruction

#### DR. EDWARD L. YOUNG'S DIAGNOSES

Acute intestinal obstruction with vascular damage  
1 Mesenteric thrombosis  
2 Volvulus

#### ANATOMIC DIAGNOSES

Leiomyoma of the left Fallopian tube.  
Volvulus of the small intestine with obstruction  
Bronchopneumonia bilateral  
Hemorrhage of the cerebellum right.  
Infarct of the left putamen  
Arteriosclerosis, moderate aortic and cerebral

#### PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY. The findings at autopsy show that the large tumor which she had almost certainly had for many years, although it was not noticed on the first entry, was a fibroid loosely attached to the Fallopian tube not in the ovary or the uterus. It had picked up a blood supply from the omentum and from an adherent loop of ileum. It had then twisted on its stalk three times and carried the ileum around with it, producing a volvulus and complete intestinal obstruction. The gut was widely dilated above the point of twisting, and it had collapsed below.

She showed in addition the usual findings of hypertension, a hypertrophied heart, slightly atrophic kidneys and diffuse arteriosclerosis of the kidneys. There were no thrombi in the cardiac cavities to serve as sources of emboli. The lungs showed a terminal bronchopneumonia.

At the time of autopsy there was no longer any trace of subarachnoid hemorrhage though the history leaves no doubt that it must have been present on her previous entry. In view of the story Dr. Knabik made a very careful search for a congenital aneurysm of the circle of Willis but could not find one. He did find a fairly fresh area of infarction and hemorrhage in the cerebellum and a much older softening in the left putamen. The cerebellar lesion was in all probability the source of the subarachnoid hemorrhage.

DR. YOUNG. Why was not the tumor sensitive? That is why I threw out the question of twist. It says 'a freely movable tumor' and nothing is said about sensitiveness.

DR. MALLORY. I do not believe we can be sure what they were feeling on the last entry, it may have been the strangulated loop of bowel rather than the neoplasm itself.

#### CASE 21512

#### PRESENTATION OF CASE

*First Admission.* A twenty-seven year old American shoe factory operator entered complaining of severe abdominal pain.

During the past month he had had 'indigestion' off and on characterized by mild attacks of cramplike abdominal pain. The pain was not associated with meals until one week before entry, when it began to occur about fifteen minutes after each meal and last for about half an hour. His bowels had been regular. There were no additional symptoms until three days before entry when he began to have sharp, cramplike severe, non-referred pain in the upper abdomen which continued until admission without relief. He had been unable to sleep since the onset of the pain. He was slightly nauseated two or three times on the evening he

fore admission but did not vomit. His bowels had moved on the day of admission as usual.

There was no history of jaundice, hematemesis or tarry stools. There was no loss in weight. For several years he had had nocturia about once a night but during the past week he voided about three times a night.

Physical examination was negative except for the abdomen. In the right upper quadrant there was a rounded, fairly firm, quite tender, freely movable mass which was not attached to the liver and which could be pushed into the right or left lower quadrant with ease. There was slight spasm over the mass. The liver, spleen and kidneys were not felt.

The temperature, pulse and respirations were normal.

A Wassermann test was moderately positive.

On the day of admission an exploratory laparotomy was performed. When the greater omentum was turned back a somewhat lobulated mass approximately 15 by 8 by 6 centimeters was found involving the mesentery of the jejunum. The mass was cystic for the most part, but in places was firm and in other places definitely whitish in color and extended to the duodenojejunal juncture, making resection very difficult. A jejunostomy was performed short-circuiting the mass, which was left intact. He was discharged on the thirteenth day.

*Second Admission, ten years later*

He had been perfectly well and symptom-free during this period. Five days before this entry after lunch, he was suddenly seized with a fairly severe right upper quadrant pain exactly similar to that experienced before his previous admission. The pain continued unaltered until admission. It was steady and constant but not associated with nausea or vomiting.

Physical examination showed a localized round area of spasm and tenderness in the right upper quadrant but a definite mass could not be felt.

Two days later an exploratory laparotomy was performed and the tumor removed. He had an uneventful convalescence and was discharged on the eleventh day.

#### DIFFERENTIAL DIAGNOSIS

DR JOHN STEWART. We seem to have here a definite picture of rather unlocalized, frequent upper abdominal pains of peristaltic origin, and our attention is at once focused on the small intestine. The severity of the pain in the absence of vomiting is interesting. Ordinarily one expects to see vomiting associated with such severe peristaltic pain, arising in the small intestine, if the lesion is obstructive in type. The fact that obstipation was present is further evidence that we are not dealing with one of the usual types of intestinal obstruction.

An important observation in the physical examination is the mobility of the mass described. We infer that the mass either had a

pedicle of some length or else was attached to a mobile viscus, such as the great omentum, small intestine, or mesentery.

The fact that operation was performed so soon is interesting in considering the symptomatology. From the evidence at hand one hardly sees a pressing indication for immediate operation without further study. There is described a mass apparently fairly well circumscribed lying in the mesentery of the jejunum and evidently interfering with jejunal peristalsis. The mass is at least partially cystic, and the meager details concerning its physical nature bear out the presumption already established of absence of active acute inflammation.

To be considered in the differential diagnosis are the following: first, a chronic inflammatory mass, such as gumma or mass of tuberculous lymph nodes, secondly, a benign neoplasm, such as lipoma, fibroma or neurofibroma, thirdly, a malignant tumor, such as fibrosarcoma, lymphosarcoma, or one of the rarer tumors arising in tissue of the sympathetic nervous system, including paraganglioma and ganglioneuroma, fourthly, a mass arising in connection with misplaced tissue, possibly of pancreatic or splenic origin, in which group also might be placed the so-called mesenteric cyst, finally, the mass may be springing from the pancreas and presenting in the root of the intestinal mesentery.

The subsequent course in this case after the first operation is of much significance in the differential diagnosis. A malignant tumor is no longer to be considered, for not only has the mass not produced symptoms or increased in size during ten years, but the lesion can now be excised. The same considerations make a chronic inflammatory mass an unlikely possibility. Besides, if the lesion were tuberculous there should be other obvious tuberculous nodes noted in the findings at operation. It seems unlikely that the lesion arose in the pancreas itself, for it seems to be too freely movable. From the description of the findings at the first operation and from the statement about the second operation, one assumes that the lesion does not spring from the bowel itself, for we are told that the tumor was removed, apparently without resection of the intestine. The diagnosis, then, seems to involve a benign, at least partially cystic mass in the jejunal mesentery. Lipoma and fibrous tumor cannot be excluded but are unlikely. The most plausible diagnosis in the light of the facts given us seems to be mesenteric cyst. At any rate, this is certainly an unusual lesion.

#### PREOPERATIVE DIAGNOSIS

Tabes mesenterica

DR JOHN STEWART'S DIAGNOSIS

Mesenteric cyst.

## PATHOLOGIC DIAGNOSIS

Lymphangioma of the mesentery

## PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY This patient was operated on for the second time by Dr. Vincent with a preoperative diagnosis of probable tuberculosis of the mesenteric lymph nodes. When he got into the abdomen he found a tumor mass about the size of a baseball situated in the mesentery of a high loop of jejunum. It was adherent along one surface to the intestine and on the opposite side it extended deeply into the root of the mesentery. It felt partly firm and partly cystic. He was able to dig it out from its attachment in the retroperitoneal tissues and resected it along with about a foot of the adherent jejunum. The patient made an uneventful recovery.

The specimen which we received in the laboratory showed a well encapsulated tumor mass 9 by 5 by 4.5 centimeters. On section it was found to consist of innumerable cavities varying in size from bare visibility to two centimeters in diameter. Many of the cysts contained creamy chylous material, others showed all

grades of blood staining up to frankly hemorrhagic content.

Microscopic examination showed that it was made up of a mass of anastomosing channels lined by endothelium, the majority of which contained partially coagulated protein material. In many places well formed lymphatics with connective tissue and smooth muscle in their walls can be made out. In other parts of the tumor the formation of lymphoid follicles and even of small lymph nodes is apparent.

This tumor is a characteristic example of the lymphangiomas of the mesentery. They probably arise in the region of the peritoneal tissues. Some of them tend to invade backward and downward along the aorta or about the kidneys. Others like this one, grow forward into the mesentery and eventually come in contact with a loop of small intestine. The formation of nodules of lymphoid tissue in the tumors has frequently been described and is apparently fairly typical of it. The condition is closely analogous to the so-called hygroma colli, which is really a cavernous angioma of the neck. Sometimes the tumors grow much more rapidly than this one apparently did, but they evidently have little tendency toward metastasis.

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## IMPORTANCE OF THE PHYSICIAN IN A HEALTH PROGRAM

WHEN health was largely the concern of individuals not organized in groups, it was the persons who were sick and the healers who carried the chief responsibilities. As the significance of disease to the community came to fuller realization organizations of lay persons as well as of physicians developed, until, at present, with the enormous widening of lay interest, physicians may be said to constitute a minority group. There has been also a strong tendency for lay groups to tell physicians how they should practice medicine.

Nevertheless, the keystone of the arch is the physician, and it is of critical importance to the community that the physician shall receive the best kind of preparation for the exacting office he is expected to perform. To say that he shall be socially minded does not mean that he shall be a person of slight individuality; it means simply that he shall see the problems presented by the individual patient against the background of a group, a society, of which the patient is a member. The wider implications of

a social organism of which an individual part is sick must be taken into consideration.

With the growing realization of the complexities of civilized life, and underneath the realization that life is actually becoming more complicated, we are faced with the question of whether the minds of men can deal with the added burden. Are mental breakdowns due to unwillingness or incapacity to face the facts and to make the necessary adjustments?

The demands of advancing civilization are such that of the physician as well as of others, but especially of the practitioner of medicine, there is required mental flexibility and adaptability, toughness and resiliency of mind. The physician occupies one of the key positions in advancing civilization. Nothing less than the best can be expected of him and so nothing less than the best must be given him.

The preparation of the physician for his exacting duties must be the best preparation. About the details we may disagree, but the quality must be excellent. It must excel the ordinary, the mediocre, in thoroughness, in comprehensiveness, in adequacy and in appropriateness. It must have distinction.

It is on this account that the formal standards set by the state for admission to the practice of medicine shall be changed from time to time to keep step with the practice of medicine. Science must and will lead the way. Education brings the gifts of science to practice. If education is antiquated, defective, substandard, the patient pays, sometimes with his life.

There is a popular delusion, often apparent in political circles, though not unknown elsewhere, that information is identical with education. Translated into practical affairs, this means that a candidate who manages to acquire enough information to get a passing mark on examination is therefore supposed to be qualified for practice. But in fact the correlation between information and education is not close enough for the presence of the first element to be accepted as a guarantee of the presence of the second.

Education, the best possible education, of physicians is demanded for the welfare of the citizens of the Commonwealth. The state has educational standards. They should be applied rigorously. The chartering of a medical school by the state should mean, not that the institution is free to carry on its work in utter disregard of the principles of education, but that the state guarantees a reasonable approximation to generally accepted standards of education. Is this too much to expect? We think not. Furthermore it is the right of the citizens to demand of the government that it protect them adequately against substandard physicians, graduates of substandard schools.

## Christmas

We are entering upon another season, another year is about to roll to its close, and fittingly enough the beginning of the sun's return to northern latitudes is marked by the most beloved and the kindest of our religious festivals. It is pleasant to believe that at the Christmas time, when a Saviour was born to bring spiritual salvation to an oppressed people we also may see the effulgent glow of an imaginary Star marking a goal and setting an ideal toward which we may at least strive with a renewal of that hope so necessary for the success of man's efforts.

Fortunate we are in belonging to a profession which, imperfect as it may be susceptible as it may be to the frailties of human nature, nevertheless has traditionally given of itself to a degree which sets it apart as a particular and a uniquely honorable Estate. That season of the year has come which has been immemorially dedicated to the giving and the receiving of gifts.

Let our choicest gifts this year be part of ourselves, as we remember that the gift without the giver is bare.

### THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

**FAULKNER, JAMES M. A.B. M.D.** Harvard University Medical School 1924 Assistant in Medicine, Harvard University Medical School Research Fellow, Thorndike Memorial Laboratory Junior Visiting Physician, Boston City Hospital Visiting Physician, House of the Good Samaritan His subject is "The Electrocardiographic Diagnosis of Acute Cardiac Infarction with Special Reference to the Value of Precordial Leads." Page 1215 Address 264 Beacon Street, Boston

**YOUNG, EDWARD L. JR. A.B., M.D.** Harvard University Medical School 1909 F.A.C.S. Assistant Visiting Surgeon Massachusetts General Hospital Surgeon in Chief Faulkner Hospital His subject is "Secondary Carcinoma of the Large Bowel." Page 1219 Address 279 Clarendon Street, Boston

**MULLER GULLI LINDH A.B. M.D.** College of Physicians and Surgeons Columbia University 1921 Formerly Assistant Physician Thorndike Memorial Laboratory Boston City Hospital Research Fellow in Medicine, Harvard University Medical School Now Pathologist, Rutland State Sanatorium His subject is "Reticulocyte Responses in the Pigeon Produced by Material Effective and Non-effective in Pernicious Anemia with Description of the His-

tologically Different Reactions of the Bone Marrow." Page 1221 Address Rutland State Sanatorium, Rutland, Mass

**SAKLAD, MEYER. M.D.** Tufts College Medical School 1924 Anesthetist, Memorial Hospital, Pawtucket, Rhode Island, Rhode Island Hospital, Miriam Hospital Providence Lying In Hospital, St. Joseph Hospital and Charles V. Chapin Hospital, Providence Rhode Island. His subject is "Spinal Anesthesia. Agents, Methods and Indications." Page 1226 Address 41 Angell Street, Providence, Rhode Island.

**RAPOPORT, BORIS. M.D.** Tufts College Medical School 1914 Anesthetist, Beth Israel Hospital, Boston Assistant in Surgery, Tufts College Medical School. His subject is "A Comparison of Postoperative Complications Following General and Spinal Anesthesia." Page 1235 Address 270 Commonwealth Avenue, Boston

**LOMAN, JULIUS. M.D.** Tufts College Medical School 1925 Research Associate in Psychiatry, Boston State Hospital Instructor in Neurology, Tufts College Medical School His subject is "Progress in Neurology in 1934." Page 1238 Address 353 Commonwealth Avenue Boston.

## The Massachusetts Medical Society

### A MEETING OF THE OFFICERS OF THE SCIENTIFIC SECTION

On the invitation of Dr. W. R. Morrison, Chairman of the Committee of Arrangements, the officers of the Scientific Sections of the Massachusetts Medical Society attended a luncheon at the Hotel Puritan, Boston, December 12, 1935 for the purpose of discussing the programs for the Annual Meeting of the Massachusetts Medical Society next June.

Dr. Charles E. Mongan, Dr. Channing Frothingham and Dr. Alexander Begg, officers of the Society, were also present.

Dr. Morrison reported the progress made by his committee in preparing the details of the facilities for the section meetings and the social features of the occasion, and called upon the chairmen of the seven sections for a report of plans under way. It was shown that all of the section officers have their respective duties well in hand and there is every assurance that the 1936 meeting will be of especial value to the members and their guests.

The President, Vice President and Secretary submitted important suggestions for general consideration.

Dr. Morrison urged this representative body to pay especial attention to getting the recently elected members of the Society to attend and



become acquainted with the officers and familiar with the functions of the organization

It was evident that everyone present was committed to making this meeting one of the best in the history of the Society

### ANNUAL MEETING

For the next annual meeting to be held in Springfield, Massachusetts, June 8, 9, and 10, the following subcommittees have been appointed

Publicity Committee R S Mace  
Ladies Committee W A R Chapin  
Historical Committee G L Schadt  
Scientific Committee Frederick Jones  
Hobby Exhibit Committee E P Bagg, Jr  
Committee on Clinics F L Dutton, Springfield Hospital, George B Corcoran, Mercy Hospital, Frederick Hagler, Wesson Hospital  
Sports Committee Richard A Rochford

### SECTION OF OBSTETRICS AND GYNECOLOGY\*

C J KICKHAM, M.D., R S TITUS, M.D.,  
*Chairman Secretary*  
524 Commonwealth Ave., 472 Commonwealth Ave.,  
Boston, Mass. Boston, Mass

### DIAGNOSIS OF STERILITY

Although the diagnosis of the causes of sterility is a difficult and time-consuming procedure when one is dealing with actual cases, it can be discussed quite simply

There are four methods of diagnosis which are essential to a complete consideration of any case. The first is the number and character of the sperm cells. This can only be determined accurately by examination of the semen. Such an examination should estimate the number and vitality of the spermatozoa and should examine the individual cells for any morphologic changes. It should also determine whether the seminal fluid in which the spermatozoa are to be found is normally constituted

The second test is made of the cervical secretions postcoitum. By this procedure it can be determined whether the sperm cells are able to get through the internal os in sufficient numbers so that they are practically certain to be able to reach the tubes. The test also shows whether the secretion itself is a favorable medium for this migration of the spermatozoa. Pus may be present or the mucus may be thick and stringy.

The third test is insufflation of the tubes. If they are normally patent no more need be done,

\*A series of short selected articles by members of the Section is being published weekly.  
Comments and questions by subscribers are solicited and will be discussed by members of the Section.

if not, some material like lipiodol which is opaque to the x-rays should be injected and pictures taken

The fourth procedure is to determine whether ovulation is occurring. This is best accomplished by getting an endometrial biopsy in the middle of the cycle and again at the end. From a study of stained sections of the endometrium one can postulate the occurrence of ovulation and tell a good deal about the hormone activity of the ovaries. Examination of the endometrium will also rule out endometritis. If all of these tests are satisfactory, one can predict pregnancy as being bound to occur sooner or later. If one or more of these tests are negative, treatment must be directed toward the correction of the conditions found before there can be any great expectation of success

### BOSTON MEDICAL LIBRARY

WILLIAM STOKES, 1804-1878

As an illustration of the influence of heredity upon the development of exceptional intellectual qualities the life of William Stokes, a celebrated Irish physician of the early part of the nineteenth century, may be cited as especially noteworthy. Whitley Stokes, 1763-1845, his father, was the son of Gabriel Stokes, D.D., a fellow of Trinity College, Dublin. He was also prebendary of Elphin, Chancellor of Waterford and rector of Desert Martin. The first of the family to settle in Ireland was another Gabriel Stokes, great-grandfather of the subject of this sketch, who was an engineer and Surveyor General of Ireland in 1735. Whitley, the father of William, entered Trinity College in 1779, became a fellow in 1788, procuring his degrees of Bachelor of Medicine in 1789 and Doctor of Medicine in 1793. On account of an early affiliation with the United Irishmen he came under the ban of English authority and was restrained from teaching for three years. However, he succeeded in removing the ban and was made a senior fellow in 1805 and a lecturer on Natural History in 1816. During 1830, he became the Regius Professor of Medicine, a position he held for thirteen years. So outstanding a figure did he become in the educational field that he was declared to be the best equipped man in the country to head a system of National Education in case Ireland should gain her independence of England.

Such was the immediate intellectual background of William Stokes who was born in Dublin in 1804, one of the nine children of Mary (Picknell) and Whitley Stokes, who were married in 1782. His education was conducted in the classics and mathematics by John Walker, a fellow of Trinity, and in the Sciences by his father. He pursued his medical studies at Edinburgh where he graduated in 1825. Re-

turning to Ireland that same year, he became a licentiate of the College of Physicians and was elected physician to the Meath Hospital, where he became a colleague of Dr Robert James Graves. Pursuant to substantial work which he had evidently done while at Edinburgh, under Cullen, in pathology and clinical medicine, he published in 1825, a monograph on "The Use of the Stethoscope" which was the first article on this subject to appear in English. This he dedicated to Cullen.

From his opportunities at Meath Hospital and his most congenial association there with Robert Graves, with whom he collaborated in many ways, he became an inspiring teacher. In fact, one of his greatest contributions to medical interests has been the prominence that he gave to bedside teaching. Typhus fever visited Dublin in 1826 and Stokes was prominent through it all in his efforts to check its ravages. He married in 1828 and with an increasing practice he moved to a more commodious home on York Street where he kept open house on Saturday evenings to which were attracted the cultured people of the town, for he had many interests outside his profession among which were art and archaeology. He was fond of collecting Irish antiquities and was the means of encouraging many a young man in various lines of artistic and scientific endeavor, notably George Petrie, the Archaeologist. He did not neglect any opportunities of foreign travel, which was of great assistance to him in developing his native, artistic tastes. These interests made him a great believer in the value of broad cultural training to a physician and he frequently emphasized this point of view in his writings and teaching.

His hospital work, preparation of his teaching courses and the exactions of a large practice did not prevent him from doing a considerable amount of literary work, for in addition to his first work on the "Use of the Stethoscope," he brought out very valuable and extensive works on "Diseases of the Chest," "Diseases of the Heart and Aorta," "Clinical Observations on the Use of Opium," and numerous lectures and papers published in the London Cyclopaedia of Practical Medicine and elsewhere covering a wide range of subjects. He founded the Dublin Pathological Society in 1838 and was for some years Editor of the *Dublin Medical Journal*.

To the profession in America the work done at Meath Hospital during the period of activity of Graves and Stokes should be of particular interest for it was largely from here that knowledge of the methods of bedside teaching practiced by them, was brought back to this country. Though Boerhaave, one hundred years before, had introduced this plan of teaching it was to the credit of these two that the method was widely introduced and popularized. This was doubtless due, so far as America was con-

cerned to the fact that fewer American students visited Leyden than came to Great Britain, and after the Edinburgh schools' influence began to wane, the school at Dublin enjoyed a short period (twenty years) of unusual popularity, largely due to the presence, there, of Graves and Stokes. During this time, many American youths found their way to Ireland and came under the spell of the teaching of these two master clinicians. It is a surprise to us, in this day, to realize what a battle had to be fought by those who were venturesome enough to employ the methods of Laennec and Auenbrugger in the study of diseases of the heart and lungs. It was due, in no small degree, to the championship of these methods that the renown of the Dublin School was achieved, as it was, of course, through their practical application that the discoveries in these fields, of such men as Graves, Stokes, Cheyne, Corrigan and Adams were made possible. It has been claimed by those competent to hold an opinion, that Stokes, after Corvisart, was the second greatest cardiologist the world has known.

Not only did these men cultivate the methods of clinical observation at the bedside but like all great diagnosticians and teachers they sensed the equally great importance of a knowledge of pathological anatomy, and the Dublin School became known in America as a place where such studies were prosecuted.

In 1861 he was made Physician in Ordinary to the Queen in Ireland, and the same year was elected F.R.S. In 1874 he was chosen President of the Royal Irish Academy and in 1876 the Prussian Government awarded him the Prussian Order, Pour le Mérite in recognition of his medical writings. This brief account of the life of a master mind may help us to see something more of a personality known to us chiefly if not solely, because it bore a name associated with a peculiar type of respiration and a rare cardiac lesion.

## MISCELLANY

### THE APPOINTMENT OF DR. KARL BOWMAN

After a civil service examination of sixteen applicants Dr. Karl M. Bowman, chief medical officer of the Boston Psychiatric Hospital, was selected to fill the position of Director of the Psychiatric Division of Bellevue Hospital.

### DR. W. E. BROWNE, ADDRESSSES THE BRIDGEPORT MEDICAL ASSOCIATION

Dr. William E. Browne, Visiting Surgeon at Carney Hospital, Boston, recently was the guest speaker of the Bridgeport Medical Association. His exhibit of a variety of ingenious splints and the presentation of related cases made his address "Management of Infections of the Hand" most interesting and instructive.

RÉSUMÉ OF COMMUNICABLE DISEASES IN  
MASSACHUSETTS FOR OCTOBER, 1935

Disease	Oct., 1935	Oct., 1934	5 Yr Average*
Anterior Poliomyelitis.....	237	10	88
Chickenpox .....	351	374	338
Diphtheria .....	35	70	157
Dog Bite .....	804	701	479
Epidemic Cerebrospinal Meningitis	13	5	6
German Measles .....	39	45	32
Gonorrhea .....	595	626	631
Lobar Pneumonia.....	259	181	192
Measles .....	179	91	212
Mumps .....	333	98	174
Scarlet Fever.....	552	479	567
Syphilis .....	511	404	373
Tuberculosis, Pulmonary.....	324	319	313
Tuberculosis, Other Forms.....	44	39	39
Typhoid Fever.....	13	15	27
Undulant Fever.....	8	2	
Whooping Cough .....	286	411	396

\*Based on the figures for the preceding 5 years

## RARE DISEASES

*Anterior poliomyelitis*—237 cases*Dysentery (amebic)* was reported from Saugus, 1*Dysentery (bacillary)* was reported from Worcester, 2*Encephalitis lethargica* was reported from Marlboro, 1, Peabody, 1, total, 2*Epidemic cerebrospinal meningitis* was reported from Boston 2, Cambridge, 2, Deerfield, 1, Franklin, 1, Lawrence, 1, Longmeadow, 1, Lynn, 1, Medford 1, Somerville, 3, total, 13*Malaria* was reported from Andover, 1, Boston, 2, Chelsea, 1 total, 4*Septic sore throat* was reported from Arlington, 1, Beverly, 1, Boston, 4, Greenfield, 1, Newton, 1, total, 8*Tetanus* was reported from Medford, 1, Springfield, 1, total, 2*Trachoma* was reported from Boston, 3, Springfield, 1, Worcester, 1, total, 5*Trichinosis* was reported from Boston, 2, Methuen, 1, total, 3*Undulant fever* was reported from Millbury, 1, Natick, 1, North Adams, 2, Northampton, 1, Northbridge, 1, Upton, 1, Webster, 1, total, 8

## RÉSUMÉ FOR OCTOBER, 1935

Infantile paralysis for the State as a whole continued on the decline although a few communities noted a slight increase

The decline of diphtheria continues to be striking. For the first nine months of the year there were sixteen deaths as compared with thirty four in the corresponding period last year

Tuberculosis pulmonary and other forms were reported about on a par with 1934

Lobar pneumonia continues to run ahead of last year's figure and the indication is that it will continue to do so through the coming winter

Scarlet fever was reported above last year's October figure and the indication is that the incidence this winter will be somewhat higher than in 1934

Epidemic cerebrospinal meningitis is running at a definitely higher level than in 1934 with nearly every part of the State represented

Typhoid fever was reported somewhat lower than last year. The number of deaths for the year to date (nine) is on a par with last year's figure, which was so low that some doubt was raised that it could be sustained

Undulant fever was reported thirty-four times this year as compared with twelve for the year before, the increase being due to better reporting

Although the number of reported dog bites is high, there were but nine reported cases of animal rabies as compared with twenty seven in 1934

Chickenpox and German measles are not remarkable

Measles was reported somewhat higher than in 1934 but below the five-year average

Mumps had its highest reported October incidence in the history of the State, while whooping cough was reported to a very low level

## THE NEW PHARMACOPOEIA

THE U.S.P. BOARD ANNOUNCES THE RELEASE DATE AND  
THE OFFICIAL DATE FOR THE U.S.P. XI

The new Pharmacopoeia, the Eleventh Revision, was available on December 16. This date was fixed by the Board of Trustees of the United States Pharmacopoeial Convention to enable the publishers, the Mack Printing Company of Easton, Pennsylvania, to place the books on sale in all parts of the country simultaneously

As directed by the U.S.P. Convention, the Board of Trustees has also fixed the date when the standards of the new Pharmacopoeia shall become official, superseding the Tenth Revision. This date is June 1, 1936

The following articles have been added to the Pharmacopoeia

Acriflavina

Acriflavinae Hydrochloridum

Aethylenum

Aethylhydriocupreinae Hydrochloridum

Aethylis Oxidum (Solvent Ether)

Antitoxinum Scarlatinae Streptococcicum

Bismuthi et Potassii Tartras

Calcii Creosotas

Calcii Gluconas

Calcii Hydroxidum

Carbo Activatus

Carbonel Dioxidum

Chlorobutanol

Digitalis Pulverata (Biologically standardized)

Emulsum Petrolati Liquidum (50 per cent)  
Ephedrina  
Ephedrinae Hydrochloridum  
Ephedrinae Sulfas  
Erythritylis Tetranitras Dilutus (Erythrol Tetra nitrate)  
Extractum Hepatis  
Ferri et Ammonii Citrates Virides  
Fluoresceinum Solubile  
Histaminae Phosphas  
Hydrargyri Succinimidum  
Iodophthaleinum Solubile  
Liquor Ergosterolis Irradiati (Vioosterol)  
Liquor Hepatis  
Liquor Hepatis Purificatus  
Liquor Histaminae Phosphatis  
Liquor Parathyroides  
Liquor Sodii Hypochloritis (4 per cent)  
Merbaphenum  
Neocinchophenum  
Oleum Iodatum  
Oleum Maydis  
Oleum Morrhuine Non-destearinatum  
Oleum Rosae  
Phenacinae Hydrochloridum  
Phenobarbitalum Solubile  
Pulvis Chinioformi  
Serum Antimeningococcicum  
Serum Antipneumococcicum—I  
Sodii Perboras  
Sodii Stearates  
Stomachus  
Tabellae Glycerylis Trinitratis  
Theophyllina cum Ethylenediamina  
Theophyllina cum Sodii Acetate  
Tinctura Iodi Mitis (2 per cent)  
Toxinum Diphthericum Detoxicatum  
Toxinum Diphthericum Diagnosticum  
Toxinum Scarlatinae Streptococcicum  
Toxibellae Hydrargyri Bichloridi Parvae  
Trypanamidum  
Tuberculinum Pristinum  
Vaccinum Rabies  
Vaccinum Typhosum  
Vaccinum Typho-paratyphosum

JAMES H. BEAL, *Chairman*  
WILLIAM B. DAY, *Secretary*

## PRESENT CONCEPTS OF TUBERCULOUS INFECTION

BY WADE HAMPTON FROST M.D.

*Professor of Epidemiology School of Hygiene and Public Health Johns Hopkins University  
Baltimore Md*

The most conspicuous fact in the history of tuberculosis in the last 50 years has been its steady and rapid decline in mortality. In view of the circumstances under which this has taken place and in the light of what is known of the natural history

of the disease is it reasonable to expect that the downward trend may continue indefinitely perhaps to the point of regional suppression of the disease, or is it more reasonable to anticipate a compensating upward swing to a higher level?

The fact that the tubercle bacillus is an obligate parasite of man transmitted directly from person to person by way of the respiratory tract, places tuberculosis in the group of diseases offering least hope of full control except by specific immunization. However tuberculosis is sharply differentiated from the other diseases in this group by the fact that two restrictions are imposed upon the propagation of the tubercle bacillus, namely (1) in order to spread the infection, it must produce actual disease—a lesion which becomes "open" and (2) it succeeds in producing this effect in only a limited proportion of those who become infected. Various other pathogenic organisms transmitted by way of the respiratory tract are subject to one or the other of these restrictions, or its equivalent, but the tubercle bacillus is unique in being subject to both.

Because of this combination of conditions limiting the propagation of the tubercle bacillus, it is reasonable to infer that the partial environmental control which has been established is definitely effective in limiting the spread of tuberculosis even though it be relatively ineffective against numerous other diseases transmitted directly by way of the respiratory tract. The fact that at present tuberculous infection as distinguished from the disease is highly prevalent, is not inconsistent with this view.

With improved measures of control which are within the limits of practicability including better detection and isolation of open cases with higher standards of living and personal hygiene there appears to be no fundamental reason why tuberculosis may not be eradicated eventually from large areas in this country. There are indeed certain contingencies which obviously might bring about a recrudescence after the disease has reached an extremely low level, but it does not appear that this result is inevitable in accordance with any accepted biological law or that it is especially to be anticipated.

Admitting that we cannot actually know the future of tuberculosis it is none the less important to define clearly what are reasonable expectations in the light of present knowledge since present activities in study and control necessarily are directed chiefly toward the future. If as now appears it is reasonable to anticipate eventual control to the point of permanent regional suppression, the establishment of this as the objective has obvious and important implications as to the scope and intensity of control measures. It has less obvious but important implications with respect to indicated lines of investigation.

Through the courtesy of the N. T. A. and of Dr. Frost, the above was published in *Neighborhood Health*, August-September 1935 Vol. 1 No. 2.

COMPARISON OF DISEASE INCIDENCE IN CONNECTICUT WITH 1934  
AND SEVEN YEAR AVERAGE

MONTH ENDING DECEMBER 7, 1935

Diseases	1935				Average cases reported for week corresponding to Dec 7 for past seven years	1934			
	Week ending Nov 16	Week ending Nov 23	Week ending Nov 30	Week ending Dec. 7		Week ending Nov 17	Week ending Nov 24	Week ending Dec 1	Week ending Dec 8
Chicken Pox	96	121	89	149	147	73	199	142	291
Diphtheria	3	1	4	9	14	3	1	2	3
Dysentery Bacillary	1	—	—	—	—	4	1	6	—
Encephalitis Epidemic	1	—	—	—	—	1	—	—	—
German Measles	9	13	19	4	6	1	—	—	16
Influenza	3	2	18	9	5	4	1	1	1
Measles	52	55	29	110	75	209	222	258	272
Meningococcus Meningitis	1	1	2	—	—	—	—	2	—
Mumps	29	63	45	65	48	20	13	16	24
Paratyphoid Fever	—	2	1	—	—	—	1	—	—
Pneumonia (Broncho)	19	9	12	24	30	16	24	15	21
Pneumonia (Lobar)	17	18	13	34	32	16	17	16	17
Poliomyelitis	3	6	5	2	—	—	—	—	—
Scarlet Fever	27	54	32	33	58	34	45	38	36
Smallpox	—	—	—	—	7	—	—	—	—
Streptococcus Sore Throat	2	1	—	1	1	—	6	1	4
Trichinosis	2	—	—	2	—	4	—	4	3
Tuberculosis (Pul)	23	22	13	26	23	11	44	31	15
Tuberculosis (O F)	2	1	1	3	2	1	1	1	2
Typhoid Fever	2	1	—	1	3	—	2	—	1
Undulant Fever	3	2	4	3	1	—	1	1	4
Whooping Cough	82	110	75	71	63	72	65	36	89
Gonorrhea	27	34	26	22	51	23	30	41	54
Syphilis	26	42	37	49	58	30	64	67	51

Remarks No cases of Asiatic cholera, glanders, plague or yellow fever during the past seven years

“MAKING WAR AND MAKING PEACE”

That psychiatry, which played an important part in preparing men to be soldiers in the World War has an even greater responsibility in preparing them for peace was the keynote of an address delivered by Dr Stewart Paton at the twenty-sixth annual meeting of The National Committee for Mental Hygiene held at the Rockefeller Center, New York City, November 14, 1935. Dr Paton, formerly lecturer on neurobiology at Princeton and other universities, spoke on “Making War and Making Peace.”

“One of the lessons that we learned during the war,” Dr Paton said, “was that in order to insure military success it was necessary for the soldiers in active service to be sound in mind and body. The late Dr Thomas W. Salmon, first Medical Director of The National Committee for Mental Hygiene, and his associates, did a great deal to open the eyes of military leaders to the importance of the emotional

and mental preparedness that is necessary in order to make a good soldier. But as we have been exceedingly indifferent and reluctant about informing ourselves as to the emotional and mental preparedness required to be peaceful and human, relatively little progress has been made in finding ways and means for the pacific settlement of either individual or international problems.”

Dr Paton expressed the opinion that the National Committee's outstanding contribution during the past quarter of a century has been in bringing about public realization that our most valuable possessions are our distinctive human characteristics, and that this must become an essential part of our outlook if we are to hope for an end of international strife.

“Man is gradually learning to fuse impulse and reason, and unless the strain is too great, he often succeeds in being peaceful, sane and human,” he said. “However, the problem of how to make peace is a much more difficult one than how to make war,

and as we have given more intelligent consideration to the war than to the peace problem we should not be surprised nor shocked by the difficulties we experience in settling any of our conflicts

Dr Paton pointed out that while there is universal agreement that our military leaders may be physically and mentally sound we pay little or no attention to the equally important requirement of sound mental and emotional qualifications in our governmental and political leaders who are engaged in the vital business of diplomatic negotiation discussion and arbitration. A great deal of valuable energy is wasted in promoting rather than in practicing peace he said due to the lack of appreciation that the rational and peaceful settlement of disputes requires definite and particular techniques and method of approach

"Too many people are now engaged in trying to promote peace throughout the world who would not be competent to assist an individual in finding a peaceful solution of the problems that drive him to take refuge in a mental hospital

Here Dr Paton referred to the warning recently issued by the Netherlands Medical Association, in a statement signed by 229 psychiatrists from thirty nations which pointed out the war dangers of the present world situation and which, he said suggested the constructive psychological methods that should be adopted to avoid destructive and insane conflicts

Although we have learned from hard and trying experience that men cannot be prepared for constructive service if they adopt prohibitive attitudes of mind he said we still rely to a large extent on prohibitions to make us temperate and sane. As a result mental hospitals and clinics are overcrowded with patients who have not been able to settle the conflicts that disturb their lives on a rational and peaceful basis.

One of the basic factors that must be considered in planning for world peace Dr Paton further said, is our "emotional immaturity"

"One of the signs that we are still children psychologically speaking is the intense interest we take in all the sensational aspects of life he said "For centuries we have focussed attention upon going to war going insane going unemployed and going to the devil Very little notice however is taken of the process of going more human more peaceful more sane Yet, slowly but surely we are becoming aware of the fact that man is a human being in spite of the fact that the present plague of nervous and mental disorders the greatest epidemic that has ever afflicted mankind is seriously interfering with our attempts to be peaceful sane and human.

Mental hygiene as time goes on can assist the American people in finding peaceful and rational solutions of their personal business, industrial and political problems By continuing and supplementing the work that The National Committee for Mental Hygiene has already done much can be accomplished in opening our eyes to the significance of the fact that we are human beings

One of the dangers at present is that technical science has supplied us with means for annihilating the human race This catastrophe can be avoided by securing the active coöperation of science and art, and mental hygiene can show the way in which we can secure this coöperation that is so essential to progress in the art of living

#### CARE FOR INDIGENT HEART CASES IN CONNECTICUT

Mrs F Donald Coster of Fairfield Connecticut, has developed plans for the reestablishment of a free clinic for indigent persons afflicted with heart diseases in Bridgeport, Connecticut. When the clinic is in full operation, fifteen trustees will be in charge of the endowment.

The facilities of the clinic will be available to any resident of Connecticut who is unable to pay for treatment.

### CORRESPONDENCE

#### CONSULTATION A LA MODE

Editor *New England Journal of Medicine*

One of the handicaps of being a general practitioner is the painfully humiliating experience he is constantly called upon to go through at the hands of the well meaning specialist who sees nothing unethical in the usual procedure of lifting all the responsibility from the shoulders of the doctor who calls him in consultation and thereafter giving said patient such excellent attention that the erstwhile physician—in good and regular standing with his former patient—is utterly ignored and forgotten.

In spite of all that has been said and written to the contrary this baneful practice still goes on and it often seems true that the greater the man called in consultation the more inevitable the outcome Today calling a consultation with many of these men of otherwise high standing is tantamount, not only to giving up your patient but your professional standing and prestige with all concerned The process is apt to be about as follows

Consultant suggests removal to hospital where case may be watched and studied. Very good You would like to watch and study this patient yourself and that's why you called him in. Perhaps you simply wanted his judgment as to whether case is operatively urgent. From courtesy you accept the first suggestion Presto! Your patient is removed as a private case to a semi private institution with a "closed staff"

You make your first call full of interest and expectancy only to find your patient well established under the more or less exclusive care of Dr Dash—who covers for Dr Blank"—a man who doesn't know you from Adam and whom you did not ask for advice You are told courteously that Dr Blank said you were welcome to come in any time meanwhile 'we are working up your case Patient one day requests you to prescribe an aspirin for her headache and discovers it cannot be done.

You make several visits you see your patient in

bed (under covers) but you are never asked advice about any procedure whatsoever, or expected to make an examination. Interest flags. The patient seems well satisfied and thanks you patronizingly for sending her to such a nice place, and quotes Dr Dash whom you now rarely see, or Dr Blank who "looks in occasionally." "Very big man, you know, did ten operations yesterday," Dr Dash as sisting

Eventually you learn that Dr A has been called to examine nose and throat, Dr B the eyes, and Dr C is "going over" the heart and kidneys preparatory to operation. Finally you are *invited* to "witness" the operation. You may have thought you were something of an authority on some one of these lines yourself, but no questions being asked, your self-confidence gradually weakens so that when you receive the final notice of the patient's discharge with "follow up nurse" you accept the inevitable Patient to report monthly to Dr Blank.

As a social duty you call at the house of your patient and are told everything is being taken care of and you will be sent for if needed. When the month comes around you debate on the policy of sending any bill whatsoever for services—except the initial call (\$3 00). If wise, acting on past experience, you simply pass it up to profit and loss, and wonder who, among the great luminaries of modern medicine, will be your next beneficiary in the sum of some hundreds of dollars.

As a physician of thirty-five years' experience, and near the retiring age anyhow—there is little to say from the standpoint of personal grievance. I am merely pointing to one of the conditions which make general practice difficult and frequently humiliating in the extreme. The doctor today not only sees his poorer patients drifting to the clinics (often run by young physicians and admiring nurses who "make suggestions") but his richer patients constantly being beguiled by a process so subtle that it takes his breath away and leaves him wondering like the man in the play "Am I now as big a fool as I think I am?"

What can be done about it? Unfortunately, the problem is not an easy one and it is futile to pass it up by implying unworthy motives to anyone. There was a time, within the memory of individuals now living, when it was reasonably safe for the family physician to call a first class consultant without the common danger of being utterly supplanted or ignored in the further conduct of the case. His opinions were often sought and respected *in the presence of the patient or members of his family*. "Follow up" engagements were arranged by mutual consent. If the case proved to be one for hospital care the consultant and the general man were in constant sympathy and intimate touch with the patient.

Whether this relation of mutual respect and genuine coöperation can continue under modern conditions in such manner as to prevent the humiliating situations above outlined is difficult to say. On the whole I have nothing but profound respect for

most of the talented surgeons and specialists who have assisted me over many difficult places in the past. On the surface it would appear that the general practitioner has no other recourse than *to refuse to have his private patients transferred to any closed staff hospital unless he himself is on that staff*. If there is any other way to avoid the inevitable situation above suggested, the writer, as a fair representative of the fast-disappearing fraternity of the general practitioner, would like to hear from those specialists in a position to speak for themselves.

WILLIAM W HARVEY, M D

114 Fenway, Boston

#### CONCERNING JENNER AND JOHN HUNTER

Editor, *New England Journal of Medicine*,

The following is from "The Farrington Diary" by John Farrington, R.A., edited by James Greig George H Doran and Company, 1923

##### "Of Vaccination Fame"

"September 13" (1796) "Dr Jenner was some years ago with John Hunter (The famous surgeon), and had He preferred a town life might have been connected with him in business. He knows Louthburgh, and observed that He does not receive remarks on his work graciously.

"While Louthburgh was painting one day John Hunter remarked that a certain part was *too green*, 'Not green enough,' said Louthburgh, and dipping his pencil in the strongest green colour put it on the canvass.

"Foote, the surgeon, became rancorous against John Hunter, because the latter had seemed to describe a Bougie which Foote had invented, as not necessary. To revenge himself He wrote of Hunter with much malignancy and asserted many falsehoods.

"Dr Jenner has a great opinion of the Cheltenham Waters, but they may be drunk imprudently which He sees in the countenances of many Young Ladies at the well. Above 3000 people have drank them this Season, not one who came for the benefit of them has died.

"September 24th. Dr Jenner has found that in *insane patients* He has moderated their violence by keeping them sick with tartar emetic. He observed that a person is more liable to take cold who suddenly removes from *cold* to *heat* than from *heat* to *cold*. Camphor water is an excellent medicine for nervous complaints.

"September 27th. Dr Jenner shewed us some lines which the Revd. Dr Stevens gave him as having been written by Gray as part of his *Elegy* in a Country Church Yard, but were omitted.

"Some rural Lais with all conquering charms,  
'Perhaps now moulders in the grassy bourne,  
'Some Helen, vein to set the fields in arms,  
'Some Emma dead of gentle love forlorn'"

Very truly yours,

WM PEARCE COUES, M.D.

12 Monmouth Court, Brookline, Mass

## ARTICLES ACCEPTED BY THE AMERICAN MEDICAL ASSOCIATION COUNCIL ON PHARMACY AND CHEMISTRY

535 North Dearborn Street Chicago Illinois  
December 5 1935Editor *New England Journal of Medicine*

In addition to the articles enumerated in our letter of November 2 the following have been accepted

The Calco Chemical Co. Inc.

Tablets Methenamine—Calco 5 grains

Cutter Laboratories

Diphtheria Toxin for the Schick Test, Diluted Ready for Use

Diphtheria Toxin Antitoxin Mixture 0.1 L+ (Goat) ten 3 cc. vials package

Typhoid Paratyphoid Prophylactic 10 vials package

Lederle Laboratories Inc.

Gas Gangrene Antitoxin (Polyvalent) Without Tetanus Antitoxin Globulin Lederle-Modified

Tetanus Gas Gangrene Antitoxin Globulin Lederle-Modified

Parke Davis &amp; Co

Gas-Gangrene Antitoxin (Combined) Refined and Concentrated—P. D. &amp; Co.

Yours sincerely,

PAUL NICHOLAS LEECH *Secretary*

## RECENT DEATHS

CABILL—CHARLES SUMNER CABILL, M.D. of 311 Prospect Street, Cambridge, Massachusetts died at his home December 10 1935 aged seventy-one years. He graduated from the Harvard Medical School in 1886 and was a Fellow of the Massachusetts Medical Society and the American Medical Association.

Dr. Cabill was active in the formation of the Cambridge City Hospital and served as chairman of the board of trustees from 1912 until December 1931. He was active in civic affairs having served on the park commission of Cambridge and as an official of the Inman Co-operative Bank and the Central Trust Company. He was a member of the Cambridge Lodge of Elks and the Cambridge Knights of Columbus.

His brother, Dr. Thomas J. Cabill of Cambridge and four sisters survive him.

LAWLOR—EDWARD FRANCIS LAWLOR, M.D., of 83 Tremont Street, Lawrence Massachusetts died at his home October 6 1935. He was born in Lawrence in 1877 educated in the public schools of that city and graduated from the Baltimore Medical College in 1905. He began practice in Lawrence soon after graduating in medicine and joined the Massachusetts Medical Society and the American Medical Association.

For a year and a half he suffered with organic diseases.

He was the surviving one of three brothers who practiced in Lawrence. He is survived by his widow Mrs. Florence Lawlor, a daughter Elizabeth Lawlor, a son Dr. Edward F. Lawlor, an interne at the Salem Hospital, and several sisters and brothers.

LOVITT—ISRAEL MELBOURNE LOVITT, M.D., of Yarmouth Nova Scotia, died at his home December 7 1935.

He graduated from the Harvard University Medical School in 1885 then spent a year in European hospitals.

He began medical practice in Yarmouth but soon discontinued it to engage in business and philanthropy.

Several children survive him.

## NOTICES

## AMERICAN BOARD OF OPHTHALMOLOGY

The 1936 Examinations will be held in Kansas City May 11 at the time of the American Medical Association meeting and in New York City in October at the time of the American Academy meeting.

All applications and case reports must be filed at least sixty days before date of examination. For information, syllabuses and application forms address Dr. Thomas D. Allen, Assistant Secretary, 122 South Michigan Avenue, Chicago, Illinois.

## ANNOUNCEMENTS

CHARLES E. DUMAS, M.D., announces the opening of his office at 330 Main Street, Worcester.

JOSEPH HARRIS, M.D., announces the opening of an office at 146 Chestnut Street, Springfield, Mass.

## REPORTS AND NOTICES OF MEETINGS

## THE WILLIAM HARVEY SOCIETY

The William Harvey Society met November 3 at the Beth Israel Hospital. Dr. Cadis Phipps presiding. Dr. E. B. Pardee, Professor of Medicine at Cornell Medical School, spoke on "Arteriosclerotic Heart Disease." Dr. Pardee emphasized the fact that generalized arteriosclerosis is not an indication of heart disease unless there is also sclerosis of the coronary arteries. Atherosclerotic changes in the cardiac valves may lead to aortic insufficiency or to mitral stenosis, but such changes are usually slight, unimportant pathologically difficult to diagnose and are rarely the primary cause of cardiac symptoms although they may contribute to such symptoms as are caused by other disease processes.

Hypertension is a frequent complication of arterio-



sclerotic heart disease, although its exact rôle is difficult to state. Dr Pardee believes that persistent hypertension can give rise to arteriosclerosis, both generalized and coronary. On the other hand hypertension can cause cardiac hypertrophy and failure without the presence of any coronary disease whatsoever.

There are three forms of coronary arteriosclerosis:

(1) Generalized narrowing of all the coronary system, with degeneration of the muscle cells and fibrous tissue replacement.

(2) Slow narrowing of one or more branches of the coronary system with resultant localized fibrotic changes. There is usually an associated generalized process of less severity. It is in this type that slow but complete limited occlusion may occur without clinical manifestations.

(3) Abrupt thrombosis of a previously patent vessel with myocardial degeneration and subsequent rupture or fibrosis. If the thrombosed vessel is small, and if collateral circulation is good, the involved area may escape acute degeneration.

One of these forms is usually predominant, but the other processes are usually found in greater or less degree in the same heart.

Although arteriosclerosis is the most usual cause of myocardial fibrosis, it is also a result of chronic passive congestion, chronic rheumatic involvement, or of narrowing of the coronary mouths due to luetic aortitis or rheumatic aortic disease with calcification.

Coronary disease is usually manifest by some or all of the following characteristic symptoms:

(1) The angina of effort which subsides with the cessation of exertion. Occasionally there is recurrence of pain at night, which is relieved when the patient assumes a sitting position. This type of pain is most often associated with localized narrowing of a coronary branch.

(2) Severe prostration and persistent angina occurring with coronary thrombosis. The prostration may persist after the disappearance of the angina, or may be the only manifestation of coronary occlusion.

(3) Chronic cardiac insufficiency, characterized by dyspnea on exertion which steadily progresses in severity over a period of years. Eventually shortness of breath is existent while the patient is at rest. This dyspnea is usually accompanied by some degree of cough. These patients may complain primarily of easy fatigue, rather than dyspnea. Ankle edema and hemoptysis are relatively late symptoms. Nocturnal dyspnea of paroxysmal or Cheyne Stokes type is often a troublesome manifestation.

(4) Cardiac arrhythmias are commonly encountered. Of these premature beats are the most common. Auricular fibrillation is of frequent occurrence, if paroxysmal, causing distress at the moment of change of rhythm, and if persistent, attracting attention only after exertion or excitement. Heart block is relatively rare, resulting in Adams Stokes syndrome in its advanced form.

Just as the pathological features are usually mixed, so are the symptoms. However, certain correlations between the pathological and clinical manifestations of the disease may be summarized as follows:

Predominant Pathology	Usually Related Symptoms
A Generalized coronary narrowing	A (1) Cardiac insufficiency (2) Cardiac arrhythmias
B Localized coronary narrowing	B (1) Angina of effort (2) Paroxysmal nocturnal dyspnea (3) Cardiac arrhythmias
C Acute coronary thrombosis	C (1) Acute persistent angina and prostration (2) Cardiac insufficiency (3) Cardiac arrhythmias

Analysis of one hundred ambulatory patients with arteriosclerotic heart disease revealed the following incidence of initial symptoms:

Angina of effort	33%
Shortness of breath	24%
Coronary thrombosis	34%
Palpitation	5%
No symptoms	4%

The incidence of coronary thrombosis as an initial symptom is undoubtedly greater than the 34 per cent noted above, inasmuch as many patients do not survive the first attack.

Those patients with coronary thrombosis as the initial manifestation of heart disease have a much higher incidence of subsequent thromboses than do patients with initial symptoms of cardiac insufficiency. The time between subsequent thromboses is extremely variant, being as long as twenty years in some cases. Giving a prognosis as to life expectancy in such cases on the basis of average time between attacks is useless, and is to be condemned inasmuch as it may cause undue alarm on the part of the patient's family.

The diagnosis of arteriosclerotic heart disease is confirmed by the presence of certain physical signs. Such signs are derived from four main sources:

(1) Inasmuch as atheroma of the aorta is usually accompanied by coronary arteriosclerosis, signs indicative of the existence of aortic atheroma are to be considered as evidence for the coexistence of coronary sclerosis. Thus, the presence of a hard ringing aortic second sound (in the absence of hypertension), a harsh systolic murmur at the aortic area, and x-ray findings of aortic atheroma and prominent aortic knob, are strong evidence for the existence of coronary arteriosclerosis.

(2) Cardiac enlargement in the absence of hyper-

tension or valvular disease is indicative of arteriosclerotic heart disease

(3) A faint first heart sound with a normal or increased sound shows myocardial weakness and points to coronary sclerosis. Prolongation or duplication of the first sound and gallop rhythms are of similar importance

(4) Electrocardiographic changes when properly evaluated are of distinct value in differentiating various cardiac lesions. Electrocardiographic abnormalities in patients of a given age without other possible causes are to be considered as due to coronary arteriosclerosis. The most important of these suggestive changes are the following: inversion of the T waves in the first, or second leads; a diminished amplitude of the P wave; a small or biphasic T wave; a prolonged PR interval; a small amplitude of the Q-R-S complex; or a low take off of the T wave

#### BOSTON ORTHOPEDIC CLUB

The second meeting of the Boston Orthopedic Club for the year was held in the Boston Medical Library on November 12, 1935. Dr. George W. Van Gorder opened the meeting and briefly introduced the speaker of the evening, Dr. Sumner M. Roberts. Dr. Roberts spoke on "Dislocations and Fractures of the Cervical Vertebrae." Contrary to the opinion commonly held, a broken neck does not always mean death and if treated properly the majority of cases recover. As in the treatment of all fractures, accurate knowledge of the regional anatomy is essential and Dr. Roberts discussed the structural differences between the cervical region and the rest of the spine. The range of motion is distinctly greater, particularly in the upper part of the cervical spine than in the lower vertebrae and because of the location this region is especially susceptible to injury. Accidents resulting in damage to this region usually consist in a forcible forward flexion of the neck.

Stiffness of the neck may be the only sign of a slight fracture. Tenderness over the transverse and spinous processes of the involved vertebrae is usually present and may be very marked. There is frequently a definite abnormality in the position of the head. If the fracture is very severe there may be pain and sensory disturbances in the arms as well as paralysis. This may be due to hemorrhage or edema of the cord or surrounding tissues and may be transient. If there is no evidence of cord damage and this should be carefully ruled out, the patient may sit up to be examined. When the head is held in both hands by the examiner and gently lifted upward the pain is frequently relieved. The neck should not be flexed forward during the examination. X-ray examination is often necessary to make a definite diagnosis. Dr. Roberts has found lateral stereo views to be useful.

Fractures or dislocations of the cervical spine must be reduced just as any other similar injury elsewhere and the sooner this is done, the better

the results will be. Closed methods should be used except on rare occasions. Preliminary to reduction the patient is put flat in bed on a Bradford frame with a pillow under the shoulders and the head in a simple canvas sling and five pounds of traction exerted. The head may be gradually hyperextended by the use of a collapsed pillow under the shoulders which is slowly inflated with an air pump. After reduction has been accomplished a plaster cast is applied. This cast should extend over the entire head with only a hole for the mouth, nose, ears and eyes and perhaps another for the topmost part of the head. The chin and forehead should be well padded with felt and a window should be placed over the Adam's apple. After the cast is molded a leather collar is used with a band extending around and over the brow.

The simplest type of fracture is of the spinous process. These are often multiple and require four to six weeks of fixation. Dr. Roberts has had five cases of fracture of the odontoid process in his series. The fracture usually takes place at the base of the process and a resulting dislocation of the atlas is common. This fracture gives pain high up in the neck which spreads into the occiput and there is pain on rotation of the head. Careful x-rays through the mouth should be taken to establish the diagnosis. A period of two to three months of complete fixation in plaster is necessary and this must be followed by two months with a molded leather collar and then finally two more months with a Thomas collar. For the treatment of compression fractures, Dr. Roberts gradually hyperextends the neck over a period of forty-eight hours by means of the pneumatic pillow at the same time exerting five to eight pounds traction. Exercises can be begun gradually after two months. These fractures are more apt to be in the lower portion of the cervical spine. Fractures of the laminae, articular facets and pedicles were discussed briefly.

Dr. Roberts has had nineteen dislocations in his series. They are most frequent in the upper portion of the cervical region where the articular facets are almost horizontal. They are often accompanied by small fractures and are usually caused by fairly severe injury. There is usually pain and tenderness at the site to help localize the lesion. If the dislocation is complete on one side the head is tipped to the other side and the chin tilted to the same side. These conditions should be reduced immediately by traction and hyperextension if complete and by closed manual manipulation if complete. For the latter process complete anesthesia is necessary and forward flexion of the head must be prevented. The patient is placed on his back with his head flush with the end of the table and a strip going around the chin and around the doctor's waist. The head is turned to the same side as the dislocation then tipped to the other side and brought back to the midline (Walton's maneuver). As the dislocated bone slips back into place a click is often heard. Reduction of dislocations may be attempted as long as ten months after injury if there is a

In conclusion it may be said that putrid abscess is the only lung abscess of clinical importance, that it is not uncommon, and that its only satisfactory treatment is immediate surgery

The paper was discussed by Dr Elliott C Cutler, Dr Frederick T Lord, and Dr Edward D Churchill. Dr Cutler expressed a variance of opinion relative to the pathogenesis of lung abscess, stating that although aspirational pathogenesis occurs in some instances, by far the greater majority are probably embolic in origin. He doubts the ability of anaerobic organisms to penetrate the usually resistant bronchial mucosa and set up an anaerobic suppurative process. In a survey of the literature and analysis of 1500 cases only thirty per cent were definitely postoperative in occurrence. Although one half of this thirty per cent followed tonsillectomy, tonsillectomy constitutes at least one half of the surgery in the United States. Tonsillectomy cannot be condemned of undue etiological importance. He does not believe in early operative procedures because the process is still in its acute phase at that time, with inadequate walling off of the abscess, pleural adhesions are not yet adequate, and some cases may heal spontaneously. He favors delaying operative procedures until the process has become more chronic with walling off of the abscess and the pleural cavity. Dr Frederick T Lord agreed with Dr Neuhoef in considering the pathogenesis as aspirational in most cases. In his experience at least two thirds of the cases occur after operations in which aspiration of infected material is a distinct possibility. The initial symptom of cough observed in most cases of pulmonary abscess is not the initial sign of embolism, in which pain is usually the first symptom. Pleural involvement with formation of adhesions in the early stage of the disease has not occurred invariably in the cases observed by Dr Lord. He condemned the use of exploratory aspiration of lung abscesses, stating that such a procedure is not necessary for diagnosis, and is apt to precipitate a fatal hemorrhage due to perforation of a large vessel. He does not advocate the use of bronchoscopy in every patient, and believes in the use of lipiodol only to differentiate bronchiectasis and abscess. The best treatment in his experience has been surgical. He advises conservative treatment of cases as long as they are progressing satisfactorily, however, since one third of the cases will heal spontaneously, and the average operative mortality is twelve per cent. Abscesses of two months or more duration usually require surgical intervention.

Dr Edward D Churchill agreed with Dr Neuhoef in all the fundamental concepts of the disease. He expressed a divergence of opinion as to the best time for operative procedures, preferring to wait until the fifth or sixth week for firm adhesions to be formed. He uses the two stage operation, and believes that this procedure minimizes the possibility of complications, allows a more adequate "unroofing", and lessens the chance of chest wall infection.

## HARVARD MEDICAL SOCIETY

The Harvard Medical Society met Tuesday evening, November 12, at the Peter Bent Brigham Hospital, Dr Milton J Rosenau presiding.

Two cases were presented, the medical case by Dr Leo Sullivan. A twenty-two year old male Greek was first seen nine and a half months ago, at which time he gave a history of five or six months of recurrent joint pains, affecting ankle, wrist, elbow, and shoulder joints, with associated weakness, insomnia, malaise, and anorexia. He had spent two and a half months in bed prior to his entry to the hospital, and had lost thirty to forty pounds during this period. Physical examination at that time showed him to be markedly undernourished, and to be suffering from generalized muscle and bony tenderness. The spleen was palpable four fingers below the costal margin, and there was questionable enlargement of the liver. Laboratory studies were normal except for a hemoglobin of sixty per cent, and a white count of 18,000.

During his stay he was given intravenous administration of typhoid vaccine, with subsequent relief of his pain. It was noted that tender subcutaneous nodules appeared on both forearms. He was discharged home with instructions to remain in bed, which he did not do. He suffered exacerbations of his symptoms and an increase in number and painfulness of the subcutaneous nodules. He was admitted to the Boston City Hospital where one of the nodules was excised, and the diagnosis of periarteritis nodosa made on the basis of the histological picture of this tissue. Following this he had an irregular course of exacerbations and remissions of symptoms, the nodules swelling and becoming painful when he was physically active, and subsiding during bed rest.

On entry he was found to have gained twenty five pounds since he was last seen, and to have improved markedly as to his general condition. Small freely movable lymph nodes were present in the cervical and axillary regions, the spleen and liver were both palpable four fingers below the costal margin. There was generalized bony and muscular tenderness, and over his left leg there were reddish areas one half to one and one half centimeters in diameter which showed thickening of the skin. No nodules were present on the legs, although they could be felt on both arms. Laboratory findings were negative except for a hemoglobin of sixty-eight per cent. Biopsy of one of the subcutaneous nodes confirmed the diagnosis of periarteritis nodosa. Occasionally patients with this disease show pulmonary changes simulating tuberculosis, but the chest plates in this case were negative. The temperature and white blood count continued normal. He was again receiving intravenous administration of typhoid vaccine with relief of pain. Evanescent nodules appeared over his arms, persisting one to four days, with gradual disappearance. No eosinophilia was observed.

Dr Marshall N Fulton in discussing the case commented on certain similarities between the signs and symptoms presented by this patient on his first admission and those described in Felty's syndrome (infectious arthritis with splenomegaly). The subcutaneous nodules were at first believed to be the nodules occasionally observed in rheumatoid arthritis although the distribution was not characteristic of the latter disease. Twenty per cent of patients with periarthritis nodosa have subcutaneous nodules biopsy of which allows the diagnosis to be made. In the absence of these peripheral nodules the manifestations of the disease are so bizarre and confusing that the diagnosis is rarely made during life except in cases subjected to exploratory laparotomy in which nodules may be found in the intra abdominal arteries. Some cases have extensive liver involvement and jaundice others may have involvement of the meningeal arteries and show signs suggestive of meningitis.

Dr Robert Bates presented a case of man bite fever from the surgical service. A forty-nine year old Greek hotel keeper entered with a swollen painful right hand, which had increased in size and painfulness since he was bitten by an inebriate one week previously. For a period of approximately forty eight hours after the infliction of the wound there was little untoward reaction except for moderate swelling and pain locally. After this period of mild symptoms there was an abrupt onset of acute illness with a rise of temperature to 102.4 F., prostration and enormous swelling of the hand to three times its normal size. The whole hand was a dark purple hue except for the fifth finger which was white and exuded extremely foul smelling pus. There was no lymphadenopathy. The blood showed a leucocytosis of 19,400 with ninety-one per cent polymorphonuclear leucocytes. Blood culture was negative. Smear of the lesion showed a myriad of various organisms with many staphylococci, streptococci and gram positive rods. Culture from the lesion revealed growth of anaerobic hemolytic streptococci only. The fifth finger was amputated but the process extended to the fourth finger which also had to be removed. Since the operation the hand had shown marked improvement although the temperature was still fluctuating between 100 and 102 F.

Dr Elliott C Cutler compared human bite wounds with gangrene of the lung. They show characteristically a period of twenty-four or forty-eight hours with little sign of infection and then gradual onset of gas formation, with the presence of innumerable organisms. The Welch bacilli causing such infections seem to be of lower virulence than those encountered in other cases of gas gangrene and these lesions are as a rule more easily controlled.

Dr Rosenau in introducing Dr Frederick F Russell, lecturer in Preventive Medicine and Hygiene at the Harvard Medical School told of Dr Russell's pioneer work in the study and control of typhoid and dysentery and of his introduction of vaccination against typhoid fever. Dr Russell presented the ad-

dress of the evening his topic being "Recent Studies in Yellow Fever—a Virus Disease." Extensive studies of Aztec literature and of the records of the Portuguese navigators have proved that yellow fever was originally an African disease and was first brought to the western hemisphere by the importation of Negro slaves to Guadeloupe. From this island it was carried over the Caribbean and to the mainland by the buccaneers. The possibility that the *Aedes aegypti* mosquito might be the carrier of the disease was first suggested by Carlos Finlay although he never proved the fact conclusively. Carter studied a yellow fever epidemic in Louisiana and established the existence of the extrinsic period of incubation which was very suggestive of the existence of an insect vector. The army commission under the direction of Walter Reed proved that the disease was carried by the *Aedes aegypti* mosquito and devised a method for control.

Carter and Shannon found that the *Aedes aegypti* breeds only in artificial collections of water due to the clumsiness of the larval forms which easily fall prey to other larvae in natural waters. This mosquito is a poor flier and experiences difficulty in crossing even a wide city street. It passes more readily from back yard to back yard and across narrow streets and alleys.

Davis found that the length of the extrinsic incubation period varies inversely with the temperature at which the mosquito is kept. This period is apparently the length of time required for the virus to pass from the gut to the salivary glands of the insect. Davis also proved that the virus does not multiply within the mosquito but diminishes gradually in concentration throughout the insect's life. The mosquito is not injured by the existence of the virus in its body and its natural life span of about six weeks is not shortened by infection.

Recent laboratory studies have shown that no less than twelve other species of mosquito are able to carry yellow fever and at least one epidemic in Brazil has been traced to the *Aedes scapularis*. There is also a possibility that infected ticks can carry the disease if they are crushed on the skin.

The researches of Noguchi into the etiology of the disease are well known. His work unfortunately was performed on patients suffering from infectious jaundice and he isolated the *Leptospira* responsible for that disease and not the organism causing yellow fever. Stokes, Bauer and Hudson succeeded in infecting Indian monkeys with inoculations of blood from active cases of yellow fever. They also succeeded in perpetuating the virus for long periods of time in mosquitoes. More recently Max Tyler has infected mice by injecting the virus intracerebrally.

The European hedgehog has been found to be susceptible to the disease and related species in South America and Africa are being studied to determine whether these animals acting as hosts for the bacilli may be responsible for the continuance of the disease in these regions.

The distribution of yellow fever, previously so widespread, has been narrowed in recent years, until it now embraces a relatively narrow band on either side of the equator in South America and Africa

Immunity conferred by an infection is lasting throughout life. The persistence of positive protection tests, after a lapse of seventy-five years from the infection, suggests that some focus of infection may be existent in the body, although no such focus has ever been demonstrated. Protection tests have shown that many subclinical infections of yellow fever escape positive diagnosis. Laboratory tests are not of aid in making the diagnosis in the first ten days of the disease, and clinical signs must be relied upon during this period.

The control of the disease is best effected by mosquito control in cities and thickly populated districts, but in sparsely settled, tropical regions such measures are not practical. Attempts at vaccination with dead virus have been uniformly unsuccessful, and it has been impossible to attenuate the virus sufficiently by animal passage. Recently, however, attempts at attenuation by growing the virus in tissue cultures seem to have been attended by some success.

Serum virus mixtures have been successfully used as vaccines in both Africa and South America, and this kind of vaccination has completely stopped infections among yellow fever laboratory workers.

#### THE NEW ENGLAND HEART ASSOCIATION

The first meeting of the New England Heart Association for the current year was held in the Ether Dome of the Massachusetts General Hospital October 28, 1935.

The meeting was opened by Dr. Paul D. White who presented a pathological specimen of chronic constrictive pericarditis. The patient was thirty-one years old and showed the classical signs and symptoms of Pick's Disease one year after an acute pericarditis of unknown origin: enlarged liver, ascites, engorged neck veins and but slight enlargement of the cardiac dullness without murmurs. There was fluid in both pleural cavities. She was too ill for operation. At autopsy the heart showed a closely adherent, greatly thickened pericardium about one-half centimeter thick. Dr. White believed that the patient could have been cured if Dr. Churchill and he had arranged to receive the patient for operation a few months earlier.

Dr. Sylvester McGinn spoke briefly of a triangular pad of fat that often is normally found at the left pericardial diaphragmatic angle outside of the pericardial sac. Because of its position it may cause confusion in accurately measuring the left border of the heart in soft x-ray films and because of this possible error, it must be kept constantly in mind. Orthodiagraphy easily avoids this error as does also physical examination. Dr. White spoke of his having had actually to testify in court concerning a case in which the size of the heart had been over-

estimated by the inclusion in the transverse diameter of 2 cm. of fat at the left pericardial diaphragmatic angle.

Two unselected cases of congenital heart disease were then presented to the audience by Dr. White for diagnosis. The first was a woman of sixty-four who had had a transient hemiplegia and who presented occasional extrasystoles, an enlarged heart, and a continuous humming murmur with a systolic thrill at the second interspace just to the left of the sternum. Dr. Samuel Levine correctly diagnosed this as a case of patent ductus arteriosus. The second patient was a child of four and a half years who tired easily, was dyspneic, had palpitation, and coughed frequently. There were a systolic thrill and a loud systolic murmur most marked in the third left interspace. The enlargement found by x-ray was thought by the roentgenologist to be consistent with a rheumatic heart. Electrocardiogram showed an *sa*\* tachycardia with a slight right axis deviation. At autopsy an interventricular septal defect was found. Dr. Paul Emerson correctly diagnosed this case at the meeting. Dr. White presented these problems, drawn at random, to counteract somewhat the impression that the diagnosis of structural defects in congenital heart disease is usually difficult or impossible, especially in children. He did agree, however, that in infants under six or eight months of age the diagnosis is far more difficult than in older children and adults.

Dr. McGinn then briefly reviewed the experience at the Massachusetts General Hospital in the past ten years as to the accuracy of diagnosis of congenital heart lesions. It was found that thirty-nine per cent of all the congenital heart cases had been either correctly diagnosed or the correct diagnosis suspected, and this was increased to sixty-three per cent if the entirely symptomless and signless valvular defects and coronary peculiarities were excluded. It was pointed out that in cases with congenital abnormality of the coronary arteries there may be inverted T waves in the electrocardiogram, that in cases of auricular septal defects there are large right auricle, right ventricle, and pulmonary artery and a small aorta, and that hearts with bicuspid aortic valves often develop subacute bacterial endocarditis but that there is nothing by which to diagnose the congenital heart lesion. Dr. White adds that there are now eight congenital cardiovascular defects that are diagnosable in adults and in children above infancy, provided sufficient care is taken in assessing all the signs, these are as follows: (1) patency of the ductus arteriosus, (2) interventricular septal defect, (3) interauricular septal defect, (4) the tetralogy of Fallot, (5) uncomplicated pulmonary stenosis, (6) coarctation of the aorta, (7) a right aortic arch, and (8) congenital heart block. In infants the diagnosis of idiopathic cardiac hypertrophy is also usually possible.

Dr. H. B. Levine spoke on pulmonary infarction complicating severe chronic mitral valve disease and

\**Sinu auricular*

reported five recent cases. It was found in a series of fifty two cases of mitral stenosis studied that 61 per cent of those with failure (twenty-six cases) had pulmonary infarction (there were only four cases without failure who developed this complication) in contrast to only 25 per cent of the twenty four cases of hypertensive heart disease with failure who had infarction in the lungs. The cases which were presented demonstrated the fact that in mitral stenosis with failure the development of pulmonary infarction makes the patient refractory to treatment and the prognosis bad. This common complication is frequently missed and should be suspected if any of the common signs and symptoms of pulmonary infarction occur and especially if the patient is not doing well. Dr Soma Weiss pointed out the hopeless prognosis in patients with congestive failure who develop jaundice and said that in Germany where more careful dissection of the whole body at autopsy is carried out than in this country thromboses in the veins of the legs are frequently found in cases of mitral stenosis.

Dr H. B. Sprague discussed "A New Method in the Treatment of Paroxysmal Tachycardia." If the attacks of tachycardia are frequent and prolonged or if the patient also has organic heart disease it may become absolutely essential to limit their incidence and duration. A case was presented of a surgeon of fifty four who has pure rheumatic aortic regurgitation and has had increasingly frequent attacks of paroxysmal tachycardia over the past eight years. In spite of all the usual methods his attacks continued to become more frequent and to last longer and he began also to have anginal distress during them. On one occasion an attack lasted seventy two hours. Mechohlyn failed to help and upon Dr Soma Weiss's advice a syrup of Ipecac was administered. This produced very severe and prolonged nausea, and the attack ceased. Since this time the patient has frequently used this method with remarkable success and he has greatly reduced the duration of attacks, saving his heart many thousands of wasted beats. He uses two drachms of the syrup of Ipecac at the onset of an attack. Dr Weiss discussed the method briefly. It has been used for some time at the Boston City Hospital. It is better than other emetics because it contains alkaloids that act centrally on the vagal center as well as having a local irritant action. The long-continued nausea and the accompanying vagal stimulation have never failed to stop an attack.

Dr R. E. Glendy discussed the normal precordial lead (Lead 4) of the electrocardiogram. The P wave may be upright, inverted or diphasic. The QRS complex usually has a total amplitude twice that in other leads. The Q-wave is usually inverted and the QRS complex is slightly longer in duration than in the classical leads. The T wave is inverted but within very wide limits of amplitude. Dr A. Graybiel presented the abnormal lead 4. This lead may give the earliest evidence of coronary thrombosis when the ST segment is diphasic or displaced

far downwards or the only evidence of old infarction at the apex of the left ventricle when the Q wave disappears. In posterior wall infarctions there is usually little or no change in lead 4. A shallow T wave in lead 4 may be caused by digitalis especially a high ST interval. Generally lead 4 abnormalities are in agreement with those in the classical leads. Occasionally lead 4 fails to show an abnormality when it is evident in the other leads and vice versa. Dr White in conclusion pointed out that the precordial electrode should be applied just median to the apex, that lead 4 is occasionally useful but that it needs much further study.

#### WORCESTER DISTRICT MEDICAL SOCIETY

The regular monthly meeting of the Worcester District Medical Society was held at the Grafton State Hospital on Wednesday evening November 18 1936 with Dr William F. Lynch in the chair and Dr Erwin C. Miller as secretary.

Dr Harlan Paine was host at an excellent buffet supper which was served in the main auditorium prior to the meeting. After disposing of routine business Dr William Lynch turned the duties of the presiding officer over to Dr Paine the Superintendent of the Grafton State Hospital.

Dr Paine then presented the President of the Massachusetts Medical Society Dr Charles E. Mongan, who was enthusiastically welcomed by all the members present. Dr Mongan called the attention of the members of the Society to the medical aspects of the Social Security Act. He also reminded them of the very excellent work and interest in the State Society by former doctors in Worcester County and urged each member of the Society to take an active interest in medical and civic affairs.

Dr William R. Morrison Chairman of the Committee of Arrangements for the next Annual Meeting of the State Society was introduced. He asked for the advice and support of the Society's members in making the next Annual Meeting a most successful one and requested that the dates of the Annual Meeting and dinner in Springfield next June 8 9 and 10 be reserved for attendance at the meeting. Dr Morrison said that a most excellent scientific and commercial program is being prepared for the Springfield meeting.

Dr Benjamin Cohen Research Member of the Grafton State Hospital Staff spoke on Repression Communicability in Catatonic Stupor. He was followed by Dr Bardwell Flower Assistant Superintendent of the Grafton State Hospital who talked on Parenteral Paraldehyde.

The meeting adjourned at 10 P. M. There were 130 doctors present at this meeting.

ERWIN C. MILLER, M.D. Secretary

#### ESSEX NORTH DISTRICT MEDICAL SOCIETY

The semi annual meeting of the Essex North District Medical Society will be held at the Riverside Tavern, Haverhill, on Wednesday January 8 1936.

at 12 30 P M The entire program will be in charge of Dr Charles E Mongan, President of the State Society, and will be entirely devoted to medical economics

E S BAGNALL, *Secretary*

#### MASSACHUSETTS MEMORIAL HOSPITALS

There will be a meeting of the Surgical Section in the Ladies' Aid Room, Talbot Memorial, 82 East Concord Street, Boston, on Friday, December 20 1935, at 12 noon

Papers will be presented by Dr Harry J Lee and Dr Kenneth Christophe

MILO C GREEN, *Secretary*

#### GREATER BOSTON BIKUR CHOLIM HOSPITAL

Greater Boston Bikur Cholim Hospital medical meeting Monday evening, December 23, at 8 15 o'clock, at the Nurses' Home, 45 Townsend Street, Roxbury Speaker Dr Soma Weiss Subject "Seven Aspects in the Management of Chronic Patients" The profession is invited

HENRY BAKER, M D, *Secretary*

#### NEW ENGLAND HEART ASSOCIATION

The next meeting of the New England Heart Association will be held at the Peter Bent Brigham Hospital, Boston, Mass, Monday, January 6, 1936, at 8 15 P M

##### PROGRAM

I Business Consideration of revision of Constitution and By-Laws

##### II Clinical

- 1 A Method of Determining Blood Volume Dr J G Gibson, 2nd
- 2 Blood Volume Changes in Congestive Heart Failure Dr William Evans
- 3 Concerning the Mechanism of Hypertensive Crises Dr Michel Pijoan
- 4 Hemopericardium as a Cause of Sudden Death Dr Marshall N Fulton
- 5 The Early Diagnosis of Aortic Stenosis Dr Samuel A Levine
- 6 Aortic Stenosis, Angina Pectoris, and Syncope Dr A W Contratto
- 7 Is Digitalis Present in Body Fluids in Digitalized Patients? Dr Maurice A. Schnitker

All members and interested physicians are invited to attend

JAMES M FAULKNER, M.D, *Secretary*

#### SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

##### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, DECEMBER 23, 1935

Tuesday, December 24—

2 30 P M Pediatric Ward Visit. Massachusetts Eye and Ear Infirmary

Thursday, December 26—

\*8 30-9 30 A M. Clinic, Surgical Staff of the Peter Bent Brigham Hospital, at the Peter Bent Brigham Hospital

Saturday, December 28—

\*10-12 Staff rounds at the Peter Bent Brigham Hospital

\*Open to the medical profession

December 20—Massachusetts Memorial Hospitals, Surgical Section See notice elsewhere on this page

December 23—Greater Boston Bikur Cholim Hospital See notice elsewhere on this page

January 6—New England Heart Association See notice elsewhere on this page

January 10—William Harvey Society 8 P M, Beth Israel Hospital, Boston

February 24 to May 16, 1936—International Medical Postgraduate Courses in Berlin See page 1211, issue of December 12

#### DISTRICT MEDICAL SOCIETIES

##### ESSEX NORTH DISTRICT MEDICAL SOCIETY

January 8—See page 1271

##### ESSEX SOUTH DISTRICT MEDICAL SOCIETY

January 8—Wednesday Danvers State Hospital, Hathorne Clinic 5 P M Dinner 7 P M Speaker Dr Hoskins Subject to be announced later

February 5—Council Meeting, Boston

February 12—Wednesday Addison Gilbert Hospital, Gloucester Clinic 5 P M Dinner 7 P M Speaker and subject to be announced later

March 4—Wednesday Lynn Hospital Clinic 5 P M Dinner 7 P M Speaker Dr Timothy Leary Subject Arteriosclerosis

April 1—Wednesday Essex Sanatorium, Middleton Clinic 5 P M Dinner 7 P M Speaker Dr Richard H. Overholt of the Lahey Clinic Subject Chest Surgery

May 7—Thursday Censors Meeting

May 13—Wednesday Annual Meeting Salem Country Club Dinner at 7 P M Speaker Dr Paul White Subject to be announced later

R E STONE, M D, *Secretary*

88 Lothrop Boulevard, Beverly

##### FRANKLIN DISTRICT MEDICAL SOCIETY

Meetings are held on the second Tuesday of January, March and May at the Weldon Hotel, Greenfield, at 11 A M

CHARLES MOLINE, M D, *Secretary*

Sunderland

##### MIDDLESEX EAST DISTRICT MEDICAL SOCIETY

Meetings to be held at the Bear Hill Golf Club at 12 15 P M

January 8

March 11

May 6

K L MACLACHLAN, M D, *Secretary*

1 Bellevue Avenue, Melrose

##### NORFOLK DISTRICT MEDICAL SOCIETY

January 28, 1936—Hotel Kenmore at 8 P M Subject "Compulsory Sickness Insurance" Speakers to be announced

February 25, 1936—Massachusetts Memorial Hospitals at 8 P M Papers by the staff

March 31, 1936—Hotel Kenmore, at 8 P M Dr Benedict F Boland—Cauterization of the Cervix Uteri Using Various Electrical Methods Illustrated with lantern slides

May, 1936—Annual Meeting (Place, date and subject to be announced)

The censors meet for the examination of candidates May 7, 1936, November 5, 1936

FRANK S CRUICKSHANK, M D, *Secretary*

1236 Beacon Street, Brookline

##### PLYMOUTH DISTRICT MEDICAL SOCIETY

January 16—Goddard Hospital Subject and speakers to be announced later

March 19—Plymouth County Sanatorium, South Hanson

April 16—Brockton Hospital

May 21—Lakeville State Sanatorium

G A. MOORE, M D, *Secretary*

167 Newbury Street, Brockton

##### SUFFOLK DISTRICT MEDICAL SOCIETY

January 29, 1936—Joint Meeting with the Boston Medical Library at 8 Fenway "Observations Around the World, Dr Walter B Cannon

March 18, 1936—Meeting at the Boston Medical Library  
The Laboratory and Clinical Story of Fatigue Dr  
Arlie V. Bock and Dr. David B. Hill. Discussion Dr  
Arlie V. Bock and Dr. Augustus Thorndike, Jr.  
April 29, 1936—Annual Meeting at the Boston Medical  
Library "The Treatment of Septicæmia, Dr. Champ  
Lyons. "The Pleurality of Scarlatinal Streptococcus  
Toxin" Dr. Sanford B. Hooker. Discussion Dr. Hans  
Zinsser.

The medical profession is cordially invited to attend  
all of these meetings.

ROBERT L. DeNORMANDIE, M.D. President,  
CHARLES C. LUND, M.D. Secretary  
FRANCIS T. HUNTER, M.D.  
Boston Medical Library

#### WORCESTER DISTRICT MEDICAL SOCIETY

January 8, 1936—Wednesday evening Worcester City  
Hospital Worcester Mass. Dinner and scientific program.  
Subjects of program to be announced later.

February 12, 1936—Wednesday evening Worcester State  
Hospital, Worcester Mass. Dinner and scientific program.  
Subjects of program to be announced later.

March 11, 1936—Wednesday evening Memorial Hospi-  
tal, Worcester Mass. Dinner and scientific program.  
Subjects of program to be announced later.

April 8, 1936—Wednesday evening Hahnemann Hospi-  
tal, Worcester Mass. Dinner and scientific program.  
Subjects of program to be announced later.

May 13, 1936—Wednesday afternoon and evening An-  
nual Meeting of Society. Time place and details of pro-  
gram to be announced in an April issue of the Journal.

ERWIN C. MILLER, M.D. Secretary

7 Elm Street Worcester

#### BOOKS RECEIVED FOR REVIEW

Puerperal Gynecology J. L. Bubis 199 pp Bal-  
timore William Wood & Company \$3.50

A Treatise on Medical Jurisprudence Benton S  
Oppenheimer 290 pp Baltimore William Wood  
& Company \$4.00

Awaken Your Sleeping Beauty Lilyan Malm-  
stead 96 pp New York E. P. Dutton & Com-  
pany Inc. \$1.75

Public Health Administration in the United States  
Wilson G. Smillie 468 pp New York The Mac-  
millan Company \$3.50

Diseases of the Thyroid Gland Arthur E. Hertz-  
ler Third Edition, Entirely Rewritten 348 pp  
St. Louis The C. V. Mosby Company \$7.50

The Evaluation of Symptoms. Offered after fifty  
years in medicine Oliver T. Osborne. 163 pp New  
Haven The Yale University Press \$3.50

A Text-Book of Fractures and Dislocations. Cov-  
ering their pathology diagnosis and treatment.  
Kellogg Speed Third Edition Thoroughly Revised  
1000 pp Philadelphia Lea & Febiger \$11.00

Food and Beverage Analyses Milton Arlandson  
Bridges 246 pp Philadelphia Lea & Febiger  
\$3.50

Free Medical Care (Socialized Medicine) 360 pp.  
New York City Noble & Noble Publishers Inc.  
\$2.00

Laboratory Methods of the United States Army  
Fourth Edition Edited by James Stevens Simmons  
and Cleon J. Gentskow 1081 pp Philadelphia Lea  
& Febiger \$6.50

The Treatment of Diabetes Mellitus Elliott P.  
Joslin 620 pp Philadelphia Lea & Febiger \$6.00

Body Water The Exchange of Fluids in Man.  
John P. Peters 405 pp Springfield Charles C.  
Thomas \$4.00

The Sexual Relations of Mankind Paolo Mante-  
ganza. 335 pp New York Eugenics Publishing  
Company \$6.00

Diseases of the Nose and Throat for Practitioners  
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A Textbook of Bacteriology Thurman B. Rice  
551 pp Philadelphia and London W. B. Saunders  
Company \$5.00

#### BOOK REVIEWS

Bernardo de Gálvez in Louisiana 1776-1783. John  
Walton Caughey 290 pp California University  
of California Press

In this valuable monograph the author gives in  
Part One The Background a complete account  
of the establishment of Spanish control in Louisiana  
and takes the reader in part two through Gálvez's  
administration and the Spanish struggle for domina-  
tion of the Mississippi and the capture of Mobile.

After the capture of Pensacola, the author tells  
us that Gálvez was ordered to undertake the con-  
quest of Jamaica, but after many delays and contro-  
versies we are told that Rodney's victory over De-  
Grasse brought the whole project to a standstill.

Gálvez returned to Spain, coming back to the New  
World in 1781 as Captain General of Cuba but soon  
he was sent to Mexico City to succeed his father as  
Viceroy of New Spain. His rule was short, however



as he died on November 30, 1786, apparently of yellow fever. He was then thirty-eight years old. He was mourned by all. "New Spain would praise him, and sing of a perfect Viceroy, a most upright Judge."

There is much of interest in this monograph to American physicians, who will enjoy the well documented and accurate account of the Spanish occupation of Louisiana.

**1000 Questions and Answers on T. B.** Edited by Fred H. Heise. 232 pp. New York City: National Tuberculosis Association.

This book of some 200 pages consists of a group of questions and answers relating to every phase of the tuberculosis problem, grouped in sixteen chapters.

It will prove of distinct value not only to the public at large but to the medical profession desirous of getting accurate information and advice from a well recognized authority on the subject concerning any point relating to tuberculosis.

The index makes it possible to find the answer easily and quickly.

The need for books of this type which are short, compact, low-priced and yet authoritative is a very real one. Such a book as this is welcome.

**International Clinics. Volume II. Forty-Fifth Series, 1935.** Edited by Louis Hamman. 327 pp. Philadelphia, Montreal and London: J. B. Lippincott Company.

As in preceding volumes, this one is marked by a group of excellent articles by authors well known for their contributions in their respective fields and well worth reading. Dr. Hamman in addition to editing this fine volume has also contributed a very interesting article.

**The Medical Man and the Witch during the Renaissance.** Gregory Zilboorg. Third Series, Volume II. 215 pp. Baltimore: The Johns Hopkins Press. \$2.50.

This volume consists of three lectures given before the Institute of the History of Medicine, Johns Hopkins University. It is the second of the Hideyo Noguchi lectures, the first of which, "The Renaissance of Medicine in Italy", by Arturo Castiglioni, was published in 1934 and reviewed in *The New England Journal of Medicine*, March 15 of the same year.

Dr. Zilboorg, a psychiatrist, presents a topic of unusual interest. For many years he has been studying the history of psychiatry and these lectures testify to his scholarship and spirit of investigation. The first lecture concerns itself largely with an account of a book, the "Malleus Maleficarum", first issued in the last years of the fifteenth century. This volume became the leading and practically the only textbook on the Inquisition and, before 1669, was printed ten times. It thus was a popular and useful book for its time, for it

"proved" the existence of witchcraft and witches and had behind it the authority of the church of Rome. Upon the basis of this book men assumed the power of judgment and many hundreds of people were burned as witches in the sixteenth century. A second lecture covers more definitely the relationship between witchcraft and medicine, and the third lecture is given over entirely to an account of Johann Weyer, the founder of modern psychiatry. Zilboorg's account of Weyer is by far the finest in existence and much of the value of this work for future historians lies in his excellent account of this man.

The book is heavy with quotations and facts, the style is not light, and the volume cannot be recommended for popular reading. For the serious student of medical history, however, it will have a definite appeal and it forms a worthy addition to the publications already issued in this series.

**Historie Des Universités Françaises et Etrangères.** Stephen D'Irsay. Tome II. Du XVII<sup>e</sup> Siècle à 1860. 457 pp. Paris: Auguste Picard.

The first volume of this interesting history of the universities was reviewed in *The New England Journal of Medicine*, February 1, 1934. Before the second volume could be issued the author died a tragic death in Paris, November 16, 1934. Estimates of his importance to the history of medicine will be found in the *Bulletin of the Institute of the History of Medicine*, Johns Hopkins University, for June 1935. The second volume of his work, which is now at hand, has, therefore, been issued posthumously. The manuscript, however, was finished before the author's death and it was only the setting up and printing which had to be supervised. This has been splendidly done and the volume is in every way comparable with the first part of the work issued a year ago. In addition, one finds as an appendix a list of the manuscripts consulted, an extensive biographical index of inestimable value to scholars, and a complete index to both volumes.

**The Evaluation of Symptoms.** Offered after fifty years in medicine. Oliver T. Osborne. 163 pp. New Haven: The Yale University Press. \$3.50.

Solidly packed with precious material, important and useful, this little volume, privately printed by the author, should be on every doctor's desk and in every intern's coat pocket. With his wide experience Osborne is certainly the philosopher to discuss a considerable group of symptoms and their value to the clinician. As he well remarks only the consultant can ignore the complaints of the patient. Many a medico has built his reputation, and no mean one, on an uncanny ability to understand and relieve the complaints of his charges. And both care little whether a diagnosis is ever made. In this little book, which should be followed by others of its kind, there is nothing stale or irrelevant. Old truths are emphasized and new ones clarified. Rarely has a work given the reviewer so much genuine pleasure and profit.

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## NEW ENGLAND SURGICAL SOCIETY

### STONES IN THE COMMON AND HEPATIC BILE DUCTS\*

BY FRANK H. LAHEY, M.D.,† AND NEIL SWINTON, M.D.‡

**I**n eighteen hundred patients operated upon for gall stones in the Clinic, the common and hepatic ducts have been opened, explored for stones and drained in five hundred and thirty-one cases, approximately in thirty per cent of this group. Common duct stones have been found and removed in two hundred and fifty-eight cases, approximately fifteen per cent of the cases. Of these two hundred and fifty-eight cases, it has been possible to obtain satisfactory follow-up data in two hundred and twenty-one. The mortality for the two hundred and twenty-one followed proved common duct stone cases was 7.6 per cent as compared with a mortality of 3.8 per cent for the entire eighteen hundred unsegregated cases of cholelithiasis upon which we have operated exactly twice as high. The mortality in all cases having had common duct exploration was 4.3 per cent. We have lost only one patient following a common duct exploration which did not have stones in the ducts. The fact that in this series stones

common and hepatic stones in operations for cholelithiasis and to discuss some of our experiences with common and hepatic duct cases.

It is interesting to note that in our series, common and hepatic duct stones were found four times more often in women than in men due no doubt to the predominating number of females who have the condition as compared with males.

TABLE 2

Years	AGE	
	No	
11-20	1	(17 years)
21-30	14	
31-40	25	
41-50	49	
51-60	60	
61-70	48	
71-80	7	
81-90	1	(84 years)
206		

15 cases age not given

15 or 7.4% were under 30 years of age

TABLE 1

(INCIDENCE)

Males	48	19.4%
Females	178	79.6%

\*21

were found in the gallbladder in the presence of common and hepatic duct stones in ninety-six per cent of the cases, the fact that by increasing the number of ducts which we now explore we have markedly increased the number of cases in which we have found common duct stones and the fact that jaundice the sign upon which the diagnosis of common duct stones used to hinge was absent both in the history and at the time of operation in thirty-nine per cent of these two hundred and twenty-one cases makes it desirable we believe to analyze these two hundred and twenty-one cases of surgically proved common and hepatic duct stones, to stress again the fact that particularly based upon older indications for exploration of the ducts, it is very easy to leave

These figures are of interest and value chiefly as relates to the fact that 7.4 per cent of these surgically proved cases were under thirty years of age. One does not usually think of stones being present in the common and hepatic ducts in relatively young people, yet when one notes that we have removed stones from the main bile

TABLE 3

SYMPTOMATOLOGY

A. Duration	
Less than 1 month	13%
1 month to 1 year	33%
1 year to 5 years	26%
5 years to 10 years	1%
11 years to 20 years	11%
Over 20 years	4%

Forty-six per cent had symptoms of less than 1 year's duration

ducts in a girl of seventeen and that of the whole series, one out of every thirteen surgically proved cases was under thirty years of age it is obvious that common duct stones are not confined to middle-aged and aged.

One notes in table 2 the successful removal

Read at the Annual Meeting of the New England Medical Society at Manchester, N. H., September 2, 1935.

†Lahey, Frank H.—Director, Lahey Clinic, Swanton, New-Surgeon, Lahey Clinic. For records and address of authors see "This Week" issue, page 1319.

of common duct stones in a patient of eighty-four years, a doctor's mother and seven cases between seventy and eighty years, but we wish to state emphatically that such operations at this age attended as they are with such a high risk rate, have never been done as duct explorations but as last resort measures in the presence of persisting or recurring colic or jaundice associated with cholangitis as evidenced by marked temperature reactions

A The fact that forty-six per cent of the cases had had symptoms for less than one year is, we believe, a tribute to the intelligence of the patients and doctors of this community and an indication that the attitude of the past against which we have for several years inveighed is changing, that is, the tendency both of the patient and family-physician to permit numerous attacks of gallstone colic to occur before deciding for surgery

TABLE 3

B Right upper quadrant colic  
172 or 80%

B Right upper quadrant colic was present in one hundred and seventy-two of the cases or eighty per cent of the total. In twenty per cent, it was absent. When one appreciates that in twenty per cent of the cases in which common duct stones were found and proved by surgical removal, colic was not present, it is obvious that if we do not wish to leave common duct stones after cholecystectomies in patients who will later bother us and be reoperated on with higher risk rates, we must explore more common and hepatic ducts and upon different criteria than has often been the case in the past

TABLE 3

C Chills and Fever  
9 or 4.2%

C Chills and fever were present in these two hundred and twenty-one proved cases with common and hepatic duct stones in a much lower percentage than one would expect, due we believe, to the fact that such a large percentage of the cases were operated upon early, due to the high percentage of ducts explored and due to the considerable number of cases in which the stones were small, not causing obstructive symptoms and probably having existed but for a relatively short period of time. One can, we believe, properly assume that a considerable number of patients in whom unsuspected stones were removed from the common duct at the time of cholecystectomy could have been saved from the dangers and difficulties associated with later deep jaundice and associated cholangitis

In reviewing our gall-stone cases, we have made three different studies of the percentage

of cases with surgically proved stones in the main bile ducts who were not and had never been jaundiced and it is of interest to note these percentages in the sequence of their determination. In the first series, thirty-seven per cent were without jaundice, in the second thirty-nine per cent and in this series, thirty-nine per cent. We have said before and again call attention to it that in over a third of the patients in whom stones have been found and removed from the common duct, jaundice was

TABLE 3

D Jaundice, present in the  
history or physical ex-  
amination 129 cases or 61%  
Absent in both history  
and physical examina-  
tion 81 cases or 39%  
(10 cases not given)

at no time present. This also helps to account for the low percentage (4.2 per cent) of serious cholangitis as seen in table 3C. These figures indicate that jaundice as an indication to explore the common and hepatic bile ducts is unreliable, and that where explorations limited to those cases in which jaundice was present or had occurred in the history, common duct stones might have been left behind after cholecystectomy in eighty-six out of the two hundred and twenty-one cases.

TABLE 4

## X-RAY FINDINGS

Out of 95 Cases of Proved Common or Hepatic  
Duct Stones with X-Rays

Intravenous dye positive for stones in the gallbladder	70
Oral dye positive for stones in the gallbladder	10
Flat plate positive for stones	13
Intravenous dye negative for stones in the gallbladder	2
X-ray diagnosis for gall stones was accurate in 98% of the cases x-rayed	
Forty-three per cent of the entire series of two hundred and twenty one cases had gallbladder x-rays	

This is about the usual x-ray finding in anyone's hands and is convincing evidence of the accuracy of x-ray diagnosis in cholelithiasis

TABLE 5

ACCURACY OF DUODENAL DRAINAGE IN 32 CASES

Duodenal drainage positive for stone	30 cases
Duodenal drainage negative for stone	2 cases

In thirty-two cases in which duodenal drainage was employed as a diagnostic measure in patients with questionable cholelithiasis, the positive factor being calcium or cholesterol

crystals in the drainage sediment and in all of which cases common or hepatic duct stones were demonstrated at operation, thirty cases were positive for stones and two cases negative for stones. This is another available diagnostic measure in doubtful cases of common duct stones and has its greatest value in those cases where common duct stones are suspected after a cholecystectomy has previously been done and therefore, x ray diagnosis not available. It is in these cases that it is so desirable to have some preoperative aid in deciding for or against reoperation and exploration of the common duct.

TABLE 6

END RESULTS IN 141 FOLLOWED CASES

1 Excellent	110 years	94.5% of the cases
2 Probable recurrent common duct stones		5.5%
3 Operative mortality		7.6%

Sixty four per cent were followed from one year to ten years

The cases in the second group have not all been proved definitely as having recurrent common duct stone. Cases are included in this group which have had colic following operation suggestive of common duct stone but there are several which we have not been able to bring to reoperation.

The cases in the second group have not all been proved definitely as having recurrent common duct stone. Cases are included in this group which have had colic following operation suggestive of common duct stone but there are several which we have not been able to bring to reoperation.

Sixty four per cent of the cases or one hundred and forty-one cases have been followed from one to ten years.

An excellent result (freedom from pain and jaundice) has been obtained in 94.5 per cent of these cases.

Probable recurrent or persisting common duct stones has occurred in 5.5 per cent of the cases.

Not all of the cases in this latter group have been proved by operation to have common duct stone but even though some of the cases may not have recurrent or persistent stones included in this group are all cases with colic after removal of common and hepatic duct stones. This is an extremely good showing as to end results and much better than I had expected would be the case because of the uncertainties at least up to recently of complete removal of all duct stones.

TABLE 7

1 Stones in both the gallbladder and bile ducts	212 or 96%
2 Stones in the biliary ducts only gallbladder being negative	9 or 4%

The fact that stones existed coincidentally in the gallbladder and in the common and hepatic ducts in two hundred and twelve cases, 96 per

cent, speaks in favor of the fact that whatever causes stones in the gallbladder tends likewise to result in stones in the bile ducts. When one realizes, however, that following removal of the gallbladder and removal of the stones from the common and hepatic ducts, there have been but 5 per cent recurrent stones, there is at least a suggestion of what we have always thought to be true, that long standing infection of the gall bladder results in eventual infection of the common and hepatic ducts which is relieved by removal of the gallbladder, drainage of the duct and removal of its stones.

With the introduction of the Bakes ampulla dilators by the passage of which the sphincter of Oddi can be so dilated that any average-sized common and hepatic duct stones will pass into the duodenum it was hoped that the danger of leaving behind small common duct stones was overcome.

We have now employed these dilators in a good many cases and with no intention to be critical of what appears to be a real advance in common duct surgery but with a desire to be helpful and frank about our own experience, we have to report that in two cases where we have widely dilated the ampulla gas bacillus infection resulting fatally has occurred apparently ascending from the duodenum through the dilated ampulla along the bile channels. Autopsies were performed in both of these cases so that there can be no question about the cause of death and there seems little question about the origin of the infection. This experience must make us at least cautious in dilating these sphincters widely so that regurgitation of duodenal drainage into the ducts can occur. In a personal communication Dr Arthur Allen reports that this has never occurred in over two hundred dilations of the sphincter at the Massachusetts General Hospital.

It is disappointing to report these two unfortunate deaths because there are so many advantages to dilatation of the sphincter of Oddi. When a large dilator can be passed through the sphincter one is quite certain that any stones at the ampulla have been removed and that if small ones are left they will be washed down through the widely dilated duct by the secretory pressure of the bile within the ducts. One cannot, however, fail to appreciate the possible dangers of the method in the presence of these two proved fatalities and it would be wrong not to call everyone's attention to them.

These figures of the percentage of common and hepatic ducts explored have been published several times before. To these figures we have added the percentages explored and the percentages of stones found for the years nineteen thirty three, nineteen thirty four and for the present year up to September, nineteen thirty five, as graphic evidence of the incidence of stones discovered in the main bile ducts by

widening the indications for exploration of the ducts

As the result of this fairly large experience with common and hepatic duct stones, we have arrived at some quite definite convictions

There has been at least an impression that adding exploration of the main bile ducts to cholecystectomy, adds definitely to the operative risk of gallstone operations. Granted that the surgeon has had sufficient experience with

#### COMMON DUCT STONES

Common Ducts	Cases Explored	Stones Found	Total Cases
1910 26	96 15 %	52 8 4%	619
1927 28	91 32 7%	38 13 7%	278
1929 30	49 35 8%	22 16 1%	137
1930 31	61 42 5%	30 21 %	138
1931 32	45 38 %	22 19 %	118
1932 33	52 46 %	24 21 2%	113
1933 34	42 35 %	21 17 6%	119
1934-35	48 35 %	17 12 %	143
1935 to September, 1935	48 44 %	21 18 9%	112

common duct surgery, we do not believe that this is so. We are further convinced that even if the above impression were so, one would still have to have in mind that the eventual mortality of secondary operations for stones overlooked and left behind would have to be added to the primary mortality of cholecystectomies with a lower percentage of duct explorations if a fair comparison were to be made of the two types of operative procedure.

As the result of this experience, we are convinced that it is the obligation of all surgeons who operate on patients for gallstones to make every reasonable effort to be certain that, in operations upon the gallbladder for gallstones, or cholecystitis (recall that stones were found in the bile ducts with no stones in the gallbladder in four per cent of the cases) stones are not left in the main bile channels. In order to do this, one must establish, we believe, wider criteria for opening and exploring the common duct than have been commonly employed by many surgeons in the past years. We believe that common and hepatic ducts should be explored in all jaundiced patients and in all patients in whom a reasonably recent history of jaundice is present, in all patients with a markedly thickened or contracted gallbladder since long-standing cholelithiasis and gallbladder infection make conditions so favorable for the production of duct stones and is so frequently associated with stones. We believe that the common and hepatic ducts should be opened and explored when the common duct is either thickened or dilated particularly when the gallbladder has not previously been removed. We believe that the common and hepatic ducts should

be opened and explored when any suspicious lump suggesting stone can be felt on palpation of the ducts between the palpating thumb and finger.

We believe that the common and hepatic ducts should be opened and explored particularly in the presence of cholelithiasis or cholecystitis when the head of the pancreas is so thickened and indurated that stones at the ampulla of Vater within the thickened head of the pancreas could be overlooked. We believe that the common and hepatic ducts should be opened and explored when bile withdrawn into a hypodermic syringe, the needle of which has been passed into the duct, is not golden yellow in color and perfectly transparent and clear in character. While valuable information may be obtained by this latter procedure, we have not considered or recorded this measure as an exploration of the ducts.

Even in the presence of the above indications, we have found stones in only fifty per cent of the cases in which with these indications the ducts were explored. We believe, however, that stones exist in the main bile channels so often without definite evidences of their presence (jaundice, ability to palpate them, contracted gallbladder or dilated ducts) that many negative explorations must be made to accomplish a high percentage of complete removal of duct stones and a low percentage of a return of symptoms after the removal of the gallbladder for cholelithiasis or cholecystitis. (See table.)

#### CONCLUSIONS

A study of two hundred and twenty-one cases of common and hepatic duct stones is presented. This includes the sex incidence, the age incidence, the symptomatology incidence, the colic incidence, the chills and fever incidence, the jaundice incidence, the percentage in ninety-five cases of successful x-ray diagnoses and failure, the accuracy of duodenal drainage as a diagnostic measure in thirty-two cases, the end results in one hundred and forty-one cases followed for from one to ten years and the percentage of cases of common and hepatic duct stones in which stones were present and were not present in the gallbladder.

Figures are presented year by year showing our percentage of common and hepatic ducts explored and common and hepatic duct stones discovered up to this day.

Criteria are cited which, from our experience, justify exploration of the ducts for stones.

If one wishes to find and remove as many duct stones as possible, many ducts must be searched on suspicion and many negative searches must be anticipated.

Any argument that this teaching is dangerous in that it may cause additional mortality by prompting the inexperienced to open common

ducts is in our opinion fallacious. No one can justify the removal of a gallbladder with stones in it without adequate investigation for possible common and hepatic duct stones and with the proved high incidence of these stones, no one should undertake the surgery of cholelithiasis without the training and experience to investigate, adequately and with reasonable safety, the common and hepatic ducts

#### DISCUSSION

DR. HOWARD M. CLUTE, Boston Mass. The frequency with which common and hepatic bile duct stones are found is certainly as Dr. Lahey, Dr. Cheever and others have shown related very definitely to the frequency with which we look for them.

It has always seemed a curious and anomalous situation when operating on a gallbladder filled with stones, to find two or three stones in the common duct in spite of the fact that the duct appears normal in size and consistency and that there is no edema or thickening in the head of the pancreas. Very commonly these stones closely resemble those in the gallbladder.

I believe that certain of these common duct stones are pushed through from the gallbladder and cystic duct into the common duct in the course of the operation of cholecystectomy. The first step in cholecystectomy is to grasp the gallbladder with forceps and then proceed with a dissection of the cystic duct. These maneuvers forcibly compress the gallbladder and could easily force stones or detritus from the gallbladder or cystic duct into the common duct.

I have had this year two experiences confirming this. In the first, the common duct was opened before removing the gallbladder and two stones were removed from it. Following this the gallbladder was removed. A second examination of the common duct after the gallbladder was out revealed two more stones which were identical with those in the bladder and which it was thought had been pushed into the duct during the dissection.

A similar situation arose in another case this year in which detritus in large amounts, similar to that in the gallbladder was discovered in a common duct which I had previously explored and found empty.

It would seem therefore that in the list of indications for exploration of the common duct, we certainly should include the presence in the gallbladder of small stones and detritus which could readily be pushed through into the common duct in the process of cholecystectomy. It would also appear to be a good plan to clamp the cystic duct before exploring the common duct. By this measure we may avoid some of the postoperative common duct stone colics which we all have now and then after an apparently simple cholecystectomy.

DR. ARTHUR W. ALLEN, Boston Mass. *Mr. President and Gentlemen*—I think we all ought to be grateful to Dr. Lahey for his contributions that have increased our consciousness of common duct stone. There isn't the slightest question of a doubt that a great many of us have removed gallbladders feeling that the common duct was probably clear and not opening it because the indications for exploration of the common duct were not well organized in our minds at the time. There are all of fourteen good reasons why we should take the common duct

into consideration when dealing with biliary calculi. I am not going into those in detail again at this time.

I am very much interested in Dr. Lahey's statistics on mortality of common duct exploration. In a little less than five years at the Massachusetts General Hospital we have had twelve hundred and nine cases of biliary calculus operated upon. Three hundred and eighty-six of these have had their common duct explored—32 per cent.

There has been a total mortality in the twelve hundred and nine cases of fifty-one or 4.2 per cent. There has been a mortality in the common duct explorations of seventeen, or 4.4 per cent—an increase of only .2 per cent.

In the three hundred and eighty-six cases that have had the common duct explored two hundred and twenty-seven have had the outlet dilated with the Bakes dilators. Some of them have not had very much dilatation perhaps not more than Dr. Cheever would accomplish with his silk woven catheters which we used prior to the time we had these metal instruments but occasionally the dilatation was carried as high as fourteen millimeters.

In the two hundred and twenty-seven cases that had the papilla dilated there were nine deaths and in the one hundred and fifty-nine cases in which the duct was explored and the papilla not dilated there were eight deaths.

We have had no such serious sequelae following dilatation as Dr. Lahey pointed out. We have been on the lookout for serious complications because we thought they might occur particularly reflux of duodenal contents but as yet we have not had any such instance.

Showing the trend of the times and our becoming more common duct conscious in 1931 there were only forty-five ducts explored in our hospital. There were eight deaths in the entire group operated on in that year regardless of whether the ducts were explored. In 1934 ninety-two of the cases had the ducts explored and there were only seven deaths in approximately the same number of gallbladder cases.

Interestingly enough and perhaps due to some selection on my part because I have been particularly interested in the subject during this same period I have operated on one hundred and twenty-two cases of biliary calculus exploring the ducts in sixty-six, or 54 per cent. In those sixty-six cases I found stones in the ducts in thirty-five and stricture of the outlet in seven.

DR. DAVID CREEVEY, Boston Mass. *Mr. Chairman*—I became "common duct conscious" a little earlier than Dr. Allen possibly because I arrived at general consciousness somewhat before Dr. Allen.

I read a paper on the subject of my personal experience in gallstones before the Massachusetts Medical Society last June. I was led in preparation for that to review my experience. I realized that I had been rather more apt than my colleagues in the early days of the Brigham Hospital at any rate to explore the common duct.

As a matter of fact as Dr. Allen knows and has noted, I began the purposeful dilatation of the common duct in the papilla of Vater in 1914, using olive pointed graduated woven French bougies. I determined at that time, by study in the anatomical department and by clinical experience that the normal calibre of the papilla is about number ten French and one could dilate it apparently easily up to about sixteen French.

I have carried that out quite regularly ever since in cases where the common duct has been opened not always dilating it to sixteen not always, in fact, dilating it at all but usually. I simply want to

CASE 5 M L (M G H No 348958), a forty-seven year old woman, entered the hospital, October 16, 1935, complaining of progressive difficulty in swallowing of eight months' duration. General lassitude and easy fatigability were noticed six months before entrance with some difficulty in swallowing for ten weeks. There was paralysis of the palate, with inability to swallow solid foods. Her speech was nasal in quality, her grips weak and walking was difficult. The diagnostic test gave a reading of 36. Under the effects of prostigmin, swallowing and talking were performed normally twenty minutes after the injection. The patient also improved under ephedrine.

## 2 The action of prostigmin on patients with conditions other than myasthenia gravis

CASE 6 M M (M G H No 345299), a twenty-three year old male, came to the hospital on May 9, 1935, complaining of weakness in his arms of about six months' duration. His grip was weak and the calf muscles were hypertrophied. With 3 cc of prostigmin and atropine 1/100 grain injected subcutaneously, no change in his condition was noted. His diagnostic test score was 2. The final diagnosis was *muscular dystrophy, hypertrophic type*.

CASE 7 W H (M G H No 346205), a man aged thirty-nine years, had been losing strength in his legs for four or five years. Weakness was also noted in his back muscles, with atrophy of both the back and legs. A biopsy examination of the muscles disclosed *progressive muscular dystrophy*. Prostigmin in the usual dose caused no effect.

CASE 8 F P (M G H No 346002), a twenty-two year old male, complained of progressive weakness of both legs over a period of six months. Although the muscles of the shoulder girdle and pelvis showed some atrophy, there was none in the legs. A biopsy examination showed muscle tissue characteristic of *progressive muscular dystrophy*. Three cc of prostigmin were given without effect.

CASE 9 M S (M G H No 345928), a fifty-four year old woman, complained of the loss of the use of her legs over a period of two years. She also had difficulty in swallowing and talking. Her arms were atrophic and her legs spastic. The diagnosis was *amyotrophic lateral sclerosis*. Prostigmin gave a slight subjective sense of improvement, without objective signs. Her diagnostic test score was 7.

CASE 10 S M (M G H No 346578), a thirty-seven year old male, entered the hospital July 6, 1935 complaining of generalized weakness and difficulty in swallowing of six weeks duration following an attack of sore throat. His gait was awkward and his grips weak. There was some discomfort in swallowing considered as due to chronic, hypertrophied tonsils. Prostigmin was given with only slight effect, the diagnostic score being 6. The final diagnosis was generalized weakness following an acute upper respiratory infection.

CASE 11 I K (M G H No B M 18622, reported through the kindness of Dr Walter Bauer), a fifty-two year old woman entered the hospital May 20, 1935. She had weakness of swallowing, talking and moving the hands. Fibrillation of the muscles involved was marked. The diagnosis was *progressive bulbar palsy*. Prostigmin was given without effect. An autopsy confirmed the clinical diagnosis.

CASE 12 D E (M G H No P H 33287, reported through the courtesy of Dr J B Ayer and Dr J C White), a boy aged eighteen years, complained of

ptosis of both eyes. This came on about six years before admission. The movements of the eye were also limited in all directions. Under prostigmin there was very slight improvement, the diagnostic test score being 4. The diagnosis was *progressive ophthalmoplegia of von Graefe*.

## DIAGNOSTIC SCHEMA

The extra-ocular muscles and other muscles supplied by the cranial nerves are usually observed while standing behind the patient's head with the patient lying down. His gait and posture, however, are also observed from time to time during the test. Tests are done at stated intervals of time and the patient is asked to express his feelings each time an observation is made. The results are listed on a scale of 0 to 4. "Subjective" (fig 1) relates to an increase in a general feeling of well-being. "General" indicates a decrease in paralysis of the larger muscle groups, such as the grip and ability to walk. "Local" reports the findings in smaller muscle groups that can be more accurately observed, such as the extra-ocular muscles, those of the face, and muscles used in talking or swallowing.

The "total" in cases of myasthenia ranged from 20 to 72, doubtful cases, from 10 to 20, negative reactions, from 0 to 10. Our positive myasthenia cases gave total scores of 55, 49, 49, 47 and 36. The negative cases tested gave totals of 2, 7, 6 and 4.

## EARLY PHYSIOLOGICAL LITERATURE\*

Rothberger<sup>14</sup> pointed out as early as 1901 that physostigmine antagonized curare in the peripheral nerve-muscle preparation. Gunn<sup>6</sup>, in 1908, working on yohimbine poisoning, concluded that myasthenia gravis was a peripheral nervous, rather than a central, affection. Further light on the mechanism of the physostigmine-curare antagonism was cast by the work of the Lapieques<sup>10</sup>, who observed that curare caused an augmentation in chronaxie while physostigmine, nicotine and veratrin diminished the chronaxie of skeletal muscle. In recent years there has been some discussion as to the validity of chronaxie determinations as a means of elucidating the problem of neuromuscular transmission, but these theoretical considerations do not affect the primary fact which the Lapieques were the first to emphasize, that curare diminished, and the physostigmine group of drugs increased, the excitability of muscular tissues, and that this was undoubtedly the basis of the antagonism of the two drugs.

Granted, then, that the state of the muscles in myasthenia gravis is akin to the state produced in them by curare, it is not unreasonable to suggest the use of physostigmine as a therapeutic measure. Edmunds and Roth<sup>5</sup> observed, moreover, that the effect of physostig-

\*Contributed by Professor John F. Fulton

mine on muscle appears to be separate from its action on the gut and various other organs innervated by the parasympathetic system, an observation confirmed and extended by Langley and Kato<sup>9</sup>

Nicotine and veratrin also augment the excitability of muscle i. e., diminish the chronaxie and they, too, tend to antagonize curare. Owing, however, to other toxic actions especially of veratrin, it has not seemed advisable to suggest their use in myasthenia gravis

#### DISCUSSION

The earlier work on the physostigmine-curare antagonism gave a suggestion that physostigmine or one of its derivatives might be of value in the treatment of myasthenia gravis a disease characterized by weakness of muscles similar to the paralysis of curare poisoning. Such has proved, in part, to be the case. The rapid response to the derivatives prostigmin however, has furnished us with a new diagnostic test for myasthenia gravis, while its therapeutic action is still uncertain except for temporary relief of symptoms. A diagnostic schema is helpful in recording the action of the drug. While the diagnostic test is of some use to medicine it is to be hoped that prostigmin or an other preparation may in the near future furnish us with a form of therapy capable of prolonged effect and thus be more suitable in the treatment of myasthenia gravis

#### CONCLUSIONS

Prostigmin, a derivative of physostigmine, causes a marked but temporary, remission of

the muscular weakness seen in myasthenia gravis

The effect is so marked that the drug is suggested as a diagnostic test for the disease

Other diseases, either of nerves or muscles, respond only slightly to prostigmin

Prostigmin is injected subcutaneously, with an appropriate dose of atropin to counteract any intestinal stimulation. Three cc. of prostigmin (Roche) and atropine, 1/100 grain, has proved to be satisfactory as a diagnostic test.

#### REFERENCES

1. Aeschlimann, J. A. and Heinert M. The pharmacological action of some analogues of physostigmine. *J. Pharmacol. & Exper. Therap.* 43: 413 (Nov.) 1931
2. Bailey, L. Prostigmin and the chemist. *Lancet* 1: 543 (March 18) 1935
3. Carmichael, E. A. et al. The therapeutic action of prostigmin. *Lancet* 1: 91 (May 5) 1934
4. Denny Brown, D. Physostigmine and belladonna by mouth in myasthenia gravis. *Lancet* 1: 767 (March 30) 1935
5. Edwards, C. W. and Roth G. H. Concerning the action of curare and physostigmine upon nerve endings or muscles. *Am. J. Physiol.* 23: 23 1908
6. Gunn, J. A.: Myasthenic reaction experimentally produced in the frog. *Her. Neurol. & Psychiat.* 6: 185 1905
7. Hamill, P. Further uses of prostigmin. *Lancet* 1: 575 (March 6) 1935
8. Hamill, P. and Walker M. B.: The action of "Prostigmin" (Roche) in neuromuscular disorders. *J. Physiol.* 84: 36 P (May 12) 1935
9. Langley, J. and Kato, T.: The physiological action of physostigmine and its action on denervated skeletal muscle. *J. Physiol.* 49: 419 1915
10. Lapicque, L. and Lapicque, M. Curarisation par la vérité antagonisme dans la curarisation. *Compt. rend. Soc. de biol.* 72: 233 (Feb. 17) 1912
11. McAlpine, D. Treatment of myasthenia gravis with "Prostigmin". *Lancet* 1: 516 (March 2) 1935
12. Pritchard E. A. Blake "Prostigmin" in the treatment of myasthenia gravis. *Lancet* 1: 52 (Feb. 3) 1935
13. Pritchard E. A. Blake and Walker M. B. The effect of prostigmin on the symptoms and on the program in myasthenia gravis. *J. Physiol.* 84: 35 P (May 13) 1935
14. Rothberger J. O. Beziehungen zwischen Curare und Physostigmin. *Arch. f. d. ges. Physiol.* 87: 117 (Oct.) 1901
15. Walker M. B.: Treatment of myasthenia gravis with physostigmine. *Lancet* 1: L90 (June ) 1934
16. Walker M. B.: Case showing effect of prostigmin on myasthenia gravis. *Proc Roy Soc Med.* 28: 59 (April) 1935

## A RECENT OUTBREAK OF FOOD POISONING IN SHOREHAM, VERMONT

BY R. F. DE WITT, M.D.\*

OF a group of sixty men, women and children who ate home made ice cream in December 1933, forty three were taken with an acute digestive upset. The refreshments consisted of vanilla ice cream with chocolate sauce, angel food cake, and coffee with cream. There were four gallons of ice cream, three of which were made by the same person who stated that she had difficulty in freezing one gallon. The ingredients used were flour eggs whole cow's milk, evaporated milk, sugar and vanilla. The resulting mixture was greyish in appearance and flat in taste. There was a question as to the cleanliness of the freezers.

At 11 P. M. lunch was served. Between 1 and 7 A. M. forty three of the sixty persons were taken with acute symptoms which included, in most instances, nausea and vomiting,

headache muscular cramps and aches weakness and marked prostration. The weakness, prostration headache and muscular cramps persisted from ten to seventy hours from the time of onset. In the cases which were examined by a physician, temperature from 98.4 to 99.6 degrees F. and pulse from 72 to 96 were noted. No diplopia, nystagmus, photophobia, pharyngeal or aural difficulties were apparent. Four of the forty three victims had puffiness of the eyelids. One child of fourteen years who ate a considerable amount, had nausea and vomiting and an irregular and thready pulse of 140, which lasted about twenty four hours. Several individuals, who suffered milder attacks, had similar recurrences of their symptoms about twenty four hours later, with no possibility of obtaining any of the above mentioned food. In individuals, who felt general malaise and slight nausea about two hours after ingestion of the

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food, took large doses of saline or castor oil. Following this treatment their upsets were milder and recovery quicker than in those untreated.

In several instances diarrhea was noted at the onset, but in the majority there was constipation which lasted two to three days. In most cases, some degree of general malaise and gastric discomfort were present for about a week following the subsidence of acute symptoms.

Examination of ice cream, which was carried in a clean but not sterile container, was made four days following the party. Culture of the ice cream showed *staphylococcus aureus*, a streptococcus, *bacillus coli*, and an undetermined rod-shaped organism. Due to inadequate facilities an examination of the filtrate was not made.

#### A DETAILED CASE

The following is a detailed report of one case. The patient, aged forty-five, male, was seized with intestinal cramps and diarrhea four hours after the ingestion of the food, nausea and vomiting came on a few minutes later and continued for four and one-half hours at which time morphine and codeine were given. The patient was restless and confused, and vomited at short intervals during the next six and one-half hours. During this time he complained of a severe frontal headache and aches and pains in his muscles. These aches and pains lasted about eighteen hours. Prostration occurred about eight hours following the appearance of symptoms and lasted approximately thirty-six hours. Twelve hours after the onset of symptoms, the temperature was 98 degrees F, pulse 78 and respiration 17, with a maximum forty-eight hours later of 99.82-16. Eighteen hours after the onset, sodium amytal grs 6, sodium bicarbonate gr 15, sodium chloride gr 15, sodium bromide gr 15, were given per rectum in eight ounces of tap-water, this kept the patient quiet for about two hours. After the first twenty-four hours of the illness, a scarlatiniform rash appeared on the trunk and arms, this lasted about thirty hours, gradually fading away. Enemas and alcohol rubs had a sedative effect. General strength returned slowly the following week with no apparent complications or sequelae during a period of ten months.

#### SEVERAL SIMILAR OUTBREAKS RECENTLY REPORTED

*Staphylococci* were first reported as occurring in milk by Barber<sup>2</sup>, who isolated both the white and yellow varieties, the white gave the investigator symptoms while the yellow did not.

Outbreaks of food poisoning ascribed to *staphylococci* following the ingestion of such foods as layer cake, cheese, devil's food cake,

chocolate éclairs, wedding cake, cream puffs, chocolate cream pie, French vanilla ice cream and Christmas cake have been reported by Dack<sup>3</sup>, Jordan<sup>4, 5</sup>, McBurney<sup>1</sup>, Nelson<sup>6</sup>, and Arthur<sup>7</sup>.

Gilbert, Coleman and Laviano<sup>8</sup>, report *B. cloacae*, *B. proteus* and *staphylococci* as being the probable cause for gastrointestinal disturbances. In October, 1930, following an outbreak attributed to cream-filled pastries, from which *staphylococci* were isolated, symptoms were not produced by feeding filtrates to various laboratory animals, but upon feeding growths of a non-motile, gram negative, encapsulated bacillus, toxic symptoms were evident. Further study indicated that these organisms were of the *cloacae-aerogenes* group although they did not correspond exactly to any species for which a description could be found.

#### SUMMARY

Due to the short time between the ingestion of the food and the onset of symptoms, the probability of a chemical or a combined chemical and bacterial rather than bacterial origin appears logical. But, in view of the above reports of food poisoning with a *staphylococcus* or a member of the *cloacae-aerogenes* group as the apparent etiological factor, it seems probable, since the symptoms in the outbreak reported above correspond closely with other records, that the etiology in this instance might well be the same.

#### ACKNOWLEDGMENT

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#### REFERENCES

1. McBurney Ralph. Food poisoning due to *staphylococci* report of an outbreak. *J. A. M. A.* 100: 1999 (June 24) 1933.
2. Barber M. A. Cockroaches and ants as carriers of the vibrios of Asiatic cholera. *Philippine J. Sc.* 9: 515 1914.
3. Dack G. M. Cary W. E. Woolpert O. and Wiggers H. J. Outbreak of food poisoning proved to be due to yellow hemolytic *staphylococcus*. *J. Prev. Med.* 4: 167 (March) 1930.
4. Jordan E. O. Production of *staphylococci* of substance causing food poisoning. *J. A. M. A.* 94: 1648 (May 24) 1930.
5. Jordan E. O. *Staphylococcus* food poisoning. *J. A. M. A.* 97: 1704 (Dec 5) 1931.
6. Nelson N. A. Outbreak of gastro-intestinal disturbance following eating of chocolate cream pie. *New Eng. J. Med.* 199: 1145 (Dec. 6) 1928.
7. Arthur C. W. The Bacteriologist of the Pasadena Health Department Laboratory 1927-1928.
8. Gilbert R. Coleman M. B. and Laviano B. Food poisoning due to toxic substances formed by strains of *cloacae-aerogenes* group. *Am. J. Pub. Health* 22: 721 (July) 1932.

## VERMONT STATE MEDICAL SOCIETY

PRACTICAL LIMITATIONS OF VACCINE  
AND SERUM THERAPY\*

BY AUGUSTUS B. WADSWORTH, M.D.†

**T**HE practicing physician must do something for his patient—anything that promises to be helpful. Perhaps the less clearly the measures are understood the more alluring they are especially if they are in the nature of a specific. Specificity of course is the underlying principle of vaccine therapy and that relationship is thus connoted whenever a vaccine is suggested whether or not there is any real scientific basis for it. From this point of view, one must consider the practical value of vaccine therapy. Its limitations have been more sharply defined each year as medical science has been advanced by research in the laboratory and by clinical experience at the bedside.

One must understand clearly what one means by a vaccine. In the first place it is an antigen. Now an antigen is a substance that when introduced into the tissues induces a reaction, in other words varying degrees of injury followed by recovery—a reparative process which becomes specific in its relation to the particular agent that incited the injury. In general antigenic action has been limited to the protein substances but their action is now known to be modified by the presence of the carbohydrates. It is conceivable that a useful vaccine might be prepared from any microorganism that gives rise to an infectious disease but, up to the present time, the practical value of comparatively few has been convincingly demonstrated. In general, vaccines are used in the prevention and treatment of infection. Vaccine therapy differs fundamentally from serum therapy in that it induces an active immunity and a lasting one whereas serum therapy provides only passive immunization which is quite evanescent. Thus in general vaccine therapy finds its sphere of greatest usefulness in the prevention of infection by developing an immunity before infection has taken place whereas serum therapy is limited more and more in practice to the treatment of infection. Serum therapy if effective is immediately effective. Immunization with vaccines requires time for the active immunity to develop and thus varies greatly with the different vaccines. Although this, in general, is true nevertheless vaccines are useful under certain conditions and in certain types of infection which may be defined as the prolonged infections of low grade in

which the disease process is not developing an adequate immunity and requires the further stimulation that might be derived from judicious treatment with a potent vaccine.

If one accepts the broad point of view I have taken in defining a vaccine, it is obvious that toxins as well as suspensions of the bacterial cells, should be included—although at the present time the term vaccine often connotes simply a suspension of bacterial cells. This usage disregards the origin of the term as applied to smallpox vaccine, which is not a bacterial suspension but a virus preparation. Moreover, smallpox vaccine is administered in the living state and owes its effectiveness to the fact that it is living and induces a modified form of the disease process from which is derived the immunity. This brings us to a fundamental differentiation in the action of these two types of vaccine—that derived from the bacterial incitants of infection as contrasted with that from the filtrable viruses.

Immunity to bacterial infection can be and is obtained by immunization with dead bacterial cells or their toxins whereas it is extremely doubtful if an effective immunity against the virus diseases can be obtained without the introduction of the living virus and the development of some form of disease process in the tissues. There is another fundamental difference in the character of the immunity that is induced by these two agencies. Dead bacterial material whether derived from the bacterial cells or the toxins may induce an extremely high degree of immunity which subsides and becomes latent when immunization has stopped just as it does after the recovery of a person from bacterial infection. In many of the infectious diseases a second infection is rare in a few it occurs not infrequently, for example in pneumonia, as you all well know. After recovery from the virus diseases, a second infection is extremely rare. The immunity is lasting, practically permanent for the duration of life. Similarly after the administration of a living virus in a vaccine the immunity is likely to be lasting with extremely rare exceptions—as for example in the case of smallpox that develops in a person who has been vaccinated. The disease in such cases has been reported as modified and mild. The explanation that has been offered recently is extremely interesting although further study is needed before one can venture to accept it namely that when these filtrable viruses enter the tissues as the inciting agent of an infectious disease or are injected

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as a vaccine, a harmless state of parasitism or symbiosis develops with recovery, and the virus which, in the tissues finds its natural habitat inside the cells, persists and continues living in the cells of its host indefinitely. Thus it is that individuals who have recovered from some of these virus diseases continue to have in their blood, years after recovery, specific substances that have a protective action on the virus when tested in the laboratory.

Further elucidation of the broad principles underlying the practical limitations of vaccine therapy would require all the time at my disposal and might serve no very useful purpose. Then, too, I fear I should become involved beyond my depth. Practical illustrations may serve much more effectively and to a better purpose, especially since they are doubtless of more interest to you as practicing physicians.

The list of bacterial vaccines that are, in varying degree, effective, is a long one, doubtless the list of those that are of little or no value is much longer. A vaccine may be potent and not useful. When a vaccine is potent and its specific relationship to an infectious process established, its sphere of usefulness is also very sharply defined clinically. Theory and practice invariably coincide.

Suspensions of typhoid, paratyphoid, dysentery, pertussis, and influenza bacilli, of cholera vibrio, and of some of the pathogenic cocci and higher bacteria have all been used in the prevention or treatment of infection. *Staphylococcus aureus* and some of the actinomyces have been used in the treatment of localized infections under certain conditions. The treatment of furunculosis with staphylococcus vaccine, *ad interim*, to prevent recurrence, might be considered rational vaccine therapy but staphylococcus vaccine is of no value and may be harmful in the acute stages of infection, whether localized or an invasive general pyemia. Thus this agent is limited to prevention as are practically all this group of vaccines.

Typhoid vaccine is perhaps better known and has been more widely used for a longer period than any of these bacterial vaccines. Its practical value, however, is definitely limited to prevention of the disease and, in conditions of frequent exposure, as in the army campaigns, vaccination must be repeated at short intervals in order to maintain the immunity in the active rather than the latent stage. The latent or dormant period of the typhoid immunity that follows inoculation after longer or shorter periods in different individuals possesses some but not always adequate protection against the development of infection after exposure. There is considerable discussion at the present time regarding the selection of strains of the typhoid bacillus with which to prepare the vaccines. Some of the old Rawlins strains have been considered lacking in antigenic potency but, after all is said and done, our experience regarding

the practical value of typhoid vaccine is derived from the use of this strain during the World War and other campaigns in various parts of the world for more than twenty-five years. It is the opinion of the medical officers of our army that the campaign in Flanders would have been impracticable without typhoid vaccine. Although similar in many respects, paratyphoid vaccine does not appear to be quite so useful—not that it lacks potency, but the character of the disease and the effect of active immunization differ to such an extent that paratyphoid vaccine is not so generally combined with typhoid vaccine as it was a few years ago. Similarly, the administration of dysentery vaccines has been practically abandoned although bacillary dysentery is endemic in many districts.

Cholera is another enteric disease in which vaccines have been used extensively but only as a preventive measure to control the spread of epidemics, and thus it is of little or no interest to us here in this country at the present time.

During the influenza epidemics, various preparations of the influenza bacillus alone or in combination with other species of pathogenic bacteria were used quite extensively. In my experience and from a review of the work of other observers, I have been unable to ascertain that they have been in the slightest degree effective clinically. Preparations of the influenza bacillus and related species, as far as we have been able to determine in the laboratory, have an extremely limited potency so that, despite any specific relationship of these microorganisms, their value in the prevention or treatment of infection is negligible.

The terminal complication of influenza is pneumonia, and pneumonia, except in rare instances, does not yield to any form of preventive vaccine therapy. It was thought for a brief period that this might be due to failure to select the proper type of vaccine but it was soon learned that recovery from one type of pneumonia may be followed by a second attack of the same type so that protective inoculation with pneumococcus vaccine, for a brief moment advocated by some authorities as a public health measure, is not practical and has never been adopted.

Pertussis vaccine, like that of the influenza bacillus, from our studies in the laboratory, possesses extremely limited potency and, despite its specific relationship to whooping cough, is of very doubtful value in either the prevention or treatment of the disease. The prolonged course that whooping cough often follows suggests that a vaccine might be useful for treatment after infection had developed but its practical value clinically is far from sharply defined—extremely doubtful—but, lacking potency, it is a harmless agent. Most of the vaccines

now prepared contain a high concentration of pertussis bacilli, ten billion organisms per cubic centimeter. Lack of potency and failure to obtain clinical results have suggested the use of vaccines from freshly isolated cultures of this microorganism, as of others in the same category. This is not a practical laboratory procedure on account of the time required for safe preparation of the vaccine. Moreover there are no proofs as yet that it is necessary.

In presenting these examples of vaccine therapy, I have tried to stress not only the conditions in which they are useful and how these vary with the different vaccines and diseases in which they are used, but also to illustrate how closely theory, as developed from laboratory research, coincides with practice as revealed by clinical experience. I have accordingly selected examples concerning which we have considerable information—sufficient to define their practical limitations on the basis of sound reason but there is also a long list of vaccines concerning the efficacy of which we really know little or nothing. Take, for example the common cold. For the past fifteen or twenty years, various bacterial and other vaccines have been suggested but not one of them has as yet convinced support. The multiplicity of the vaccines or species selected bespeaks a lack of knowledge not only of their potency but of their specific relationship to the infectious process. The only basis for the selection of some of the bacterial species that have been used has been the fact that they were present and isolated. That they were the incitants of the common cold or that if a vaccine were prepared from them it would be potent, has never been determined. Moreover, theory and practice also coincide in these negative results—complete absence of a scientific basis and quite indeterminate clinical results from its administration. Now if recent studies are confirmed, the common cold is due to a filtrable virus. These nondescript vaccines of the present day will therefore fall in the category of the gunshot prescriptions of our forebears.

In striking contrast to the common cold, the etiology of some allergic affections of the upper respiratory tract, such as hay fever or rose cold, can be determined and vaccines prepared from the toxic material, vaccine therapy is most effective as a preventive measure in such instances.

Lack of convincing clinical results often suggests the use of autogenous vaccines prepared from microorganisms isolated from the individual patient. These are not limited to the treatment of common colds and conditions of the upper respiratory tract but are extended to infection of any part of the body from which one can obtain bacteria—usually exposed parts, contaminated by species other than the in-

citant. The value of autogenous vaccines depends entirely upon their potency in the first instance and in the second place, upon proofs that the particular species selected is the specific incitant of the process to be treated—data which are often lacking in the common practice of preparing and administering these autogenous vaccines. I have no quarrel with the use of autogenous vaccines when these conditions are fulfilled and the patient is not suffering seriously from an acute infection.

Preparations of the toxins of the diphtheria and tetanus bacilli and of the hemolytic streptococci are all potent vaccines and their etiological relationship to the disease process is generally very clearly established, but even these preparations are of limited practical value. No one presumes to advocate their use in the acute infectious processes. Here we have general acceptance of the sharply defined practical limitations of this type of vaccine therapy and it very strikingly illustrates the points of view regarding other forms of vaccine. When these preparations are so toxic that it is difficult to use them unless modified treatment with formaldehyde when carefully adjusted destroys their toxicity without injuring materially their antigenic activity. These toxins can therefore be converted into toxoids and used effectively. Comparatively little has yet been done with tetanus toxoid but I believe it will have a very practical, although limited, sphere of usefulness. You are all familiar with the preventive immunization against diphtheria that is now so generally used. It was first modified by the addition of antitoxin, then by treatment with formalin, and very recently the formalin product has been adsorbed on alum or other substances and found to be far more effective when administered in this form. We have been interested particularly in the study of toxoid precipitated on calcium phosphate because it offers certain advantages over the alum and appears to be as effective, but we have not as yet distributed this preparation for general use. The precipitated toxoid can be given in somewhat larger quantities and in one dose. It is a more effective immunizing agent—doubtless on account of the slower absorption. There is no question but that the public health program of immunization against diphtheria has produced results in diminishing the morbidity and mortality of diphtheria. It does not mean however, that diphtheria never develops in vaccinated persons. This, of course, is due to inadequate immunization. Individuals vary in their response and a few fail to develop the necessary immunity. The present procedures suffice for the great majority.

The hemolytic streptococcus culture may be divided into two parts from the standpoint of vaccine therapy: the toxic filtrates, which are potent antigens, and the bacterial suspensions

the action of which as a vaccine has not yet been determined. Vaccine therapy and serum therapy alike as they relate to streptococcus infection, are complicated by the fact that the toxins and antitoxins vary according to the strain. It is necessary to use a corresponding vaccine for preventive inoculation or a corresponding serum for treatment after infection has developed. The strains bear no specific relationship to any of the characteristic disease processes such as scarlet fever or erysipelas. The different strains are found with about the same frequency in each of these diseases. There is no specific etiological relationship, hence there is no specific vaccine or serum therapy as yet developed. Preventive inoculation with the toxin is therefore limited for the present to those who are constantly exposed, it certainly is not practical for general use with the preparations available. To obtain a combination of toxins that will protect against all hemolytic streptococci is the difficult problem. The time required for immunity to develop is also a practical limitation in epidemics. The number and size of the doses have been repeatedly increased since the procedure was first recommended.

Vaccine therapy may be said to date from Jenner's work on smallpox, which belongs to quite another group of infectious diseases. The vaccine therapy of this group differs fundamentally from that of the bacterial infections. Smallpox, rabies, and epidemic poliomyelitis in man and distemper in the dog are incited by filterable viruses. There is no convincing evidence that the agent of the disease smallpox and the agent of the vaccine are different species. By passage through the cow, the vaccine virus becomes so modified that it gives rise only to a modified infection as compared with the disease smallpox. From time immemorial, protection against smallpox has been dependent upon a "take." This is the result of the development of the living virus in the tissues.

Similarly, in rabies, the vaccine prepared from the cord of infected animals, dried or treated with various chemical reagents, is a modified form of the virus that gives rise to hydrophobia. Its practical value is to be attributed to the long period of incubation in this disease, which permits active immunization of the tissues with the vaccine before the disease has time to develop and thus is preventive in its action. If the administration is delayed treatment with the vaccine would be considered dangerous were it not for the fact that rabies is invariably fatal. In other words, when this virus finds lodgment and develops to the extent of inducing the disease, the virus survives but not the host.

There is corresponding experience with immunization of the dog against distemper. These vaccines proved of little or no value until it was recognized that the living virus must

be introduced. However, experience with new methods has established the fact that very slight but sufficient immunity may be induced in the tissues by the introduction of dead vaccine and that this must be given as a preliminary treatment to the inoculation with the living distemper virus in modified form. If the dog is a very valuable one, it seems wise to repeat the injection of the dead vaccine before giving the living virus. Moreover, to be certain of saving the dog, serum therapy is often recommended to control the disease process incited by the living vaccine if this should become alarming.

Attempts to develop a vaccine therapy to prevent, and thus control, epidemics of poliomyelitis have been unsuccessful. Research has now turned to preparations of the living virus in the hope of obtaining a modified living vaccine that might be safely given the human subject, and this has not yet been accomplished. These are concrete examples of the limitations of vaccine therapy in the virus diseases.

There is still another group of diseases incited by other species of microorganisms such as the *Plasmodia* or the *Trypanosomae*, for which we have as yet no vaccine therapy and comparatively little information concerning the problems involved.

Serum therapy is passive immunization in contrast to active immunization—vaccine therapy. Serum therapy is thus the transfer of the products of an active immunization to the infected individual. A horse is hyperimmunized, that is, receives a long and accumulative course of vaccine treatment to develop an active state of immunity. In some instances, this can be accomplished in two or three months, with other bacterial products it takes a year or two before the horse reaches a sufficient state of hyperimmunization. The horse is then bled and the serum or concentrated preparations of the globulins are used for the treatment of the homologous type of infection.

These sera may be divided into two classes: those that are predominantly or purely antitoxic in their action, such as the diphtheria, tetanus, and botulinus antitoxins, as contrasted with those that possess protective activity against, such incitants of infection as the meningococcus or pneumococcus. The sera obtained by immunization with the hemolytic streptococci may possess both types of activity. You are all quite familiar with the antitoxic action of sera in neutralizing the diphtheria, tetanus, and botulinus toxemias, but with the meningococcus, pneumococcus, and streptococcus, the disease is characterized by a bacterial invasion of the tissues that does not occur in diphtheria, tetanus, or botulism. The problems of serum therapy are therefore greatly complicated. It is not only necessary to neutralize the toxic products of the bacterial incitant of the infection, but the bacteria that have invaded the tissue must be destroyed also.

These different sera irrespective of antitoxic or antibacterial activities, are effective in the treatment of infection after it has developed. They may be useful as a preventive measure for a brief period. Diphtheria antitoxin as it was formerly extensively given to children exposed to diphtheria is an example and the administration of tetanus antitoxin following accidents is another. Passive immunization with antitoxin or serum has a very restricted usefulness.

You are familiar with the practical value of the antitoxic sera—their unquestioned potency and specificity in the treatment of the disease and thus also the remarkable clinical results you have obtained with them. Nevertheless, there are very definite practical limitations to their usefulness. Even with diphtheria antitoxin, reports have reached me of the failure of treatment to control the course of the disease. Different observers have attributed the failure of diphtheria antitoxin to differences in the character of the diphtheria bacilli which give rise to the outbreaks that fail to respond to treatment or to lack of potency in the antitoxins that were used. I personally have been interested in endeavoring to determine whether the rapidly fatal course of some cases of diphtheria might not be due to complicating infection of the necrotic lesions induced by the diphtheria bacillus in the upper respiratory tract. The work of Prudden in the early days of antitoxin treatment of this disease stresses the importance of the streptococcus as a contaminating agent. However, this point of view is speculative and lacks the necessary proofs.

With present methods of standardization in this country since federal control, diphtheria antitoxin has not lacked potency. No convincing proof has yet been obtained that the toxin produced by the different strains of the diphtheria bacillus differs in its neutralization by the standard antitoxin. On the contrary I have examined carefully strains of diphtheria bacilli isolated from serious outbreaks—notably one that occurred in Berlin in 1927—and found that the toxins of these diphtheria bacilli were all neutralized by the standard diphtheria antitoxin.

For the present, therefore, one must attribute the failure of diphtheria antitoxin to delay in its administration or to inadequate dosage. This is a most important conclusion because it not only applies to serum therapy in diphtheria but to serum therapy in all the infectious diseases. Serum must be promptly administered to be effective.

This is particularly striking when one considers the treatment of tetanus with antitoxin. Early in the disease it is of value but the course of the disease is so rapid and vital tissues become so early involved that serum therapy in this disease depends entirely upon the prompt

administration of the serum in adequate doses. For precisely the same reason, the practical value of treatment of another disease that involves the central nervous system botulism, is rendered practically useless by the delay in securing and administering the serum. The poisoning is so acute that the central nervous system is immediately involved. It is usually impossible to obtain antitoxin of the proper type to administer in time to be of value. Patients, therefore, die or recover irrespective of serum therapy.

I must again stress these very striking examples of the practical limitations of serum therapy dependent as they are upon prompt administration of these sera. In the treatment of epidemic meningitis pneumonia and scarlet fever and other streptococcus infections this is especially important on account of the fact that with these infections the disease is complicated by the invasion of the tissues by the meningococci, pneumococci and streptococci respectively whereas diphtheria tetanus and botulism differ fundamentally in that they are toxemias without invasion.

The botulinus toxin unlike the diphtheria toxin is characterized by type specificity and it is necessary to use antitoxin of the corresponding type. Meningococci, pneumococci, and streptococci are also differentiated into types. It is therefore necessary to use either a polyvalent serum or one of limited valency corresponding to the type of the strain giving rise to the infection to be treated. By combining a few selected strains serum of a potency approximating equaling or possibly exceeding that of monovalent sera can be prepared for the treatment of meningococcus meningitis. It would seem as though the relationship of the different types of meningococci differs in this respect from the pneumococci and streptococci. The results of serum therapy in meningococcus meningitis are very striking but quite variable, depending upon the severity of the infection. The fulminating cases are difficult to treat promptly or effectively. Epidemics vary greatly in virulence and thus in their mortality. Hence the results of the different series reported in the literature are not comparable. Dopter reports the lowest mortality—14.5 per cent—in treated cases. His results have not been obtained by others. Fleischer reports 30.9 per cent deaths in his cases 17.8 per cent failed to recover in our series.

There are practical difficulties in preparing sera of the requisite potency and breadth of valency with the different strains of the pneumococci and streptococci. In the treatment of pneumonia it is necessary to determine the type of serum to be used if satisfactory results are to be obtained. Moreover in the treatment of pneumonia we find marked differences in the results obtained with serum therapy among the different types. For example some

the action of which as a vaccine has not yet been determined. Vaccine therapy and serum therapy alike as they relate to streptococcus infection, are complicated by the fact that the toxins and antitoxins vary according to the strain. It is necessary to use a corresponding vaccine for preventive inoculation or a corresponding serum for treatment after infection has developed. The strains bear no specific relationship to any of the characteristic disease processes such as scarlet fever or erysipelas. The different strains are found with about the same frequency in each of these diseases. There is no specific etiological relationship, hence there is no specific vaccine or serum therapy as yet developed. Preventive inoculation with the toxin is therefore limited for the present to those who are constantly exposed, it certainly is not practical for general use with the preparations available. To obtain a combination of toxins that will protect against all hemolytic streptococci is the difficult problem. The time required for immunity to develop is also a practical limitation in epidemics. The number and size of the doses have been repeatedly increased since the procedure was first recommended.

Vaccine therapy may be said to date from Jenner's work on smallpox, which belongs to quite another group of infectious diseases. The vaccine therapy of this group differs fundamentally from that of the bacterial infections. Smallpox, rabies, and epidemic poliomyelitis in man and distemper in the dog are incited by filterable viruses. There is no convincing evidence that the agent of the disease smallpox and the agent of the vaccine are different species. By passage through the cow, the vaccine virus becomes so modified that it gives rise only to a modified infection as compared with the disease smallpox. From time immemorial, protection against smallpox has been dependent upon a "take." This is the result of the development of the living virus in the tissues.

Similarly, in rabies, the vaccine prepared from the cord of infected animals, dried or treated with various chemical reagents, is a modified form of the virus that gives rise to hydrophobia. Its practical value is to be attributed to the long period of incubation in this disease, which permits active immunization of the tissues with the vaccine before the disease has time to develop and thus is preventive in its action. If the administration is delayed, treatment with the vaccine would be considered dangerous were it not for the fact that rabies is invariably fatal. In other words, when this virus finds lodgment and develops to the extent of inducing the disease, the virus survives but not the host.

There is corresponding experience with immunization of the dog against distemper. These vaccines proved of little or no value until it was recognized that the living virus must

be introduced. However, experimental new methods have established the slight but sufficient immunity in the tissues by the introduction of the vaccine and that this must be given in treatment to the inoculation of distemper virus in modified form. For a very valuable one, it seems that the injection of the dead vaccine living virus. Moreover, to the dog, serum therapy is of value to control the disease produced by living vaccine if this should be necessary.

Attempts to develop a vaccine for distemper, and thus control, epidemics have been unsuccessful. It is now turned to preparations in the hope of obtaining a vaccine that might be safely given to the subject, and this has not yet been accomplished. These are concrete examples of vaccine therapy in the virus group.

There is still another group of diseases caused by other species of microorganisms, the *Plasmodia* or the *Trypanosomes*. In these we have as yet no vaccine therapy. Relatively little information is available regarding the problems involved.

Serum therapy is passive immunity in contrast to active immunization. Serum therapy is the use of the products of an active infection in an infected individual. A horse, for example, is inoculated, that is, receives a long course of vaccine treatment, and is then in a state of immunity. In serum therapy, this can be accomplished in two ways. First, with other bacterial products, the horse is inoculated two before the horse is in a state of hyperimmunization. Second, the serum or globulins are used. In the case of the homologous type of infection, the results are usually good.

These sera may be divided into two groups: those that are predominantly toxic in their action, such as tetanus, and botulinus antitoxin, and those that possess passive immunity against, such incitants of infection as pneumococcus or pneumococcus. The bacteria may possess both types. The sera are all quite familiar with the use of sera in neutralizing the diptheria and botulinus toxemias, but with pneumococcus, pneumococcus, and streptococcus disease is characterized by a bacterial toxin of the tissues that does not occur in tetanus, or botulism. The problems of therapy are therefore greatly complicated. It is not only necessary to neutralize the products of the bacterial incitant, but the bacteria that have invaded the tissue must be destroyed also.

to us because when a new serum is prepared there is so much newspaper publicity about it that each of us has to decide what he is going to do about it, and whether he is going to use it.

I have had a good deal of experience in the use of pertussis vaccine. We have used the vaccine which has been publicized by Dr. Sauer of Chicago for the past three years. In the cases where we have used it, it is my personal opinion that we have not had more than two slight cases of whooping cough develop and these were so mild that we had to resort to the use of the blood count and blood plates in order to be sure that we had an infection of whooping cough.

I would like to say a word about the use of the erysipelas serum. Before we had that, as described by Dr. Birkhaug the mortality in the past ran around 60 per cent but since we have used that serum the mortality has dropped to about 0 per cent.

About the use of convalescent serum, that is so limited that it is not a serum that can be used to wipe out an epidemic, but when available we have found that serum very useful.

In regard to the infantile paralysis I would like to say that our Board of Health agrees quite closely with what Dr. Wadsworth has said. They will not help us in using it and will not give their permission to us to use it in the vicinity of Detroit. Dr. Kolmer feels very strongly that his vaccine is a safe vaccine. We had a letter from him within the past two weeks in which he stated his vaccine had been used in 8000 patients each receiving three injections, and he feels very definitely that his vaccine is safe. Of course we agree with most public health authorities. It has been very pleasant to be here and listen to Dr. Wadsworth.

PRESIDENT MARSHALL Perhaps Dr. Dalton will discuss this. It is a subject he is familiar with and interested in.

DR. DALTON I am surely interested in this subject and also want to assure the members of the Society that we are very fortunate to have Dr. Wadsworth come here and read a paper on this subject. We have now pretty nearly the last word on the subject.

I would like to correct if I may the impression Dr. Howard seems to have about infantile paralysis being endemic in Vermont. To be sure we do have a number of cases each summer but I am sure, in studying reports from other states, that we have no more per centage of population than many other states and less than some. The reason we are said to have more in Vermont is that we have been studying infantile paralysis intensively since 1914 and have not hesitated to tell about it and it is probable that every diagnosed case is reported.

Returning to Dr. Wadsworth's paper I am frequently impressed with the gullibility of the public, and many of the doctors, in regard to these vaccines and serums. Only within a few days you probably have noticed in one of the southern states, they have been using a serum which is supposed to be potent and specific for infantile paralysis and the Public Health Department of that state has given its approval to the use of this and there have been about 600 persons inoculated and pronounced secure against the disease. I expect this announcement has done a great deal of injury throughout the whole country because people who are afraid of infantile paralysis feel, perhaps that now the subject has been closed and they may be following a false impression. Some of the doctors feel the same way in regard to the use of human immune serum. I appreciate the fact that when a doctor has a case of infantile paralysis

he has to do something and he wants to do the thing which is for the best interest of the patient. When the doctors call me I tell them it is well to use the serum if they want to but not to let the family think they now have a specific cure for infantile paralysis.

While serum may do some good, there are no statistics which show that it will prevent the paralytic stage from developing. In the Massachusetts series, it did appear that there were fewer paralysis cases which had the serum than in those which did not have the serum.

I hope that Dr. Wadsworth's report is printed and that every doctor will read it.

PRESIDENT MARSHALL Dr. Wadsworth will you close the discussion?

DR. WADSWORTH There are some very interesting points in this discussion which I could not bring out in detail in my paper. As Doctor Dalton has mentioned the streptococci in poliomyelitis I might add that I have talked with Doctor Rosenow of the Mayo Clinic who has a broad point of view in regard to the biological adaptability of the streptococci which we appreciate but which as applied to particular infectious processes lacks definite proofs. For example he has been unable to bring forward any convincing evidence that poliomyelitis is a form of streptococcus infection or that vaccination with the streptococcus is an effective preventive measure. On the contrary his work in this field was not confirmed by Doctor Bull then at the Rockefeller Institute. Doctor Gilbert in our laboratories immunized a monkey with the streptococcus which I received from Doctor Rosenow but subsequently induced characteristic poliomyelitis in this animal following inoculation with the filtrable virus of the disease. We have been working intensively for ten years with the streptococci and it is extremely difficult to determine the biologic variation in the different strains. They vary in their toxigenic and antigenic action comparatively few are of practical value in the production of potent antisera. It is largely owing to this fact that the commercial manufacturers of serum were handicapped by attempting to prepare sera with cultures lacking in the requisite properties. It has been only since they have adopted new methods and special strains such as the Dochez N Y 5 which is now almost universally used, that the available sera have improved in quality. In the immunization of horses a year or two are required to obtain sera of high titer.

In regard to the serum from recovered cases of poliomyelitis our experience has brought us to the conclusion that it is not of practical value. In 1931 we spent \$100,000 to provide treatment for cases of poliomyelitis throughout the state. It is extremely difficult to diagnose the cases and treat them with the serum in time to have any recognizable effect on the course of the disease. Thus it comes down to the original feeling that I had during the height of the epidemic and you as practicing physicians may agree with me namely that the important thing in the treatment of poliomyelitis is absolute quiet. Certainly I know of no preventive or other treatment that is effective.

For the past six years we have been studying the preparation of pertussis vaccine. In 1930 I discussed the problem with Doctor Gardner of Oxford who work stressed the selection of certain fresh strains. We have found quite marked differences in the strains but the selection and maintenance of those that are satisfactory antigens for the preparation of a vaccine have not yet been solved satisfactorily. It is important however to secure a strain that will retain its antigenic potency and maintain it under conditions that will preserve these properties.



PRESIDENT MARSHALL We surely appreciate your coming here and giving us this excellent address  
We will now adjourn this session until two o'clock this afternoon, and the House of Delegates will meet at one o'clock in this hall

Adjournment to 2 P M

MISCELLANY

VERMONT DEPARTMENT OF PUBLIC HEALTH

NOVEMBER, 1935

The following communicable diseases were reported to the office of the Department of Public Health during the month of November chicken pox 336, diphtheria 4, measles 203, mumps 43, German measles 23, poliomyelitis 3, undulant fever 5, scarlet fever 39, typhoid fever 4, whooping cough 130 and tuberculosis 4

The Laboratory of Hygiene made 1,706 examinations, the details of which are

Examinations for	diphtheria bacilli	133
"	Widal reaction of typhoid fever	36
"	undulant fever	63
"	gonococci in pus	141
"	tubercle bacilli	216
"	syphilis	531
of	water, chemical and bacteriological	109
"	water, bacteriological	248
"	milk, market	146

Examinations of milk, submitted for chemical only	6
" " milk, submitted for microscopical	1
" " foods	2
" " drugs	0
" for courts, autopsies	3
" " courts, miscellaneous	17
" " miscellaneous	53
Autopsies to complete death returns	1

The Director of the Division of Venereal Diseases reports twenty six cases of gonorrhea and thirty seven cases of syphilis made to this Division in November Six hundred and fifty eight Wassermann outfits and 312 slides for gonorrhea were distributed from this Division

The After Care Nurses of the Infantile Paralysis After Care Division made 184 home visits, calling on 179 patients One patient was admitted to the Audubon Hospital and one patient discharged from this hospital Twenty one pieces of apparatus were fitted, ten pieces of apparatus were repaired and forty-three orthopedic corrections made to shoes The Vocational Worker of this Division reports sales made, amounting to \$156 14

Seven towns of the state were visited by the State Advisory Nurse of the Public Health Nursing Division, in the interest of the work of this Division Part of the nurse's time this month was devoted to starting a project under WPA One thousand and ninety seven Notifications of Birth Registration and 700 pamphlets were mailed out in November

THE BIRTH RATE THROUGHOUT THE WORLD

The gratifying rise in the birth rate which was recorded for the United States in 1934 was by no means world wide The long time declining tendency in fact was still in evidence in 20 of the 34 countries whose 1934 birth rates have become available thus far It is true that the drop in 1934 was less than 1 per cent in four countries, namely, The Netherlands, New Zealand, Italy, and Venezuela, and that in five instances—the Irish Free State, Norway, Sweden, Poland and the Union of South Africa—the 1934 birth rate was identical with that for 1933 This may mark the end of the prolonged downward trend in natality in these countries

Clearly, however, the declining birth rate still remains a problem in the social economy of 15 nations, where the decreases in 1934, as compared with 1933, ranged from 12 per cent in France and Switzerland, to 54 per cent in Spain, 56 per cent in Austria and 63 per cent in Palestine

Eight countries, in addition to the United States however, recorded rises in their birth rates in 1934, with the increases in most instances ranging between 2 and 3 per cent By far the most noteworthy

instance of an abrupt reversal of the long-time downward trend is Germany, where the astounding rise of 224 per cent was registered in a single year Germany, in fact, is the only one of these 33 nations whose 1934 birth rate was actually higher than for any year of the 5 year period 1930 to 1934

The birth rate for the United States for 1934 was 171 as compared with 166 in 1933, but these figures are below the rate of 189 for 1930 —*Statistical Bulletin*, Metropolitan Life Insurance Co., November, 1935

MALARIA DEATHS

Officers of the Metropolitan Life Insurance Company are reported to have estimated that there are ninety thousand persons suffering with malaria in the United States

Dr L L Williams of the United States Public Health Service, is quoted in *Science* as believing that this estimate is too low Malaria accounted for 4520 deaths in the United States in 1934, which is regarded as indicative of the figures cited

## MEDICAL PROGRESS

PROGRESS IN THE STUDY OF CARDIOVASCULAR  
DISEASE IN 1934

BY SYLVESTER MCGINN, M.D.\*

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## I INTRODUCTION

OUR knowledge of the cardiovascular system has been increased during the year 1934 by the contributions of a great many investigators. Their observations have done much to solve various problems associated with the circulation, have supplied valuable information to others engaged in research, and have afforded a better understanding to those confronted with complex cardiac situations in clinical practice. There have not been any observations of such great importance or sufficiently substantiated, however, to alter drastically our previous concepts or treatment of diseases of the heart.

Of outstanding importance in 1934 was the work initiated and carried on by a group of Boston physicians, which may ultimately provide the medical profession with a new method of treatment for patients with congestive heart failure and angina pectoris. Great and widespread interest is manifest in the progress being made on this problem of total ablation of the thyroid gland in heart disease.

The value of electrocardiography in the study of heart disease is well recognized. Several groups of investigators have been studying electrocardiograms more closely in the hope that they may give even more accurate information than has generally been expected of them.

There has been an increase in the mortality rate due to heart disease. *Cohn and Langg* have reviewed the mortality statistics of the

registration area of the United States to determine whether the death rate due to diseases of the heart was actually increasing. In the later decades a distinct, although not a great, rise has gradually become more evident in recent years. The apparent rise in the mortality rate of heart disease has largely depended upon the fall of the death rate of infectious diseases, not only of children but of all ages. At the Cook County Hospital at Chicago *Flaxman* has estimated that 17 per cent of the patients admitted had organic heart disease. Because of the great frequency with which heart disease is encountered in the general practice of medicine physicians everywhere have been attracted to and have developed a keen interest in the subject. To facilitate the study of the cardiovascular system it is the purpose of this review to give a summary of the work concerning it done in 1934 by providing a bibliography and abstracts of contributions thought to be representative and of interest.

Two monographs of considerable value for special study have been published in 1934. *Cordry* has edited a book of six hundred and seventeen pages on arteriosclerosis comprising twenty-one chapters written by twenty-three contributors. It is a useful reference book on this disease of the circulatory system. *Pal* has presented a monograph on the subject of vascular tension written with the viewpoint of correlating the physiologic mechanisms with the clinical picture. It is essentially a good review of the author's work and of the German and Austrian literature.

## II ANATOMY

*Robb, Easby* and *Hiss* have performed further experiments showing that the heart consists of several muscle bundles arranged spirally each with a specific blood supply and from which they strengthened the impression that impulse conduction of the heart beats is in and runs parallel to the fibers of the ventricular muscle bands. Injury to a muscle band by compression, by ligation of its blood supply or by transverse section, produces a result typical for that muscle bundle, namely various electrocardiographic changes of the coronary type.

*Gross* has prepared specimens with anatomically open but functionally closed foramina ovale in such a manner that he can regulate the pressures in the right and left auricles. He has observed that an increase of pressure in the right auricle greater than that existing in the

McGinn, Sylvester — A Resident in Medicine, Massachusetts General Hospital. For record and address of author see "This Week's Issue" page 1219.

left auricle results in the passage of fluid from the right to the left auricle, however, a reversal of this shunt is not possible. It is believed that this probably explains the occurrence of paradoxical embolism in cases having functionally closed foramina ovale although patent to the passage of a probe.

### III PHYSIOLOGY

*Henderson* and his associates believe that a third factor, in addition to the vasomotor nervous control of blood vessels and the pumping action of the heart, is necessary to the circulation. This is the force that sends the blood back to the heart through the venous system. They have found that a muscle in a state of tonus has an internal pressure of 50 to 70 mm of water. If a muscle is in a state of tonus, it takes up through its elasticity some of the force of the incoming arterial blood. The pressure increases the venous outflow from the muscle and facilitates its return to the right heart. In flaccid muscles the force of the arterial pressure is lost and the venous return is impeded.

*Robb* and *Weiss* have found that the injection of sodium cyanide intravenously gives a reliable index of the velocity of blood flow in the pulmonary and peripheral venous circulations. No strict correlation was found between the clinical manifestations and the aspects of the circulation studied. As a rule, the slowing of the circulation time was proportionate to the severity of the congestive failure.

Determinations of the heart volume and stroke volume during rest in normal and decompensated individuals have been made by *Lyscholtz*, *Nylin*, and *Quarna*. The heart volume was calculated from x-ray measurements. In healthy individuals of different sizes under standard conditions the index of heart to stroke volume is nearly constant, and appears to be a measure of the functional condition of the heart during rest. In cardiac insufficiency the stroke volume falls below normal, whereas the heart volume increases.

*Schneider* and *Crampton* determined the output of the heart of several subjects in both the reclining and standing positions. There was an increase in the cardiac output after fifteen minutes when the subject changed from the standing to the reclining position. *Starr* et al have made estimations of cardiac output and determinations of metabolism, blood pressures and pulse rates on healthy individuals and on hospital patients for the purpose of seeking relationships by which the condition of the heart muscle might be ascertained. The relationship between heart work per beat and heart size holds more closely than any other studied. It was found to be abnormal almost without exception in cases that had once been decompensated. In patients with neurocirculatory

asthenia the average cardiac output, stroke volume, and heart work per minute and per beat were far below normal.

*Harrison* and his associates have studied a group of patients with "evening dyspnea," which is described as the increased difficulty in breathing experienced by cardiac patients in the late afternoon and evening and is not to be confused with the paroxysmal type. It was found that the vital capacity was slightly lower and the oxygen consumption was ten per cent higher in the evening than it was in the morning. The respiratory rate was about fifteen per cent greater in the evening. As a result of animal experiments it was shown that the pulmonary afferent fibers of the vagus were very sensitive to pulmonary congestion and by reflex action stimulated the respiratory center. Because of increased bodily activity during the day it is thought that there is greater pulmonary congestion present at evening than in the morning and that this increase more readily irritates the nerve endings.

*Gilligan* and her associates found that the serum cholesterol value increased after total thyroidectomy and that the basal metabolic rate decreased. The most striking changes occurred by the end of the first postoperative month, although the serum cholesterol continued to rise gradually as hypothyroidism developed. The administration of thyroid resulted in an elevation of the metabolic rate and decrease of the serum cholesterol concentration.

*Harrison* has found a direct relationship between an increased venous pressure and the cerebrospinal fluid pressure in patients with congestive heart failure. As the patient improves and the venous pressure drops, the spinal fluid pressure also goes down. Removal of cerebrospinal fluid resulted in reducing the venous pressure in many of the cases, and in a majority of the patients there was a temporary decrease in dyspnea.

Interesting observations have been made by *Pickering* on the relationship between cerebrospinal fluid pressures and arterial hypertension. When the spinal fluid pressure was over 250 mm water in hypertensive individuals, the patients were noted to be younger, the kidneys badly damaged, and the prognosis was very poor. Older hypertensive patients had lower spinal fluid pressures, the kidneys were less severely damaged, and the downhill course was less rapid. Albuminuric retinitis was thought due to neuroretinal edema, inasmuch as only the patients with a cerebrospinal pressure of over 250 mm had these eyeground changes. There was no alteration in the pressure of the spinal fluid during headaches or acute attacks of coma. Some relationship is suggested between high diastolic pressures and high cerebrospinal pressures, although the latter seem unaffected by elevated systolic pressures.

## IV PATHOLOGY

Before making a comparative study of the diameters of arterioles of patients with and without hypertension, *Moritz* determined that there was no artefact due to the fixing process and none due to the physiological state of the vessel after death. The walls of the arterioles appeared to be definitely thicker in persons having persistent hypertension than in a control group without hypertension. However some individuals in the hypertensive group did not have thickened arterioles. This is believed to be evidence supporting the contention that arterioles become thickened after long periods of high blood pressure and that this thickening does not by itself produce hypertension.

By feeding cholesterol to rabbits *Leary* has been able to reproduce lesions very similar to those of human atherosclerosis. Evolution of the lesions through lipoidosis, lipid cell formation and fibrosis is much more rapid in animals than it is in man and consequently is more amenable to study. It is suggested that diets containing a high percentage of cholesterol may favor the atherosclerotic changes in the blood vessels. The paper contains excellent microphotographs illustrating the changes that have taken place in the vessels.

*Schur* has made an extensive review of the subject of adhesive pericarditis which has included a summary of the literature, the pathology and the pathologic physiology. From seventeen personal cases proved at autopsy he has noted the clinical signs which form a rather complete symptomatology for this condition.

*Levine* reports finding at the autopsy of a ten months old infant a heart weighing 150 grams associated with diffuse thickening of the endocardium of the left ventricle, coarctation of the aorta, and stenosis of a portion of the left descending coronary artery.

An interesting case has been recorded by *Fischer* of a twelve and a half months old child whose heart showed rheumatic valvulitis at postmortem examination. The mother of the child suffered from polyarticular rheumatism at the third month of pregnancy and again at the fifth month postpartum. The case of a seven weeks old infant who died of bacterial endocarditis, the infectious process being superimposed on the mitral valve and in the absence of congenital lesions has been reported by *Tausig*.

*Calvin* and *Nichamun* have reported two cases of spontaneous rupture of the thoracic aorta in children. Emphasis has been placed on the importance of rheumatic fever in such cases inasmuch as this was the factor responsible in nearly one half of the forty four reported cases of aneurysm of the thoracic aorta in persons under eighteen years of age.

## V ETIOLOGY

## A Congenital

*Muir* and *Brown* have studied forty cases having the physical signs of a patent inter-ventricular septum. They encountered neither cases of heart block nor of permanent cyanosis, and believe that if either of these conditions is present, there must be an associated anomaly. The "maladie de Roger" has no characteristic x ray picture.

## B Rheumatic Heart Disease

*Rothschild* and his associates feel that the majority of cases dying with heart failure in the first five decades and having a valvular defect are due to an active rheumatic infection rather than to the mechanical defect of the valve. Their conclusions follow the pathological study of one hundred and sixty-one cases dying with evidence of rheumatic heart disease. In the first decade active infection was present in 100 per cent of the cases, the percentage decreasing gradually to thirty-eight per cent in the fifth decade. Of the total number of cases fifty-five were quiescent, the youngest being found in the second decade.

*Stoff* has directed attention to the varied symptoms indicating the chronic nature of rheumatic fever such as prolonged low grade fever, increased sedimentation rate and white count, and recurring arthritis. The greater susceptibility of individuals having had rheumatic fever to upper respiratory infections with consequent development of joint symptoms when ordinarily normal individuals overcome the infection without sequelae is further evidence of the chronicity of the rheumatic infection.

*Perry* believes from his study of the sedimentation rates of children with rheumatic heart disease that the condition must be considered active if the sedimentation rate remains elevated and no other cause likely to maintain such an elevated rate is found.

*Fraser* has presented four cases of acute rheumatism in which endarteritis of the coronary vessels was present, apparently due to the rheumatic infection.

## C Subacute Bacterial Endocarditis

Although the protracted course of subacute bacterial endocarditis due to the streptococcus viridans is a common condition, an acute process with fatal termination due to the same organism is infrequent. *Held* and *Goldbloom* have reported four cases of acute and rapidly fatal streptococcus viridans endocarditis.

A review of three hundred and sixty-four cases of subacute bacterial endocarditis by *Weiss*, further confirms the general opinion that this disease most frequently follows infection of the upper respiratory tract.

## D Angina Pectoris

To produce attacks of angina pectoris and to evaluate the severity of the attacks, a tol-

erance test has been devised, which consists of determining the number of trips a patient can make over measured steps located in a chamber with controlled temperature. *Riseman* and *Stern* have reported their results in using this exercise test which they found very helpful in judging the status of angina pectoris patients.

*Wayne* and *Graybiel* found that there was an average reduction of twenty-five per cent in exercise tolerance in six patients with angina pectoris following a heavy meal. Distention of the stomach, however, by the introduction of air had no effect on the exercise tolerance. It was concluded that in angina of effort the exercise tolerance was diminished after food, because of the increased energy expenditure of the heart rather than because of gastric distention. External temperature changes had no effect on exercise tolerance of the six patients. A case is described of angina sine dolore where the symptoms were of substernal pressure rather than pain. Electrocardiographic studies showed that during these periods there was present a rapid ventricular action very closely resembling fibrillation.

*White* and *Sharber* have compared the frequency with which alcohol and tobacco were used by seven hundred and fifty patients with angina pectoris and by a control group of seven hundred and fifty individuals of the same sex and age incidence but without angina pectoris. An analysis of their observations shows that neither the use of nor the abstinence from alcohol or tobacco has any definite significance in the etiology of angina pectoris.

The occurrence of angina pectoris and intermittent claudication in patients with pernicious anemia has been described by *Pickering* and *Wayne*. Among twenty-five consecutive patients with anemia, the hemoglobin being twenty-five per cent or less, eight had precordial pain brought on by exercise and relieved by rest. Seven of the twenty-five anemic patients had pain in the legs brought on by walking and relieved by rest. After the anemia was cured, only one patient had pain in the legs and two complained of chest pain. It is believed that the leg pain is the result of the accumulation of metabolites in the tissues due to incomplete oxidation and the anginal pain results from an insufficient oxygen supply to the cardiac muscle. The electrocardiograms of ten anemic patients showed only lengthening of the P-R interval in two cases which subsequently became normal when the anemia was corrected.

#### E Coronary Disease and Coronary Thrombosis

Because of the frequency with which the diagnosis of coronary occlusion is made, *Barkei*, *Wilson* and *Coller* cite four cases of upper

abdominal disease closely simulating coronary thrombosis. Two cases of gallbladder disease were erroneously diagnosed coronary occlusion, a third case of perforated gastric ulcer required intensive study to establish the correct diagnosis, and in the fourth case both cholelithiasis and coronary disease were present.

In a statistical survey *Enklewitz* has found that coronary thrombosis occurred twice as frequently in diabetic as in nondiabetic patients. Of one hundred diabetic patients beyond forty years of age, thirty-four showed coronary thrombosis and forty-five coronary sclerosis. An opinion is expressed that both coronary thrombosis and diabetes in individuals over the age of forty years are manifestations of degenerative vascular disease. In a series of one hundred and fifty cases of coronary occlusion, *Blumer* found the incidence of the use of alcohol and tobacco almost exactly the same as in a control group of one hundred and fifty patients without coronary thrombosis.

#### F Blood Pressure

*Cushing* has presented evidence suggesting that the source of eclampsia and essential hypertension may lie in the posterior lobe of the pituitary body. The activity of the posterior pituitary lobe is judged by the extent of basophilic cell invasion from the pars intermedia and an excessive infiltration of these elements represents the histopathological basis of eclampsia and essential hypertension. Further study along these lines may provide valuable information regarding hypertensive states.

*Ayman* failed to find hypertension associated with any of two hundred and forty cases of active tuberculosis. Investigation of the past and family histories and the postmortem examinations of hypertensive patients showed that the tuberculous infection had been present at some time in life. Tuberculin studies with various dilutions showed reactions in ninety per cent of a group of patients with elevated blood pressures and in ninety-one per cent of a control group with normal blood pressures.

*Levine* made a gross and microscopical examination of twenty-seven hypertensive hearts. All of the hearts had minute myocardial scars many of which contained varying amounts of elastic tissue. No correlation was found among age, sex, race, heart, weight, degree of blood pressure or the cause of death.

*Adson* and *Brown* sectioned the anterior spinal nerve roots on both sides from the sixth thoracic to the second lumbar in a twenty-nine year old woman with a blood pressure of 228 mm systolic and 156 mm diastolic. A report was made one month after operation, at which time the pressure was observed to be 168 mm systolic and 128 mm diastolic, when in the upright position. The effect of position was striking, the pressure always being lower in the upright

position than when recumbent. It is suggested that by lowering the blood pressure when the person is walking around, a certain strain is removed from the heart. The renal function apparently was unimpaired by the change in blood pressure.

### G Cardiovascular Syphilis

Burnett and Rymer found associated cardiovascular disease to be present clinically in 319 per cent of two hundred and fifteen patients with neurosyphilis. Electrocardiograms were abnormal or questionable in forty-seven per cent of one hundred and sixty-four patients so studied. The authors were impressed by the incidence of coronary changes found in their series.

Four cases of angina pectoris have been reported by Van Muzden and Schoof, the cause of which seemed to be a syphilitic mesoarteritis in which the inflammation of the coronary ostia had produced a stricture. The prognosis of angina pectoris due to this cause is unfavorable.

Keefer and Mallory have reported twenty-two cases of aneurysms of the aorta complicated by pleural or pulmonary changes. These included atelectasis, bronchopneumonia, abscess, and bronchiectasis as the result of tracheal or bronchial compression of the lungs. Pulmonary tuberculosis occasionally accompanies aneurysm of the aorta.

### H Thyroid Heart Disease

Lahey and Hurxthal have reported an operative series of three hundred thyrocardiac patients defined as patients with toxic goiter in which the outstanding feature has been cardiac disability. The mortality after operation was 4.25 per cent. Seventy-one per cent of the patients with auricular fibrillation were restored to and maintained in normal rhythm and compensation was restored in ninety-five per cent of the patients after hyperthyroidism was alleviated by a subtotal thyroidectomy. Preoperative therapy consisted in the administration of digitalis, Lugol's solution, and diuretics as necessary. Quinidine is used to restore normal rhythm but not until the fifth postoperative day.

Ernstene and Mulvey found that seven per cent of patients with hyperthyroidism had auricular fibrillation before operation and that sixteen per cent developed it after operation. Postoperative auricular fibrillation usually appeared within the first sixty hours after operation without the occurrence of congestive heart failure and normal rhythm was usually re-established in forty-eight hours. The arrhythmia was more common in thyrotoxic patients having an adenomatous goiter than in those with hyperplastic goiter.

Lerman, Clark, and Means have added eighteen new patients to their original series of thirty myxedema patients in whom it was noted

that the size of the heart diminished after starting thyroid medication. Of the eighteen new cases fifteen had enlarged hearts, all of which, with the exception of one decreased in the transverse diameter 1.3 to 4.6 cm. after treatment of the myxedema was instituted.

### I Pulmonary Heart Disease

Among anthracite coal miners Dyson found two hundred and thirteen cases of pneumoconiosis of which number eighteen had complicating pulmonary heart disease or chronic cor pulmonale. The condition he points out is not uncommon and can be diagnosed in patients with pneumoconiosis by the presence of a large right ventricle and pulmonary conus, and right axis deviation by electrocardiogram.

Churchill has offered three explanations for the cause of death after pulmonary embolism. First, immediate death may follow complete obstruction of the pulmonary artery due to cerebral anemia and failure of the respiratory center; secondly, delayed death may be due to a condition resembling shock after partial obstruction of the pulmonary artery; and thirdly, delayed death may be due to right heart failure as the result of partial obstruction of the pulmonary artery. Comments were made on the Trendelenburg operation or the surgical procedure for the removal of clots from the pulmonary artery on the basis of ten cases, none of which were successful.

Belt has observed that a high percentage of postoperative fatalities from pulmonary embolism shows evidence of minor degrees of cardiac incompetence.

### J Miscellaneous

A review of four hundred and ninety-six cases of myocarditis which developed in four thousand six hundred and seventy-one diphtheria patients has been made by Hoyle and Welford. The death rate of diphtheria myocarditis they found to be sixty-two per cent, death occurring usually in the first fourteen days of the disease. The mortality was highest in cases of nasal diphtheria and of poor prognostic evidence were vomiting, abdominal pain and a falling pulse rate and blood pressure. It was thought that dextrose solution given parenterally definitely helped some of the cases.

An etiological classification of neurocirculatory asthenia has been made by Craig and White and an analysis has been made of one hundred cases of this disorder, fifty with organic heart disease and fifty without evidence of organic heart disease. Palpitation, respiratory discomfort, precordial aches and exhaustion are considered to be the four cardinal symptoms of neurocirculatory asthenia, and when associated with sighing respiration and precordial tenderness the diagnosis is almost

certain Radiation of the precordial discomfort into the left shoulder or arm is possible The diagnosis of neurocirculatory asthenia must frequently be added to that of an organic cardiac condition where symptoms of the former are present

In the opinion of *Warfield* no form of athletics other than college rowing injures a normal heart He cites the studies of *Deutsch* and *Kauf* who found that occasionally a heart would become dilated after some form of sport After rest the heart resumed normal size It was believed that these hearts had previously suffered some muscle damage, probably from childhood infection For this reason, it seems wise to be conservative in deciding when a child may resume activity after an infection Slight systolic murmurs at the apex without cardiac enlargement he considers to be functional Patients with valvular trouble are allowed freedom in activity within the limits of producing symptoms, providing there is no active infection present

*Purks* has compared the causes of death after operation of sixty cases having organic heart disease with sixty postoperative fatalities having no heart disease The first group of sixty deaths occurred in a series of four hundred and ninety-four operations on four hundred and fourteen cardiac patients and represents a mortality of 12.1 per cent and the second group occurred in sixteen hundred operations or 3.7 per cent Congestive failure was found not to be an important cause of death, but the cardiac group was more susceptible to pulmonary infections and to fatal coronary occlusion

#### VI SYMPTOMS AND SIGNS

*Friedlander* and *Levine* have studied thirty-five patients, thirteen of which had paroxysmal or transient, and twenty-two, permanent, auricular fibrillation Four cases of auricular flutter were also reviewed In no case was there evidence of organic cardiac disease, and it was concluded that these arrhythmias were of functional origin They represented six per cent of all of their cases of auricular fibrillation and twenty per cent of all those with auricular flutter The majority of the patients were males, there being only three women in the series, and most of the patients were under fifty years of age Quinidine sulphate is most successful in restoring normal rhythm but daily doses of both digitals and quinidine are helpful in diminishing the frequency of the attacks

*McGinn* and *White* have reviewed one hundred and twenty-three cases of aortic stenosis proved at autopsy and one hundred and thirteen clinical cases, and have reported their observations This valvular lesion was found almost as commonly as mitral stenosis, and the diagnosis could be made more frequently if it

was considered The majority of the cases had calcareous deposits in the aortic valves, both superimposed on old rheumatic infections and occurring singly It appears justifiable to make the clinical diagnosis of aortic stenosis when a harsh systolic murmur is heard in the region of the second right interspace and in the absence of dilatation of the aorta An aortic systolic thrill, diminished aortic second sound, or a plateau pulse, are helpful confirmatory findings but need not be present to make the diagnosis of aortic stenosis

Following a clinical pathological study, *C E White* has concluded that arcus senilis does not occur in a sufficiently high percentage of older individuals to be considered a sign of senility, and because of the low percentage of occurrence in various forms of arteriosclerosis, it can hardly be indicative of that pathological condition

Further studies in optical recording of heart sounds or phonocardiography have been carried on in South America. *Menéndez* and *Orias* made such records on one hundred healthy medical students and observed third heart sounds in forty-two of the tracings and evidence of vestigial third heart sounds in eighteen others Auricular heart sounds were noted in fifteen cases, and in five, vestigial auricular heart sounds were found Invariably the third heart sound occurs during the last moments of the ventricular inflow phase, and it is thought that they are due to vibrations in the ventricular wall set up by the in-rush of blood from the auricles

*Battro*, *Menéndez*, and *Orias* studied twenty-two cases with definite audible gallop rhythms by recording the heart sounds simultaneously with the venous pulse The timing of the sounds in the heart cycle was not constant, and varied especially with the heart rate It was thought that gallop rhythm resulted from the pathological exaggeration of phenomena present but inaudible in normal individuals Phonocardiography is in the process of development and may provide us with helpful clinical information that cannot be detected with the most careful use of the stethoscope

Following an analysis of the physical signs present in twenty-three patients with bundle branch block, *Lewis* concluded that the nature of the signs did not permit their use in diagnosing the condition of bundle branch block Records of heart sounds were made in all of the cases Reduplications of the first sound, a presystolic gallop rhythm, and a palpable presystolic impulse were found frequently Inasmuch as some of their patients did not have such signs and since they may occur in people without bundle branch block, their diagnostic value is small

In these times of complicated laboratory procedures and specialized medical centers, *Har-*

ronson has made an opportune comment emphasizing the importance of obtaining the patient's history in discussing functional tests of the heart. The best index of the capacity of the heart to do work is the patient's story as to the amount of activity required to bring on dyspnea. The most reliable index as to the condition of the coronary circulation is the amount of work that can be performed without producing angina pectoris. Other signs are helpful in judging whether the capacity of the heart for work is impaired, but of less importance than the subjective symptoms of the patient are the presence of gallop rhythm, an enlarged heart, electrocardiographic changes, and a diminishing vital capacity.

King, Hitzig, and Fishberg observed three cases of left recurrent laryngeal paralysis following failure of the left ventricle. Postmortem examination with careful dissection of the recurrent nerve was made in two cases. They concluded that the left recurrent laryngeal nerve runs through a triangle bounded by the arch of the aorta, the left pulmonary artery, and the ductus arteriosus, and that the nerve can be compressed by a dilated and distended pulmonary artery resulting from failure of the left ventricle.

#### VII X RAY

Ihro has reported the results obtained in using the Stumpf kymograph in examination of the heart. He found the method useful in that it gave a more detailed study of the movements of different parts of the organ. Baird, Ling, Loy, and Palmer have reported the failure to obtain striking benefits in eight cases of severe essential hypertension treated by x-ray radiation of the pituitary and adrenal glands.

#### VIII ELECTROCARDIOGRAPHY

Acute distention of the right heart chambers of dogs was produced by Buchbinder and Katz by means of clamping the pulmonary artery and injecting metallic mercury intravenously. Electrocardiograms taken failed to show right axis deviation. When mercury was employed, aberrations in the ventricular complexes were due to short circuits between the intracardiac metal and extracardiac electrodes. Krimmhaer reported electrocardiographic changes found after clamping the pulmonary artery of cats. Auricular-ventricular block, ventricular fibrillation, and changes in the P and T waves were observed. It was thought that the changes were due to increased intraventricular pressure.

Katz, Hamburger, and Schutz induced a general anoxemia by rebreathing in seventeen normal subjects and in six patients with angina pectoris. Although electrocardiographic changes took place, only two subjects with angina pectoris complained of pain. The elec-

trocardiographic changes consisted in diminution of the amplitude sometimes with inversion of the T waves and depression of the S-T segment. Because of the electrocardiographic changes in normal individuals as well as in patients with angina pectoris and the variability of the production of pain, induced anoxemia as a test for coronary disease is of questionable value.

McGinn and White have used the Lucas comparator to measure the durations of the QRS complexes of the electrocardiograms of one hundred and fifty normal and three hundred and fifty abnormal subjects. The average duration of the QRS complex in normal adults was 0.0777 seconds. Females and children under twelve years of age had average measurements slightly below 0.0777 seconds. In normal cases with duration times longer than 0.0900 seconds particular variations in the QRS deflections, such as upright Q or S waves accounted for the prolongation. A note was made concerning inconsistencies in naming the QRS deflections with suggestions as to changes in nomenclature.

Edeiken and Wolferth call attention to the poor prognosis of M or W shaped complexes of an amplitude less than 5 mm found in lead two. Their cases have been divided into two groups, the first of which contained twenty-one cases, and of this number fourteen are dead, six are incapacitated by severe myocardial disease and one is untraced. Only two have lived more than three years after the M or W complex was observed. One tracing showed no other abnormal electrocardiographic finding. The second group contains twenty-five cases, of which number twenty had coronary occlusion, nine having died within two years. None of these electrocardiograms were normal in all other respects, although in eleven the changes were slight or inconclusive.

Koroy and Katz injected ninety-five per cent alcohol into various areas of the ventricular myocardium of dogs. They concluded that the standard three leads cannot be used to differentiate injuries to the anterior and posterior walls of the ventricles, the right and left ventricles, and injuries to the basal and apical portion of the ventricles. No constant correlation could be made between the size of the injured area and the magnitude of the electrocardiographic changes.

Results of work done in further localizing areas of myocardial infarction in dogs' hearts by means of the electrocardiogram have been reported by Wilson and his associates. Ligation of the septal branch of the left coronary artery resulted in infarction of a large area of the septum. Electrocardiograms showed at first changes in the RS-T segment, later intraventricular or atrioventricular conduction disturbances, and all showed right bundle branch



block. They believe that the R deflection of the levocardiogram is not of septal origin and that most of the endocardial surface is active before the first deflection is written.

Additional electrocardiographic evidence of coronary infarction that may occur without changes in the T waves and that remains either definite or regressed has been offered by *Wintermüt*. Necrosis of the anterior heart wall may be present when the R wave in lead one is small with deep S waves in leads two and three, or when the principal deflection of any lead is in the negative direction. Necrosis of both the anterior and posterior walls by two thromboses is suggested by the diminished amplitude of the main waves, although the smaller waves persist unchanged.

*Barnes* has reviewed eighty-four electrocardiograms of patients who had suffered acute myocardial infarction to determine the frequency of occurrence of the  $T_1$  and  $T_3$  changes described by *Parkinson* and *Bedford*, and the  $Q_1$  and  $Q_3$  changes described by *Wilson* and his associates. The former refers to the high or low origin of the RS-T segment in lead one, depending on whether there is anterior or posterior infarction. The opposite deviation of the RS-T segment is present in lead three. *Wilson's* classification is in reference to the presence or absence of Q waves in leads one and three, depending upon the position of the infarcted cardiac area. Although *Barnes* found the RS-T changes to be more typically developed, he feels most information can be obtained by considering both kinds of changes.

*Durant* has given the criteria to determine whether Q waves are abnormal. Excepting cases of right axis deviation, the Q wave in lead one is abnormal if it measures at least 1 mm and is at least one-fifth as large as the largest R deflection of any lead. Curves of the  $Q_3$  type are defined as those in which the Q wave in lead three is at least half as large as the largest QRS deflection. Because of the permanent character of these changes, they are thought to be valuable aids in recognizing coronary disease.

*Shookhoff* and *Douglas* have questioned the significance and evaluation of the so-called  $Q_3$  wave of the electrocardiogram as commonly interpreted. They found that in normal ventriculograms the Q waves of all leads corresponded in time, but that in the tracings with large  $Q_3$  waves they did not correspond in the timing of the ventricular deflections. In fifty cases of this latter type the  $Q_3$  wave was found in most instances to correspond either entirely or in part with the R waves of leads one and two. For this reason it is believed that the presence of a deep Q wave in lead three does not justify the assumption that a particular myocardial area is the site of disease and that it necessarily indicates coronary disease. They consider factors that change the relative posi-

tion of the ventricular musculature, as by rotation of the heart by a high diaphragm, the most important cause of the " $Q_3$ " wave.

In twenty cases that had come to necropsy after an acute myocardial infarction, *Barnes* found that fairly typical  $Q_1$  and  $Q_3$  changes corresponded respectively with anterior and posterior infarcted portions of the left ventricle and associated interventricular septum. However, not all acute infarctions of the left ventricle were followed by characteristic Q patterns.

Alterations in the T waves and in the S-T segments of the electrocardiograms of three patients with acute rheumatic fever have been observed by *Easby* and *Roesler*. Inversion of the T waves as seen in coronary disease and high or low origins of the S-T segment, both of which findings varied with the course of the disease, were noted. The literature has been extensively reviewed and they have found anatomical studies supporting the suggestion that such electrocardiographic changes are due to myocardial variations consequent to acute infection of the coronary circulation.

*Bayley* found that seventy of one hundred and seventy three cases of bundle branch block had the less common type or right bundle branch block. He believes that right bundle branch block is more common than is usually thought and that bundle branch block is more frequently associated with arteriosclerotic heart disease than any other disease.

*White* has presented electrocardiograms of a patient having a recent coronary thrombosis superimposed on previous coronary disease, as indicated by left bundle branch block. After the more recent coronary occlusion, the T wave in lead three became inverted. Postmortem examination confirmed the suspected changes in the coronary vessels.

*Barnes* has found in a case of acute coronary occlusion with pericarditis that the RS-T segment is upright in all leads and so varies from uncomplicated cases. This difference should suggest pericardial involvement.

Lead four is thought by *Battio* and *Del Rio* to be helpful in establishing the diagnosis of angina pectoris. In four out of twenty cases of angina pectoris, lead four showed evidence of myocardial infarction, while the three conventional leads were practically normal. *Wood* and *Wolferth* have directed attention to the presence of large T waves in the precordial leads, as the result of observations on seven cases having the symptoms of coronary occlusion. These large T waves are obtained from only a small area of the precordium and disappear at a later date. They suggest that very large upright T waves indicate a lesion in the anterior portion of the left ventricle and very deeply inverted T waves in the precordial leads signify a lesion in the posterior surface of the left ventricle.

## IX. PHARMACOLOGY

*Scupham* has found theobromine sodium acetate useful in the treatment of some early cases of thrombo angustis obliterans and intermittent claudication.

*Van Laere* and his associates produced cardiac dilatation in twenty three dogs by diminishing their oxygen supply. The dilatation decreased after digitalis was given and when the dogs were again subjected to atmosphere deficient in oxygen, the hearts failed to dilate as much as prior to the administration of digitalis. It was felt that the drug acted directly on the myocardium and increased the tone of the muscle.

*König* has attempted to prevent postoperative thrombosis and embolism by the administration of symphirin tartrate a compound similar to and one-fiftieth as strong as epinephrin. The dosage is twenty drops by mouth or 1 cc. hypodermically three times a day for seven days. The patient also is given short inhalations of carbon dioxide every hour for from four to six days. Comparative observations on four thousand five hundred cases showed satisfactory results. The incidence of postoperative thrombosis and embolism was reduced from 38 per cent to 104 per cent and the pulmonary complications were reduced from 94 per cent to 34 per cent.

## X. TREATMENT

## 1. Medical

*Barack and Levy* have again emphasized the beneficial effect of supplying oxygen to patients suffering from acute coronary occlusion. They used most frequently a concentration of fifty per cent oxygen. In the discussion of their paper, several points of interest were brought out, namely, that with a nasal catheter a concentration of forty two per cent oxygen can be maintained in the inspired air sometimes a concentration of oxygen as high as ninety five per cent is necessary to relieve symptoms and occasionally the administration of oxygen succeeds in relieving the pain of acute coronary thrombosis when morphine has failed.

Marked relief of symptoms has been observed by *Sutton* in eleven cases of rheumatic pericarditis with effusion in which a therapeutic pericardial paracentesis had been done. From two cases of pericardial effusion that came to necropsy, it was learned that the distended pericardium almost reaches the posterior chest wall. This would seem to justify a posterior approach which can be done without penetrating the lungs.

*Gilchrist* increased the ventricular rate by administering ephedrine in four of six cases with complete heart block. The normal dose was one-half grain every eight hours, and it has been given for as long as two and a half

years without harmful effect. He felt that barium chloride did not prevent Stokes-Adams seizures.

*Evans and Hoyle* have closely observed one hundred and twenty two patients with angina pectoris to discover which of the many drugs they used was most efficacious in relieving or preventing the pain. Tablets of glyceryl trinitrate dissolved on the tongue were the most successful. When used before expected attacks it was frequently found to prevent them.

## B. Surgical

The superior and inferior thyroid arteries have been divided and ligated by *Lyon and Horgan* with beneficial results. By this procedure they were able to lower the basal metabolic rate without producing myxedema, and so diminish the demands on the circulation.

*Blumgart and Davis* have described the procedure of completely removing the normal thyroid gland in the treatment of chronic heart disease. A hypothyroid state is induced which can be controlled by thyroid medication, so that the patients may be comfortable and still benefit by the reduction in cardiac work. Much relief has been given patients under the conditions of reduced metabolism, the symptoms of which are insignificant in comparison with the benefits derived.

*Weinstein* and his associates have concluded from their observations of nineteen patients whose chest pain had been relieved immediately after total thyroidectomy that this relief was due to interruption of afferent impulses from the heart. This relief was transient and not until the basal metabolic rate had been lowered was the chest pain permanently affected. The use of local anesthesia was thought unimportant, inasmuch as the immediate relief was also observed after the use of nitrous oxide anesthesia.

The group associated with *Blumgart* interested in totally removing the thyroid gland in cases of congestive heart failure and angina pectoris, has presented its criteria in selecting cases for the operation. Both the preoperative and postoperative treatment of the patients have been outlined. The results have been encouraging thus far, but the final appraisal of this therapeutic procedure awaits the observation of a larger group of patients over a longer period of time.

*DeCourcy, DeCourcy, and Thuss* believe that a relationship exists between hypertension and hypersuprarenalism. They liken overactivity of the suprarenal glands to overactivity of the thyroid gland in hyperthyroidism. In cases of hypertension they have been removing about two-thirds of each suprarenal gland in a two-stage operation. The beneficial effect on the hypertension is such that they advise this operation in selected cases.

*Blalock* has reported successfully suturing a wound produced by an icepick in the intrapericardial portion of the ascending aorta

## REFERENCES

- Adson, A. W. and Brown, G. E. Malignant hypertension report of case treated by bilateral section of anterior spinal nerve roots from sixth thoracic to second lumbar inclusive *J. A. M. A.* 102: 1115 (April 7) 1934
- Ayman, D. Arteriolateral essential hypertension and active tuberculosis their rare association. *Am. J. M. Sc.* 188: 712 (Nov.) 1934
- Baird, P. C., Linsley, J. R. and Palmer, R. S. Failure of roentgen-ray therapy of pituitary and adrenals in essential hypertension. *New Eng. J. Med.* 211: 952 (Nov. 22) 1934
- Barach, A. L. and Levy, R. L. Oxygen in treatment of acute coronary occlusion. *J. A. M. A.* 103: 1690 (Dec. 1) 1934
- Barker, P. S., Wilson, F. N. and Collier, F. A. Abdominal disease stimulating coronary occlusion. *Am. J. M. Sc.* 188: 219 (Aug.) 1934
- Barnes, A. R. Correlation of initial deflection of ventricular complex with situation of acute myocardial infarction. *Am. Heart J.* 9: 728 (Aug.) 1934
- Idem. Electrocardiographic pattern observed following acute coronary occlusion complicated by pericarditis report of cases. *Am. Heart J.* 9: 734 (Aug.) 1934
- Idem. Q and T types of electrocardiograms their comparative and complementary value in indicating occurrence of acute myocardial infarction. *Am. Heart J.* 9: 722 (Aug.) 1934
- Battro, A. and Del Rio, J. G. La Derivación IV en Electrocardiografía. Síndromes Anginosos Extrasístoles y Bloqueos de rama. Registro electrocardiográfico simultáneo. *Rev. Argent. de Cardiología* 1: 192 1934
- Battro, A., Menéndez, E. B. and Orlas, O. El ritmo de galope su análisis mediante fonocardiografía y fleografiografía simultáneas. *Rev. argent. de cardiología* 1: 117 (May-June) 1934
- Bayley, R. H. Frequency and significance of right bundle-branch block. *Am. J. M. Sc.* 188: 236 (Aug.) 1934
- Belt, T. H. Thrombosis and pulmonary embolism. *Am. J. Path.* 10: 129 (Jan.) 1934
- Blalock, A. Successful suture of wound of ascending aorta. *J. A. M. A.* 103: 1617 (Nov. 24) 1934
- Blumer, G. The relation of the use of alcohol and tobacco to coronary occlusion. *J. A. M. A.* 102: 1177 (April 7) 1934
- Blumgart, H. L. and Davis, D. Hypothyroidism induced by complete removal of normal thyroid gland in treatment of chronic heart disease. *Endocrinology* 18: 693 (Nov.-Dec.) 1934
- Blumgart, H. L., Berlin, D. D., Davis, D., Riseman, J. E. F. and Weinstein, A. A. Treatment of angina pectoris and congestive heart failure by total ablation of thyroid in patients without thyrotoxicosis with particular reference to pre and postoperative medical management. *Ann. Int. Med.* 7: 1469 (June) 1934
- Buchbinder, W. C. and Katz, L. N. Electrocardiogram in acute experimental distention of right heart. *Am. J. M. Sc.* 187: 785 (June) 1934
- Burnett, C. T. and Rymer, C. A. Cardiovascular observations in 215 neurosyphilitics. *Ann. Int. Med.* 8: 327 (Sept.) 1934
- Calvin, J. K. and Nichamin, S. J. Thoracic aortic aneurysms in children their relation to rheumatic fever. *Am. J. Dis. Child.* 48: 780 (Oct.) 1934
- Churchill, E. D. Mechanism of death in massive pulmonary embolism with comments on Trendelenburg operation. *Surg. Gynec. & Obst.* 59: 513 (Sept.) 1934
- Cohn, A. E. and Lingg, C. Heart disease from point of view of public health—1933. *Am. Heart J.* 9: 283 (Feb.) 1934
- Cowdry, E. V. Arteriosclerosis. A Survey of the Problems. New York: The Macmillan Company 1933
- Craig, H. R. and White, P. D. Etiology and symptoms of neurocirculatory asthenia. analysis of 100 cases with comments on prognosis and treatment. *Arch. Int. Med.* 53: 633 (May) 1934
- Cushing, H. Hyperactivation of neurohypophysis as pathological basis of eclampsia and other hypertensive states. *Am. J. Path.* 10: 145 (March) 1934
- DeCourcy, J. L., DeCourcy, C. and Thuss, O. Subtotal bilateral suprarenalectomy for hypersuprarenalism (essential hypertension). *J. A. M. A.* 102: 1118 (April 7) 1934
- Durant, T. M. Initial ventricular deflection of electrocardiogram in coronary disease. *Am. J. M. Sc.* 188: 225 (Aug.) 1934
- Dyson, J. M. Pulmonary heart disease in pneumoconiosis. *Am. Heart J.* 9: 764 (Aug.) 1934
- Easby, M. H. and Roessler, H. Changes in S-T Segment of electrocardiogram in acute rheumatic fever. *Ann. Int. Med.* 8: 46 (July) 1934
- Edelken, J. and Wolferth, C. C. Clinical significance of M or W shaped Q-R-S complex in lead II of electrocardiogram. *Am. J. M. Sc.* 188: 842 (Dec.) 1934
- Enklewitz, M. Diabetes and coronary thrombosis analysis of cases which came to necropsy. *Am. Heart J.* 9: 386 (Feb.) 1934
- Ernstene, A. C. and Mukey, B. E. Study of auricular fibrillation following operations for goiter. *Am. J. M. Sc.* 188: 382 (Sept.) 1934
- Evans, W. and Hoyle, C. Prevention and treatment of individual attacks of angina pectoris (angina of effort). *Quart. J. Med.* 3: 105 (Jan.) 1934
- Fischer, V. E. Rheumatic heart disease at one year. *Am. J. Dis. Child.* 48: 580 (Sept.) 1934
- Flaxman, Nathan. Heart disease in Middle West incidence and etiology of 1646 cases at Cook County Hospital. *Am. J. M. Sc.* 188: 639 (Nov.) 1934
- Fraser, A. D. Coronary endarteritis in acute rheumatism. *Arch. Dis. Childhood* 9: 267 (Oct.) 1934
- Friedlander, R. D. and Levine, S. A. Auricular fibrillation and flutter without evidence of organic heart disease. *New Eng. J. Med.* 211: 624 (Oct. 4) 1934
- Gilchrist, A. R. Ephedrine sulphate and barium chloride in prevention of Stokes-Adams seizures. *Brit. M. J.* 1: 610 (April 7) 1934
- Gilligan, D. R., Volk, M. C., Davis, D. and Blumgart, H. L. Therapeutic effect of total ablation of normal thyroid on congestive heart failure and angina pectoris relationship between serum cholesterol values basal metabolic rate and clinical aspects of hypothyroidism. *Arch. Int. Med.* 54: 746 (Nov.) 1934
- Gross, Paul. Patency of so called anatomically open but functionally closed foramen ovale. *Am. Heart J.* 10: 101 (Oct.) 1934
- Harrison, T. R. Functional tests of the heart. *Mod. Concepts Cardiovasc. Dis.* 3: 2 1934
- Harrison, W. G. Jr. Cerebrospinal fluid pressure and venous pressure in cardiac failure and effect of spinal drainage in treatment of cardiac decompensation. *Arch. Int. Med.* 83: 782 (May) 1934
- Harrison, W. G. Jr., Calhoun, J. A., Marsh, J. P. and Harrison, T. R. Congestive heart failure reflex stimulation of respiration as cause of evening dyspnea. *Arch. Int. Med.* 53: 724 (May) 1934
- Held, I. W. and Goldbloom, A. A. Acute streptococcus viridans endocarditis report of 4 cases with autopsy observations in 2. *Arch. Int. Med.* 53: 508 (April) 1934
- Henderson, Y., Oughterson, A. W., Greenberg, L. A., Searle, C. P. Third major mechanical factor in circulation of blood. *Science* 79: 508 (June 1) 1934
- Hoynes, A. L. and Welford, N. T. Diphtheritic myocarditis review of 496 cases. *J. Pediatr.* 5: 642 (Nov.) 1934
- Ihre, B. Röntgenkymography ad modum Stumpf as method of examining the heart. *Acta radiol.* 15: 107 1934
- Katz, L. N., Hamburger, W. W. and Schutz, W. J. Effect of generalized anoxemia on electrocardiogram of normal subjects. Its bearing on mechanism of attacks of angina pectoris. *Am. Heart J.* 9: 771 (Aug.) 1934
- Keefer, C. S. and Mallory, G. K. Pulmonary and pleural complications of aortic aneurysm. *Am. Heart J.* 10: 208 (Dec.) 1934
- Kling, F. H., Hitzig, W. M. and Fishberg, A. M. Recurrent laryngeal paralysis in left ventricular failure. *Am. J. M. Sc.* 188: 691 (Nov.) 1934
- König, W. Weitere Erfahrungen über die Vermeidung der postoperativen Thrombose und Embolie. Vergleichender Bericht über 4600 Fälle. *Deutsche med. Wchschr.* 60: 739 (May 18) 1934
- Korey, H. and Katz, L. N. Electrocardiographic changes produced by injuries of various parts of ventricles. *Am. J. M. Sc.* 188: 387 (Sept.) 1934
- Krumpholtz, E. B. Note on electrocardiographic changes accompanying acutely increased pressure following pulmonary artery ligation. *Am. J. M. Sc.* 187: 792 (June) 1934
- Lahey, F. H. and Hurxthal, L. M. Postoperative end-results in 300 thyrocardiacs. *Am. J. Surg.* 24: 225 (May) 1934
- Leary, T. Experimental atherosclerosis in rabbit compared with human (coronary) atherosclerosis. *Arch. Path.* 17: 463 (April) 1934
- Lerman, J., Clark, R. J. and Means, J. H. Further observations on heart in myxedema. *Ann. Int. Med.* 8: 82 (July) 1934
- Levine, H. D. Cardiac hypertrophy in infancy associated with thickened endocardium and coarctation of aorta. *Am. J. Dis. Child.* 48: 1072 (Nov.) 1934
- Levine, V. Myocardial changes in hypertension. *Arch. Path.* 18: 331 (Sept.) 1934
- Lewis, J. K. Nature and significance of heart sounds and apex impulses in bundle branch block. *Arch. Int. Med.* 53: 741 (May) 1934
- Lyon, J. A. and Horgan, E. Dissociation of thyroid from sympathetic nervous system and reduction of blood supply to the thyroid in angina pectoris preliminary report. *South. M. J.* 37: 985 (Dec.) 1934
- Lysholm, E., Nylin, G. and Quarna, K. Relation between heart volume and stroke volume under physiological and pathological conditions. *Acta radiol.* 15: 237 1934
- McGinn, S. and White, P. D. Clinical observations on aortic stenosis. *Am. J. M. Sc.* 188: 1 (July) 1934
- Idem. Duration of QRS complex in normal and in abnormal electrocardiogram study of 500 cases with note on nomenclature. *Am. Heart J.* 9: 642 (June) 1934
- Menéndez, E. B. and Orlas, O. Estudios fonocardiográficos en cien adultos jóvenes. *Rev. Argent. de Cardiología* 1: 101 1934
- Moritz, A. R. Arteriolateral changes in essential hypertension. *Science* 80: 547 (Dec. 14) 1934
- Muir, D. C. and Brown, J. W. Patent interventricular septum (maladie de Roger). *Arch. Dis. Childhood* 9: 27 (Feb.) 1934
- Pal, J. Die Tonuskrankheiten des Herzens und der Gefäße Ihre Biologie und Therapie. Vienna: Julius Springer 1934
- Perry, C. B. Sedimentation rate in rheumatic carditis. *Arch. Dis. Childhood* 9: 285 (Oct.) 1934
- Plokerling, G. W. The cerebrospinal fluid pressure in arterial hypertension. *Clin. Sc.* 1: 387 (Dec.) 1934

- Pickering G W and Wayne E J: Observations on angina pectoris and intermittent claudication in anaemia. *Clin. Sc.* 1: 305 (Nov) 1934
- Purks, W K: The cause of death of patients with organic heart disease subjected to surgical operation. *Ann. Int. Med.* 7: 838 (Nov) 1934
- Rosenman, J E, F and Stern, H: Standardized exercise tolerance test for patients with angina pectoris on exertion. *Am. J. Med. Sc.* 188: 546 (Nov) 1934
- Robb G P and Weiss, S: Velocity of pulmonary and peripheral venous blood flow and related aspects of circulation in cardiovascular disease: their relation to clinical types of circulatory failure. *Am. Heart J.* 9: 745 (Aug.) 1934
- Robb, J S; Easley M. and Hies, J G P: Experimental interference with conduction in heart. *Am. J. Med. Sc.* 189: 835 (Dec.) 1934
- Rothschild, M. A.; Kugel M. A. and Gross, L.: Incidence and significance of active infection in cases of rheumatic cardiovascular disease during various periods clinical and pathological study. *Am. Heart J.* 9: 856 (June) 1934
- Schneider E. C and Crampston, C B: Effect of posture on minute volume of heart. *Am. J. Physiol.* 110: 14 (Nov) 1934
- Shookhoff C and Douglas, A. H.: Variation in normal and abnormal human electrocardiograms. *Ann. Int. Med.* 8: 177 (Aug.) 1934
- Schur, M.: Probleme der adnalen Perikarditis. *Ergebn. d. Inn. Med. u. Kinderch.* 47: 618 1934
- Scupham G W: Effect of theobromine on peripheral vascular disease: clinical observations. *Arch. Int. Med.* 81: 656 (Nov) 1934
- Starr I. Jr, Donald, P S, Margolis A, Shaw H, Collins L. H. and Gamble, C. J.: Studies of the heart and circulation in disease: estimations of basal cardiac output, left heart size, and blood pressure in 225 subjects. *J. Clin. Investigation* 13: 161 (July) 1934
- Sutton, L. P.: Paracentesis of pericardium as a therapeutic measure. *Am. J. Dis. Child.* 49: 44 (July) 1934
- Swift, H. F.: Chronology of rheumatic fever. *New Eng. J. Med.* 811: 197 (Aug. 3) 1934
- Tauszig H. B.: Septic endocarditis in infant 7 weeks of age. *Am. J. Dis. Child.* 48: 268 (Aug.) 1934
- Van Lier, E. J.; Crisler, G and Hall J. E.: The effect of digitalis on acute cardiac dilatation produced by anoxemia. *J. Pharmacol. & Exper. Therap.* 58: 408 (Dec.) 1934
- Van Muijden, N. H. and Scherf, D.: Ueber ein durch hochgradige linke Verengung der Coronararterien hervorgerufenes Krampfleiden. *Wien. klin. Wochenschr.* 47: 746 (June 13) 1934
- Warfield, L. A.: The heart and athletics. *Mod. Concepts Cardiovasc. Dis.* 3: 5 1934
- Wayne, D. J. and Graybiel, A.: Observations on effect of food, gastric distention, external temperature, and repeated exercise on angina of effort, with note on angina sine dolore. *Clin. Sc.* 1: 47 (Nov) 1934
- Weinstein, A. A. Davis D. Berlin, D. D. Blumgart, H. L.: Mechanism of early relief of pain in patients with angina pectoris and congestive failure after total ablation of normal thyroid gland. *Am. J. Med. Sc.* 187: 753 (June) 1934
- Weiss, H.: Relation of portals of entry to subacute bacterial endocarditis. *Arch. Int. Med.* 54: 710 (Nov) 1934
- White, C. E.: The relation of arcus senilis to arteriosclerosis and senility. *New Eng. J. Med.* 212: 10 (Jan. 2) 1935
- White, P. D.: Electrocardiographic evidence of recent coronary thrombosis superimposed on bundle-branch block resulting from previous coronary disease. *Am. Heart J.* 10: 260 (Dec.) 1934
- White, P. D. and Sharber, T.: Tobacco alcohol and angina pectoris. *J. A. M. A.* 108: 666 (March 3) 1934
- Wilson, P. N., Hill, L. G. W. and Johnston, F. D.: Form of electrocardiogram in experimental myocardial infarction: apical infarct and origin of preliminary deflections of canine leucocardiogram. *Am. Heart J.* 9: 846 (June) 1934
- Winteritz, M.: Initial complex of electrocardiogram after infarction of human heart. *Am. Heart J.* 9: 816 (June) 1934
- Wood, P. C. and Wolferth, C. C.: Huge T waves in precordial leads in cardiac infarction. *Am. Heart J.* 9: 706 (Aug.) 1934

### THE INFLUENZA MENACE

Science reports that there is a possibility of an influenza epidemic in the United States this winter which is founded on the information received by the United States Public Health Service, that there are about five thousand cases of this disease in Honolulu. This epidemic started early in November.

The last big influenza epidemic, that of 1933 is reported to have started in Hawaii. It invaded the United States with a record of ninety thousand cases.

### THE COMMUNITY FUND CAMPAIGN

The forthcoming Community Fund Campaign serving one hundred hospitals, health and social agencies in the membership of the Community Federation of Boston is receiving generous support from the physicians of Greater Boston. The goal set for the 1936 Campaign is \$3750 000.

This amount will not fully meet the needs of the welfare agencies which are members of the Community Federation, says Ripley L. Dana, general chairman of the Campaign "and these agencies will have to practise economies which to some extent will hamper them.

"But it seems more business-like to fix the goal at a figure which can be reached even though it is less than the agencies require, than to fix a goal at a figure which will meet the requirements of the agencies but which at the moment and under present conditions seems beyond the capacity of the community to provide.

I believe that \$3750 000 can be raised. It must be raised. I hope this amount will be largely over-subscribed.

The dates set for the 1936 Community Fund Campaign are January 26 to February 10. Dr John F. Monks is Group Chairman and Dr George C. Shattuck, Vice-Chairman, of the medical group.

### DR. M. E. BINET WILL VISIT THE UNITED STATES

Dr. Binet, Vice-President of the Medical Society of Vichy (France) will visit the United States. The purpose of his visit is to extend an invitation to several American physicians to attend the International Congress of Hepatic Deficiency which will be held in Vichy in 1937 presided over by Professor Maurice Loeper, Professor of Clinical Medicine at the Faculty of Paris.

### TUBERCULOSIS IN BROOKLINE

As part of the Seal Sale Campaign the Brookline Anti-Tuberculosis Society has made public, through the Health Bulletin of the Board of Health the following statistics:

"40 deaths 1897 population 17 000 8 deaths, 1934 population 50 000 253 possible cases, 1935 to be watched and prevented exposure to 80 children who have gone to summer camps annually for health and happiness. The Anti-Tuberculosis Society to help guard your health planned action to combat the disease."



# Case Records

ANTE MORTEM AND POST MORTEM

AS USED IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

AT THE

MASSACHUSETTS GENERAL HOSPITAL

*Founded by* RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

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VOLUME 21

1985



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## CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

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1935

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## CASE RECORDS

of the

MASSACHUSETTS GENERAL  
HOSPITALANTE MORTEM AND POST MORTEM RECORDS AS USED  
IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., Editor

CASE 21521

## PRESENTATION OF CASE

**First Admission** A sixty-one year old white American artist was admitted complaining of pain in the right knee following an injury three days previously.

He had "heart trouble" eleven years before entry attributed by his physician to medication received for an attack of influenza which he suffered at that time. He had a left inguinal hernia for fourteen years. He had a "bad attack" of pleurisy at the age of fourteen. Two and a half years prior to entry he had an attack of sharp pain in the penis followed by hematuria. There had been no similar difficulty since.

His father died at seventy-four of cardiac failure, the mother died at eighty-seven with jaundice. One sister had heart trouble.

Physical examination showed a well-developed and nourished man. The chest was emphysematous. There was an occasional squeak audible bilaterally. The heart was not enlarged; the sounds were regular and of fair quality. The blood pressure was 140/80. There were bilateral inguinal herniae, the right being larger than the left. There was tenderness and swelling about the internal condyle of the right knee.

The temperature, pulse and respirations were normal.

He improved with physiotherapy and massage and was discharged on the fifth day.

**Second Admission**, two years later for repair of the left inguinal hernia.

**Third Admission**, four months later.

He had been well until twelve days before entry, when while walking up a hill he suddenly developed a sensation of constriction about the thorax at the level of the heart. There was no radiation. He continued to walk became dyspneic, and developed tingling sensations in both arms and forearms. This persisted for twenty minutes and then subsided spontaneously. Three days later he was seized with a similar attack while sleeping. This was more severe and the tingling sensation was more marked in the left arm and hand. His physi-

cian gave him two pearls of amyl nitrite which afforded him considerable relief. He remained in bed for seven days but then arose for an anniversary dinner. At the table, while eating, another attack occurred which continued for four hours and was finally relieved by two hypodermics and six pearls of amyl nitrite. During the attack there was marked fear of death. He had no attacks after this but entered the hospital because of fear of recurrence. His weight which had been 170 pounds seven years before was now 140. There had been no dietary restrictions.

Physical examination showed slight puffiness of the lower lids. The sclerae were injected. There were leukoplakic spots on the tongue. There was a fatty tumor in the left posterior part of the neck. The fundi were negative. The apex impulse was neither seen nor felt. The left border of cardiac dullness was 10 centimeters from the midsternal line, 15 centimeters beyond the midclavicular line. The sounds were regular but distant. There was a blowing systolic murmur replacing the first sound at the apex. The second sound was sharp.  $A_2$  was greater than  $P_2$ . The blood pressure was 140/85. The radials were thickened but compressible. A few inspiratory crackles were audible at the bases but disappeared quickly. The abdomen was protuberant. The hernia scar was well healed. The knee jerks were slightly exaggerated.

The temperature, pulse and respirations were normal.

Examination of the urine showed a specific gravity of 1.011 to 1.013. The sediment contained 15 to 25 white blood cells. The blood showed a red cell count of 5,000,000, with a hemoglobin of 80 per cent. The white cell count was 9,000, 67 per cent polymorphonuclears. A Hinton test was negative. An electrocardiogram showed a deeply inverted  $T_1$  and  $T_2$ ;  $P_1$  and  $P_2$  were notched.  $P_3$  was inverted.

The x-ray showed no significant change from that previously taken. The transverse diameter of the heart was 14.6 centimeters, that of the chest being 28.7 centimeters.

On the fourth morning directly following breakfast he had an attack similar to the others, with a sensation of congestion in the left arm and in the left posterior part of the neck. This responded quickly following the administration of one-hundredth of a grain of nitroglycerine. He was discharged on the twenty-third day.

**Fourth Admission**, fourteen months later.

The patient had no further attacks of chest discomfort. He remained well until six weeks before reentry, when he became constipated and noticed that his stools were thinner and contained material resembling "shredded tobacco". There were no bloody or tarry stools. He began taking a laxative daily. A short time later he developed dull aching pain across the upper abdomen which occurred directly after

meals and lasted for about an hour. It sometimes recurred during the night but for the most part returned only two or three times a week. There was associated gaseous eructation. The pain was not definitely localized and was not very severe. Occasionally it kept him awake and the fear of initiating it prevented him from eating a regular diet. Gradually he developed a sensation of fullness in the epigastrium after meals and thought food did not pass. After five or ten minutes this was relieved spontaneously. He frequently avoided this sensation by drinking hot broth before meals. There was no nausea or vomiting. His weight decreased about ten pounds during this illness.

Physical examination showed that he had aged considerably and was poorly nourished. The skin was loose and flabby. The abdomen was scaphoid. The heart was slightly enlarged to the left but there were no other changes. The lungs were clear. The abdomen was negative.

The temperature, pulse and respirations were normal.

Examination of the blood showed a red cell count of 4,700,000, with a hemoglobin of 75 per cent. The white cell count was 13,000, 73 per cent polymorphonuclears. Examinations of many stool specimens were negative for blood. An electrocardiogram showed a split  $P_2$ .  $T_2$  and  $T_3$  were inverted. There was slight widening of Q-R-S, a rather low voltage and a slight elevation of S- $T_2$  and S- $T_3$ .

X-ray showed a slight delay in the passage of barium through the lower end of the esophagus. There was no dilatation of the esophagus except when the patient drank barium rapidly. The fundus of the stomach protruded through the diaphragm at the esophageal hiatus. There was a diverticulum of the esophagus just below the aortic arch and a definite filling defect and constriction of the lower end of the esophagus due to a lesion 4 centimeters in length which apparently extended downward and involved the fundus of the stomach. The remainder of the stomach, pylorus and duodenum was negative. Three days later another x-ray showed dilatation of the lower third of the esophagus which included the diverticulum. The relief was irregular and there were bandlike areas of decreased density instead of the normal rugae. The entire area was soft and pliable except for the epicardia, which appeared to be rigid. There was a constant fleck about 3 millimeters in diameter in this region.

On the fourth day an esophagoscopy was done which revealed a hemorrhagic surface 11.5 centimeters from the front of the teeth. This bled easily when rubbed with a sponge. A specimen was removed for examination. During the second week the patient received repeated heavy doses of x-ray to the chest. He had little reaction to the irradiation but had considerable symptomatic improvement. The discomfort was relieved and he began to eat

a full diet. He was discharged one month after entry.

#### *Fifth Admission, six weeks later*

Since his last admission he felt very well, gained weight and continued to eat a full diet with no discomfort. Two days before entry he again developed a sensation of substernal discomfort while eating. Food appeared to "stick" for ten minutes. He retched considerably with no relief but finally took one-hundredth of a grain of nitroglycerin which gave complete relief.

Physical examination showed a partial compensation of his previous weight loss. The heart and lungs were unchanged. The liver edge descended about 3 centimeters beneath the costal margin with respiration. It was slightly tender but not nodular.

He was given another series of x-ray treatments and discharged without symptoms in three days.

#### *Sixth Admission, ten weeks later*

He remained quite well for about two weeks after his discharge but then began to vomit soft foods. Emesis became more frequent and for two days prior to reentry he was unable to retain anything. The vomitus contained food, mucus and a little yellow bitter material. There was rapid loss of weight and strength and the sensation of blocking was now felt higher up behind the sternum. His bowel movements were regular, once daily, with a laxative.

Physical examination showed considerable weight loss since the previous visit. The skin of the chest was browned and scaly. The blood pressure was 110/70. The remainder of the examination was unchanged.

The temperature, pulse and respirations were normal.

Examination of the blood showed a red cell count of 4,100,000, with a hemoglobin of 70 per cent. The white cell count was 9,000, 80 per cent polymorphonuclears. A stool examination was negative.

An x-ray showed a narrowing of the lumen of the esophagus at the site of the lesion. The esophagus remained filled while the patient was prone. In the upright position, however, the barium passed fairly well. The lesion was more sharply defined and appeared to involve the fundus of the stomach.

The patient was given further x-ray therapy. He refused other treatment and returned to his home in three days. He became gradually weaker, was able to eat less food and finally died two months after his final discharge.

#### DIFFERENTIAL DIAGNOSIS

DR. TRACY B. MALLORY: I have asked Dr. Means to start the presentation of this case and then turn it over when we come to the details of the esophagus to Dr. Mosher, who knows nothing about the case and will give a differential diagnosis from that aspect.

Dr. J. H. MEANS I will try to bring out the things that are important. This was a man I took care of in the Baker Memorial, followed through two diseases, and saw on Cape Cod last summer several times up to the time of his death.

The first admission had nothing to do with the final story so let us pass over it.

The repair of the hernia is of no interest at the present time.

Let us go to the third admission when I first saw him, and consider that briefly.

The weight loss had been very gradual and did not indicate any wasting disease. The story abstracted from the Baker Memorial record is fairly clean, but as I got it verbally I got a still more vivid impression that it was a classical picture of coronary thrombosis of a mild sort. When he came to the hospital there were no symptoms whatever. He was kept in bed for four weeks simply as a precautionary measure because we believed he had coronary thrombosis.

As I recall the cardiologist had thought the electrocardiographic findings were an indication of coronary thrombosis. He had another small attack of coronary pain in the hospital, not an impressive one, but yet a fairly typical attack of angina pectoris apparently. Since then he had no more symptoms of any kind pointing toward his heart, therefore we can set that aside as chapter one. Of course I saw the autopsy and I now know what this man had but I did feel at the time, as anyone would that he had had a small cardiac infarct. Subsequently I inferred that it was a well healed one because of the extraordinarily good result which followed. Chapter two has nothing to do with the coronary picture. When he came in the second time it was for a totally different disease. That is the one that interests us chiefly at present.

The history does not give us an accurate impression of this man's symptom picture. Doubtless this account was abstracted from the Baker Memorial history which the house officer took. I have no doubt that it is correct but it does not give the proper emphasis. The outstanding part of the picture was dysphagia. He had difficulty getting food down the esophagus into the stomach. This became apparent on talking with him. His sensation was of food sticking at the lower end of the sternum and after a time passing on into his stomach.

Am I right in supposing that this electrocardiogram still shows some evidence of coronary disease? Dr. Glendy?

Dr. ROBERT E. GLENDY Yes.

Dr. MEANS So although he had no symptoms pointing to the coronary and had carried on a fairly normal existence he still had electrographic evidence that something had happened to the heart over a year before.

We might let the x ray men state their findings at this point to make it interesting. They were not in entire agreement.

#### X RAY INTERPRETATION

Dr. AUBREY O. HAMPTON This is the lower end of the esophagus and a herniated portion of the fundus of the stomach. Complete filling is not possible in the upright position. He was lying on the table drinking out of a tube as rapidly as possible when this film was taken. The left side of the diaphragm is here, the stomach there, the stomach comes through the diaphragm up to here and thus we think is in the region of the cardiac sphincter. In this area near the cardiac sphincter there is a one centimeter fleck which we thought to be ulceration, and surrounding it is a large area of induration. There is also a diverticulum up here just below the arch of the aorta. I described this lesion as being rather unusual in that the ulceration was smaller than one would expect with a malignant lesion of this type. That is, the ulcer should be dish shaped and its margins should be nearer to the periphery of the filling defect, and for this reason we asked Dr. Schatzki to see the patient.

Dr. RICHARD SCHATZKI The x ray examination seemed simple until this moment and became complicated as soon as I looked at the patient. The reason was this. There were those changes just described by Dr. Hampton, the small hernia of the stomach through the hiatus, a diverticulum, and just above the cardia was this area of rigidity with a small area of ulceration, or rather this small constant fleck, but there was also pathology higher up in the esophagus above the diverticulum almost to the arch of the aorta. Then the question arose as to what this lesion higher up was. In some of the pictures one saw definite band like areas of decreased density running through this region. It was rather difficult to combine all these facts, pathologic changes extending over at least the lower half of the esophagus with increased rigidity in the lower end of the esophagus.

I finally reported that I had never seen a picture like this. The upper part of the picture looked more like varices than anything else but it was difficult to explain the rigidity of the lower end of the esophagus by this diagnosis. I had never seen a patient with difficulty in swallowing due to varices but if at the time of the examination I was forced to explain all the anatomical changes by one diagnosis I would favor varices though it was impossible to exclude cancer.

#### DIFFERENTIAL DIAGNOSIS CONTINUED

Dr. HAMPTON He did drink a little alcohol did he not?

Dr. MEANS Yes within reason. He was an artist.

The next event was the esophagoscopy and

Dr Mosher is going to discuss the case at this point. He has had just the information that Dr D Campbell Smyth had when he did the esophagoscopy. The x-ray men were in some doubt as to what the lesion was and the suggestion was made by Dr Schatzki that he had esophageal varices, and the picture, as Dr Schatzki has said, is almost classical of that. There was no reason, however, that we could discover why he should have had esophageal varices. We had no evidence of cirrhosis of the liver.

Will you carry on, Dr Mosher?

DR HARRIS P MOSHER I am glad Dr Means said something about this man's being an artist and mentioned his being human because as Dr Means started out he implied that this was inconsequential from the scientific standpoint.

I was overcome with the elaborate history. It took half the morning to read it. I was very much pleased that the medical house officer missed the chief point, namely, that the man had difficulty in swallowing. This carries me back to my own house officers a little more cheerful than before I came over.

The chief feature in this case is that the man had difficulty in swallowing at his fourth admission, and in this connection he had abdominal pain. The examination by Dr Smyth was practically typical of carcinoma and the report on the biopsy was epidermoid carcinoma. Thus it was a perfectly straight case.

The x-rays as you saw, and as Dr Schatzki said, suggested varices. Dr Schatzki was enthusiastic enough to come over and watch Dr Smyth at the examination. He looked over Dr Smyth's shoulder trembling and said he trembled more when Dr Smyth took a specimen, thinking that Dr Smyth was going to get into trouble from hemorrhage. This did not happen.

The points I wish to speak about are the pouch and hernia of the diaphragm. A pouch at the level of the arch of the aorta is extremely common. It is usually due to a suppurative gland which has become attached to the esophagus and in healing pulls it out into a pouch. It gives few symptoms. They are easily found with the esophagoscope. These pouches usually empty themselves and so, from the clinical standpoint, amount to very little.

Herniation of the stomach through the esophageal opening of the diaphragm was discovered, as the older men know, by Dr Morrison of this city. Dr Jones has operated on quite a few of these cases by mobilizing the lower end of the esophagus, pulling it down and fastening it. These hernias are fairly common, especially after sixty years, and cause very few symptoms, and are no longer operated upon.

The patient was treated by x-ray and swallowed better for a short time. This brings up the question of the treatment of carcinoma of

the esophagus by x-ray. We have had two cases under treatment in this hospital with disappearance of the lesion. X-ray will cause the disappearance of the carcinoma, but the resulting fibrosis is apt to be a condition equally dangerous.

DR A. S. MACMILLAN My part will be limited to the showing of lantern slides on the relative frequency of carcinoma in patients with difficulty in swallowing. This slide was made from a careful study of 1,000 cases of dysphagia. It shows that carcinoma accounts for 40 per cent, and cardiospasm or, as Dr Mosher has correctly labeled the condition, fibrosis of the lower end of the esophagus is second in frequency with 15 per cent. Other lesions that are to be found in the esophagus are webs, pouches, paralysis, burns, and ulcers. Varices of the esophagus while they may account for profuse hemorrhage do not produce obstruction. In the general classification of the causes of death in the United States, according to the government statistics, carcinoma of the esophagus is low in the list, accounting for only 15 per 100,000, while 214 per 100,000 cancers occur in the stomach. Carcinoma of the esophagus occurs, as you would expect, at the same time as carcinoma in other parts of the body, the average age in our three hundred and eighty patients was sixty-seven, with very few in the third or fourth decade.

DR MEANS There is very little more to add. Dr Hampton gave this man a course of heavy radiation, as heavy as he knew how to give.

DR HAMPTON We gave him 8000r, 2000r to each of four fields 10 by 20 centimeters in size directed to the lower half of the esophagus. He had no discomfort from these treatments. As a matter of fact, he ate an elaborate dinner during the treatments and said he had some champagne, too. He felt quite well. Following these treatments the tumor in the esophagus did smooth out and we thought that there was less delay in the passage of barium through the esophagus, although there was not much delay in the first place. At the second entry after the x-ray treatment we thought the lesion looked the same as in the beginning. We gave him another series of treatments equal to the first and, so far as I can tell, without injuring his skin appreciably.

DR MEANS He went downhill rapidly with esophageal cancer and died. Gastrostomy, which was offered to him, he refused, I think quite wisely, and with morphia was made comfortable. He never had pain at all, had gradually increasing dysphagia, and finally got to the point where he was bothered with swallowing mucus, having that collect and being obliged to vomit it up. I talked to Dr Mixter about gastrostomy who said the chief reason for do-

ing it was to relieve the pangs of hunger. If they were troublesome, as they may be, gastrostomy offers relief. This patient did not complain of that and it was not necessary. He gradually became more and more emaciated and finally died of weakness.

#### CLINICAL DIAGNOSES

Carcinoma of the esophagus  
Coronary heart disease

#### DR. HARRIS P. MOSHER'S DIAGNOSES

Epidermoid carcinoma of the esophagus  
Diverticulum of the esophagus

#### ANATOMIC DIAGNOSES

Adenocarcinoma of the esophagus with metastases to the tracheal and esophageal glands and lungs  
Diverticulum of the esophagus  
Arteriosclerosis, marked, aortic coronary renal  
Bronchopneumonia  
Pulmonary congestion  
Cholelithiasis  
Cachexia

#### PATHOLOGIC DISCUSSION

DR. MALLORY. When the second phase of this man's illness developed the history was a fairly obvious one of cancer of the esophagus and I do not suppose there would have been any question of diagnosis at all if Dr. Schatzki had not been brought into the case. Dr. Schatzki found this quite extraordinary picture which was inconsistent with anything anyone had seen in cancer of the esophagus. The autopsy specimen shows very clearly why that was the case. We found an extensive tumor in the lower third of the esophagus, close to the cardiac orifice. Then the mucosa of the esophagus for the most of its middle third was elevated by papillary masses of tumor. Looking at it from the surface one would suppose that he was dealing with a papilloma of squamous epithelium, rather similar to what one sees in the bladder. Microscopic examination shows something entirely different, however. The tumor proves to be an adenocarcinoma although in places there is a little bit of cornification and you can call it adenocarcinoma if you want to. It is invading all layers of the esophageal wall, the submucosa, the muscularis, and the serosa. It crops up to the surface from below the various spots but even where these shaggy papillary masses are most marked there is a layer of normal epithelium above the tumor so the situation is exactly analogous to that seen with varices, a hidden mass in the

submucosa pushes the true mucosa upward and it is only reasonable that an x-ray picture identical with varices should have been produced.

With regard to the rest of the autopsy, we found almost complete occlusion of the descending branch of the left coronary evidently quite old and calcified, but we were not able to find any gross evidence of infarction of the myocardium.

DR. HAMPTON. The biopsy was taken eleven inches from the teeth. I think the large lesion that we first found was fourteen inches from the teeth.

DR. MALLORY. Adenocarcinomata are less common than squamous carcinomata and when found are usually at the lower end of the esophagus close to the cardiac orifice. I think there is little question that the tumor started close to the cardia and gradually worked its way upward through the lymphatics and perineural spaces possibly in part through the blood vessels.

DR. GEORGE W. HOLMES. Is this condition of extension by cancer up along the esophagus giving the appearance you describe generally known to pathologists?

DR. MALLORY. It certainly was not known to me. I had never heard of it. Do you know of any cases, Dr. Mosher?

DR. MOSHER. No.

#### CASE 21522

#### PRESENTATION OF CASE

*First Admission.* A sixty-nine year old white American woman was admitted because of an injury to the back following a fall.

Physical examination showed a rather obese elderly woman lying quietly in bed. The heart appeared to be normal. A. was greater than P. The blood pressure was 170/80. A few fine rales were audible at both lung bases. There was a point of tenderness over the eighth dorsal vertebral spine and marked spasm of the erector spinae muscles. No attempt was made to elicit spinal movement. All normal reflexes were present and unaffected. A sensory examination was negative.

An x-ray examination showed a collapsed fracture in the region of the fourth and eighth dorsal vertebrae.

A high back brace was applied and the patient was discharged on the fortieth hospital day still wearing the back brace and suffering no marked discomfort.

#### *Second Admission, two years later.*

The patient had been seen in the clinic many times following her discharge. She was treated there palliatively for complaints which concerned themselves for the most part with lower abdominal pain, cramps, constipation and painful stiff joints of long standing. She had been



seen at another hospital five months prior to her reentry where she complained of "chest pain, heart attacks, attacks of cough, and shortness of breath." Hospitalization was advised but the patient returned to her home.

At 3 00 a.m. on the morning of her reentry she was awakened by a severe pain in her epigastrium and lower chest, radiating to the region between her shoulder blades. There was also pain in both upper quadrants. The patient's condition was such that further details could not be elicited. The pain continued unabated until 7 30 a.m., when the patient came to the hospital in a taxicab.

Physical examination showed a poorly nourished elderly woman evidently suffering from considerable pain. She was restless and uncooperative, and her condition precluded further examination. There was no cyanosis. The heart sounds were of poor quality and were slightly accelerated. The blood pressure was 100/60. There was marked tenderness in both upper quadrants. It was particularly excruciating on the left. The liver edge was thought to be palpable three centimeters beneath the costal margin.

The temperature was 98.6°, the pulse 90. The respirations were 20.

Ten minutes after examination the patient became intensely cyanotic, her neck veins became markedly engorged, and she died within a few minutes.

#### DIFFERENTIAL DIAGNOSIS

DR SYLVESTER MCGINN. On the first admission there are three points that stand out. One is that we can establish the normal blood pressure as 175/80. The second is that she was having early signs of congestive failure marked by fine râles at both lung bases. The third is an injury to two vertebrae.

"She had been seen at another hospital five months prior to her reentry where she complained of 'chest pain, heart attacks, attacks of cough, and shortness of breath.'" There is an important bit of evidence here. We would like to know what the chest pain was, whether it was precordial discomfort or the chest pain of angina coming on exertion, and what the heart attacks were like. Were they paroxysmal attacks of tachycardia or did they relate again to the anginal syndrome? The fact that hospitalization was suggested and advised makes me think that she had a considerable degree of cardiac involvement at the time. I think we must assume that.

In summary we have an elderly woman who had been definitely having attacks of heart trouble, probably with congestive failure and, I believe, with angina, having an attack at night and dying about five hours later. I think it is fair to assume that the attack she had at three o'clock was the beginning of the final

episode five hours later. There are abdominal symptoms with reference of pain to the mid-scapular region suggesting gallbladder disease. I do not believe that people can die that suddenly of gallbladder disease. A cerebral accident causing sudden death is another possibility. She had five hours to develop some kind of neurological symptoms and I think we would have been told if there were any present. Sudden death can come in aortic stenosis and I believe if she died from aortic stenosis we would have been given more information if murmurs had been present. Sudden death is observed in cardiovascular syphilis, either from involvement of the coronary vessels or rupture of an aneurysm. That is a possibility, but I think the three most likely possibilities are those of coronary thrombosis, pulmonary embolism or dissecting aneurysm. We have a real lead for dissecting aneurysm here, in that the pain is definitely referred to the midscapular region and if there is any one single point we have in looking for dissecting aneurysm of the aorta it is this presence of midscapular pain. Death was marked by venous engorgement. If she had a dissection beginning at three in the morning and rupturing five hours later I believe that she probably would have been bled out rather than have engorgement of the neck veins, unless there was a cardiac tamponade where rupture had taken place into the pericardium. In view of the past history, I do not think that is quite so likely as the two conditions that are left, pulmonary embolism and coronary thrombosis.

At three o'clock something happened to give her a definite drop in blood pressure from 175/80 to 100/60. She was not definitely cyanotic when she came into the hospital but that is not particularly against pulmonary embolism because with the initial embolus patients often go into shock and are seen without venous engorgement and without cyanosis. I do not know whether an embolus could occur so late from the effects of the neck injury, but it must be included. There is another possible location for a thrombus and subsequent embolus. The liver was three fingers down, indicating well-marked congestion and in any such case thrombi in the larger systemic veins are frequent and would provide sources for an embolus.

The final possibility is coronary thrombosis. It is an atypical condition where the pain is especially noticed in the abdomen and yet that can occur. A reference of the pain to the mid-scapular region would be consistent with a right coronary occlusion. I saw one case of coronary occlusion, occurring in the hospital, where all the symptoms were related to the lower abdomen, in the region of the pelvis, and it was some time later before the pain ever did get up into the chest. Rupture of the heart is strongly suggested by the terminal symptoms though

the time interval seems short. Again it is possible to have a pulmonary embolism after a coronary thrombosis as a result of a mural thrombus and yet five hours seems a short time for a clot to have formed.

I think, in view of the past history and believing that the attacks of chest pain were an ginal, that she had a coronary thrombosis, probably with rupture of the heart into the pericardium.

DR. GERALD BLAKE The contrast between the patient's appearance ten minutes before death and immediately after death particularly the engorgement of veins in the neck, suggest failure of the right heart. It is perhaps better explained by pulmonary embolism. But we have no story of previous infarction of the right heart, and it is too early for this attack to produce an embolus from a mural thrombus. My thought was that this patient had coronary thrombosis, probably in the right coronary.

DR. PAUL D. WHITE May I add a comment about rupture of the heart? It seems to me very unlikely if the coronary thrombosis which is the probable diagnosis here occurred at three a.m. that the heart could have ruptured that same day, the cases of heart wall rupture from coronary thrombosis that I remember generally occurred in the second week or between about five and seventeen days after the acute coronary occlusion.

#### CLINICAL DIAGNOSIS

Coronary thrombosis

DR. SYLVESTER MCGINN'S DIAGNOSIS

Acute coronary thrombosis, possibly with rupture of the heart into pericardium

#### ANATOMIC DIAGNOSES

Coronary thrombosis with occlusion, fresh

Infarct of heart, old

Arteriosclerosis, marked Coronary, aortic, renal

Peritonitis, chronic, generalized.

Hydrothorax, very slight, bilateral

Pulmonary tuberculosis, healed, right apex.  
Cholelithiasis

#### PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY I think the earliest case of rupture that I have seen occurred three days after the thrombosis. They are usually later than that. This patient did show a coronary thrombosis but it was in the usual spot, the descending branch of the left coronary artery and not the right. There was no gross evidence of infarct of the heart, as you would expect in a case dying within four or five hours of the time of onset. It takes a definite length of time before degenerative changes become visible even microscopically several hours are required. The patient, like a good many cases of coronary thrombosis, had apparently had one before. We found one small area of healed infarction an old fibrous scar evidently years old to which there is no lead whatever in her past history.

DR. MCGINN How long does it take for a mural thrombus to form and how long before an embolus can be given off? Can a fat embolus or clot arise from an injury two years old?

DR. MALLORY It seems unlikely without some succeeding, recent trauma. One does of course, from time to time see a sudden pulmonary embolus in a medical patient in whom there is no history whatever of phlebitis, and no lead as to the possible source of emboli. As a matter of fact small emboli, according to Dr. Belt of Toronto, are probably commoner in medical cases than in surgical cases. The very massive embolus that is rapidly fatal, however, seems to be pretty rare in medical as compared with surgical cases.

In regard to the rapidity of formation of a thrombus I do not know of any exact figures. I should guess that it would take forty-eight hours perhaps before the thrombus formed but that is nothing more than a guess and probably some little time after it is formed before it is likely to break loose and give rise to an embolus.

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## WHO IS INTERESTED IN RAISING THE STANDARDS FOR PRACTICE?

If the question concerning interest in raising standards of qualification for the practice of medicine in Massachusetts is phrased "Who is interested?" one finds signs of concern for or against such raising on the part of a few persons only. The Board of Registration in Medicine regularly puts itself on record by recommending to the General Court each year that the standards be raised. The Massachusetts Medical Society puts itself on record as favoring such raising. The proprietors of low grade medical schools, or their representatives, put themselves on record as opposed to raising standards. The members of the General Court apparently take little interest in the matter and express themselves as satisfied with the status in quo.

The opposition states that the Board is interested in increasing its own power, that the Medical Society is interested in limiting practice to

persons of whom it approves. In other words the "Haves" are trying to keep out the "Have nots." The proprietors of the objecting schools are seeking to preserve their vested interests since they are reported to be making money under present conditions.

But to whose interest is it that the standards of medical practice be raised? To the Board? Yes, because its prime function is to protect the public against incompetent practitioners of medicine, and its members know that mere graduation from a medical school is no guarantee of competence. To the medical profession? Yes, because it is a profession and its prime function is to render a service and not to make money. To the General Court? Yes, because its prime function is to make the laws by the administration of which the people of the Commonwealth are protected against incompetent practitioners of medicine. It seems to be satisfied with the status in quo because the legislators appear to be impressed by the persons who make the most noise, magnitude of noise directs their thinking.

The medical schools reported to be making money? Their answer is equivocal no, in so far as they are interested in making money, yes, in so far as they are interested in education. The equivocation is due to the fact that medical education is expensive and costs more than students pay. Since actions speak louder than words, the interest in education becomes inconsiderable and the worship of mammon makes the welkin ring.

What is for the interest of the people, who are sick, many of whom, medically speaking, do not know their left hand from their right? Should they not have the best medical care there is? Is not every human being entitled to the best possible medical care? Yes, and the problem is the practical one of making it available.

If raising the statutory standards for admission to the practice of medicine will actually improve medical care in the state, what justification is there for not changing the statute? Should revenue derived from giving an inadequate medical education be allowed to stand in the way of better medical care for the people of Massachusetts?

But who lifts a voice that can be heard all over the state on behalf of the sick of the state? The Board mildly recommends. The Medical Society mildly approves the recommendation. The General Court is complacent since the people do not speak for themselves. Who will be a Moses to this people?

## PRACTITIONERS, WAKE UP!

IN June, 1935, upon the recommendation of the Committee on Public Relations of the Massachusetts Medical Society, the Council of

the Society voted to urge the various boards of health and health officers throughout the Commonwealth to refrain from establishing clinics and doing immunization work against diphtheria for people who are able to pay for that work, except in cases of emergency.

At the same time upon recommendation by the same committee the Council voted to urge the practitioners of medicine to organize for immunization work at an appropriate cost to the public.

In making these recommendations, the committee felt that on this program the practitioners would be stimulated to be more of a force in the problems of preventive medicine and the patients would be better served in having this work done by the family physician.

These votes have been spread throughout the Commonwealth and already some misgivings have been voiced by health officers that this immunization work against diphtheria will diminish if the health officers do not continue their clinics for this work. The figures which are obtainable suggest that where at the request of the practitioners the health authorities have not done this work, the immunization work is not done. Another feature of this problem is that there is the need of educating the public in regard to the value of this work and experience indicates that persuading an individual to adopt a new idea is more difficult if there is expense attached to it.

If the health officers are going to give up immunization against diphtheria the practitioners must not simply immunize those who apply but must aid in educating the public in regard to the importance of eliminating diphtheria from the Commonwealth. An aggressive attitude rather than a passive one toward bringing patients into physicians' offices for this work should be organized and pronounced ethical Arrangements should also be made so that patients may receive this immunization at a price commensurate with their ability to pay. Unless the practitioners wake up and do this work, the misgivings of health officers will be justified and the work should be turned back to them.

It is of interest to note that the physicians of Boston as represented by the members of the Middlesex South, Norfolk and Suffolk District Societies have already organized to offer opportunities for immunization at a rate much below the usual price of office visits and that the health officers of the City are urging the patients to go to their family physicians for this work.

Let us hope that this experiment will succeed and that throughout the Commonwealth the practitioners and health officers will cooperate in developing similar programs.

## THIS WEEK'S ISSUE

CONTAINS articles by the following named authors

LAHEY, FRANK H. M.D. Harvard University Medical School 1904 F.A.C.S. Director, Lahey Clinic Surgeon in Chief, New England Baptist Hospital Surgeon New England Deaconess Hospital Address 605 Commonwealth Avenue, Boston Associated with him is

SWINTON, NEIL. M.D. University of Michigan Medical School 1929 Surgeon, Lahey Clinic Address 605 Commonwealth Avenue, Boston Their subject is "Stones in the Common and Hepatic Bile Ducts." Page 1275

VIETS, HENRY R. B.Sc., M.D. Harvard University Medical School 1916 Instructor in Neurology, Harvard University Medical School Neurologist Massachusetts General Hospital Consulting Neurologist, Massachusetts Eye and Ear Infirmary Address 6 Commonwealth Avenue Boston Associated with him is

SCHWAB, ROBERT S. M.D. Harvard University Medical School 1931 Assistant in Neurology Harvard University Medical School Resident in Neurology, Massachusetts General Hospital Address Massachusetts General Hospital, Boston Their subject is "Prostigmin in the Diagnosis of Myasthenia Gravis" Page 1280

DEWITT, R. F. B.S., D.N.B., M.D. University of Vermont College of Medicine 1934 His subject is 'A Recent Outbreak of Food Poisoning in Shoreham Vermont' Page 1283 Address Plymouth, N. H.

WADSWORTH, AUGUSTUS B. B.S., M.D. College of Physicians and Surgeons, Columbia University 1896 Assistant in Bacteriology and Hygiene, 1899-1908 Assistant Professor of Bacteriology 1908-1913 College of Physicians and Surgeons, Columbia University Director Division of Laboratories and Research New York State Department of Health Albany 1914- His subject is "Practical Limitations of Vaccine and Serum Therapy" Page 1285 Address Division of Laboratories and Research New York State Department of Health, Albany, New York.

MCGINN, SYLVESTER. A.B. M.D. Harvard University Medical School 1929 Assistant in Medicine Massachusetts General Hospital Staff St. Elizabeth's Hospital Cardiac Consultant, Sturdivant Memorial Hospital Attleboro His subject is "Progress in the Study of Cardiovascular Disease in 1934" Page 1293 Address 270 Commonwealth Avenue Boston

## The Massachusetts Medical Society

### SECTION OF OBSTETRICS AND GYNECOLOGY\*

C J KICKHAM, M.D.,      R S TITUS, M.D.,  
Chairman                      Secretary  
524 Commonwealth Ave.,    472 Commonwealth Ave.,  
Boston, Mass.                  Boston, Mass.

#### PYELITIS AND PREGNANCY

The past two decades have contributed materially to our knowledge concerning, and management of, nontuberculous infections associated with pregnancy. They still remain in two major divisions, namely, infections present during gestation and infections which follow delivery.

Both subdivisions are influenced by the physiological changes in the bladder, ureters and pelvis, which are generally admitted to take place to some degree, in all pregnant women. These changes modify the incidence of infection during the pregnancy. They occur in approximately one and a half per cent of all pregnant women, which is well above the incidence of such infections in nonpregnant women. They also modify the character of postdelivery infections if they occur, as they usually do, before the retrogressive changes in these organs, which begin immediately after delivery, have had time for completion.

The changes which occur in the bladder and urethral walls during pregnancy apparently are of little significance. Residual urine is absent except with cystocele or gross urinary pathology. Malformation of the bladder from pressure of the uterus produces nothing worse than a benign form of frequency, which is free from symptoms of stranguria. It is worthy of remark that burning and painful voiding is less common in these bladders, when infection is present, than in the nonpregnant. Absence of this symptom confuses differential diagnosis in many cases of fever.

Changes in the upper urinary tract, due to pregnancy, are of great significance in modifying the symptomatology and management of infections which occur either in the course of pregnancy or immediately after delivery. The characteristic deformity is dilatation of the upper two thirds of the ureters and the pelvis. The midportion of the ureter is carried laterally and redundancy of ureteral length is taken up in kinking near the renal pelvis and near the pelvic brim. The pelvis dilates extensively and rounded calyces are often noted which suggest a long-standing condition, but which return to normal in the course of the retrogres-

sion which follows delivery. Deductions made from pyelography, performed during the stage of dilatation, are unsafe findings on which to do radical surgery. These dilatations are accompanied by atony which accounts for the often painless character of the condition and the persistence of dilatability after delivery without the usual pain response to overdistention, so noticeable in the normal kidney. Atony may also be responsible for the severity of postpartum infections of the kidney since edema of the more nearly unchanged lower portions of the ureters may produce retentions in the dilated portion and pelvis above.

While hematuria marks the onset of pyelitis in pregnancy, in a sizable group of cases, and others show only fever and pyuria, dull renal pain, fever, nausea and rapid pulse, with or without bladder symptoms, are the usual symptoms. Acute appendicitis and pelvic peritonitis constitute the common differential diagnosis. Pelvic peritonitis increases in importance in differential diagnosis in the postpartum infections. The white cell count is usually in the neighborhood of 15,000 in urinary infections and higher in the other diseases but is not always reliable.

The state of nutrition and secondary anemia are important considerations both as to incidence of infections and their management. Transfusions are not used in the course of pregnancy as treatment for anemia in most clinics but are freely used in the postpartum stage. Blood-building diet and preparations of iron will suffice in most instances to combat anemia in pregnancy when coupled with proper urologic measures where required.

The treatment of pyelitis in pregnancy should begin with the pregnancy. Where free ingestion of fluid is practiced with all pregnant women, those infections which occur are less toxic in character. Ten to fifteen glasses of water daily are advised. The onset of infection in patients with low fluid intake is quickly marked by severe degrees of toxicity and with sustained nausea. The patient quickly becomes seriously ill and unresponsive to treatment by any means until fluids have been restored in large quantities by other means.

Rest in bed, forced fluids and alkalinization by oral or rectal means are adequate measures for handling the majority of infections in pregnancy. Elevation of the foot of the bed and changing the patient from one side to the other have proved effective in both the pregnant and the nonpregnant in shortening the febrile period. Sixty grains of potassium citrate is adequate alkalinization for the average case. PH determinations on the urine will control the medication.

If conservative measures do not produce evidence of beginning subsidence of pulse and

\*A series of short selected articles by members of the Section is being published weekly.  
Comments and questions by subscribers are solicited and will be discussed by members of the Section.

temperature by the fourth day, cystoscopic measures should be considered. Of the two signs the pulse is a more reliable indication of the patient's condition than temperature. Beyond the fourth and fifth days patients are more resistant to treatment by cystoscopic measures.

Cystoscopic treatment, early in the infection, is productive of prompt amelioration of symptoms when it consists of nothing more than emptying the pelvis allowing them to drain for fifteen to twenty minutes and washing them clear of pus with a bland solution such as two per cent boracic acid solution. If symptoms recur, this can be repeated at three day intervals. Cystoscopic treatment can be expected to fail in the long standing septic case of weeks or months' duration. Involving ureteral catheters are not required in cases treated early in the disease. They have several disadvantages, they require special and constant care to prevent plugging with pus and mucus they are painful for the patient, and produce edema of the lower ureteral segment by their presence. After removal this edema is in itself obstructive.

There will be found a few intractable cases which are best treated either by interruption of the pregnancy or surgery. Unless there is some unusual reason to the contrary interruption is advised. The insertion of a pezzet tube in the pelvis, which can be worn throughout the remainder of the pregnancy, will preserve the first pregnancy but becomes less attractive for subsequent infected pregnancies should they occur. These sinuses heal promptly after delivery.

Postpartum bladder dysfunction is closely associated with postpartum pyelitis. Perfectly adequate and timely management of the bladder after delivery should theoretically abolish postpartum pyelitis. This is not easy to accomplish. Trauma to the bladder at delivery and probably other factors result in either complete retention of urine or overflow from a residual. In palpation of the abdomen it is not easy to differentiate the bladder and the uterus immediately after delivery. When in doubt catheterize. Frequent voiding of small amounts of urine indicates residual. Bladder management is carried on by one of two adequate measures intermittent catheterization or constant drainage. If infection exists previous to delivery constant drainage with the pezzet type of catheter (not soft winged catheters) is preferable to intermittent catheterization. The onset of retention will often produce symptoms of pyelitis within a few hours in the infected case, but in the uninfected case infection must be introduced and time allowed for its development before a pyelitis is apt to occur. If uninfected catheter relief should be tried for either residual or retention for a period of four or five days. In those cases in which the residual or retention is not allowed to exceed twenty to twenty

five ounces fevers seldom occur. Catheterization must be controlled by the fluid output rather than the clock. Bladders which distend to large urine content between catheterizations have little chance to overcome atony. If constant drainage is placed it should be left undisturbed for five days. This period has been determined empirically. After removal the bladder should be checked for residual. If large the catheter should be replaced for an other five-day period. Two to three ounce residuals are usually handled safely by the patient but should be watched. Constant drainage is preferable for the resistant case because it requires less constant exercise of judgment to insure against inadequate emptying of the infected bladder.

Intravenous pyelography is eminently satisfactory in pregnancy and the puerperium. It should be resorted to early in pregnancy, where there is any suspicion of preëxisting pathology in the urinary tract. It is safer for both mother and child to carry a patient through pregnancy with known handicaps present than to try to rush to a diagnosis as an emergency, after trouble has arisen. Early diagnosis of preëxisting pathology can be made without undue x ray exposure at any time in pregnancy.

In the majority of instances the patient will complete the pregnancy safely. If this is to be accomplished at the cost of destroying one or both kidneys, there must be an accounting of values preferably made as early as possible in the pregnancy. Where the lesion is producing no real damage it can be remedied after delivery. This applies to most stones. Pregnancy cases tolerate any urological operation well if liberally supplied with morphine during convalescence.

Pure cystitis, without renal involvement following intermittent catheterization or constant drainage for bladder atony is usually bacteria and pus free in thirty days. The average renal infection is free in four months. Failure to clear in that time under treatment should lead to cystoscopic investigation. It is assumed that the general condition of the patient, anemia, social aspect of her life and formalin bearing drugs given with a urine having a pH of at most 5 have already been considered and proper relief measures applied.

It is unfortunate that symptomatic recovery so readily follows delivery. Unless the patient is bacteria free, an infected subsequent pregnancy is practically assured.

#### OUR RESPECTED SENIOR FELLOW

In 1863 Dr Edmund Horace Stevens of Cambridge Massachusetts joined the Massachusetts Medical Society and on January 2 1936 will celebrate his ninetieth birthday.

It is eminently fitting that the members of the

Society should take cognizance of the record and influence of this, our Senior Fellow, and do him the simple honor of a brief reference to his accomplishments

Dr Edmund Horace Stevens was born January 2, 1846, at Stanstead, Quebec, Canada, the son of Dr Horace and Louisa Mann Stevens. Both his father and mother were of old New England stock, their forbears having come to Massachusetts between 1630 and 1640. Dr Horace Stevens had graduated from the Vermont College of Medicine in 1842 and settled in Stanstead shortly after that. In 1848 the family moved to Skowhegan, Maine, and there Dr Edmund H Stevens lived through his boyhood, attending the local schools and Bloomfield Academy.

In 1861 he entered Dummer Academy in South Byfield, Mass., and remained there until early in 1863 when he was forced to leave school on account of ill health. At that time he, supposedly doomed to an early death from tuberculosis, was put in the care of Dr Henry I Bowditch. He remained in Boston in Dr Bowditch's care and in the fall of 1863 registered as a student under Dr James Harlow and began to attend lectures at the Harvard Medical School. In May, 1864, he enrolled in the Navy as medical cadet and was assigned to the U S S Philippi, attached to Farragut's fleet. In August, 1864, at the Battle of Mobile Bay, while under shell fire from the forts, he sustained a broken leg from a flying splinter and was invalided home.

In September of that year he formally entered the Harvard Medical School. In March 1865 he entered the Army as a contract surgeon and was assigned to duty to the Cavalry Post Hospital at City Point, Virginia, where his father was in command. He was mustered out of the army in July, 1865, and returned to Boston to resume his studies. He graduated from the Harvard Medical School in 1867 and in that same year was appointed Assistant Port Physician of Boston, stationed at Deer Island. He continued in this position until April, 1871, when he settled in Cambridge, where he has remained and practised ever since.

In 1886 when the Cambridge Hospital was opened he was the first Visiting Surgeon to go on duty and he continued to hold the position as Visiting Surgeon in that hospital until 1911, when he resigned and was appointed Consulting Surgeon which position he has since held.

He has been a member of the Massachusetts Medical Society since 1868, and was a Councilor from the Middlesex South District for about fifty years and nominating Councilor for many years. He has been a Fellow of the American College of Surgeons since its organization and one of the original members of the New England Surgical Society. He is also a member of the Boston Obstetrical Society, the New England Obstetrical and Gynecological Society and the Cambridge Medical Improvement Society.

During the World War he was a member of the

Volunteer Medical Service Corps and of the Medical Advisory Board for his district.

Of Dr Stevens' work both the profession and the laity have repeatedly testified. The writer recalls a statement of the late Dr Frederick C Shattuck, when doctors were under discussion, that he, Dr Shattuck, would feel as safe in Dr Stevens' hands, if obliged to submit to a surgical operation, as he would with any other surgeon. Coming from this eminent teacher and practitioner anything further would be superfluous.

Dr Stevens' interest in the Massachusetts Medical Society is shown particularly in his disinclination to take advantage of the provision for retirement.

The *Journal* tenders its cordial congratulations to Dr Stevens for his long and successful service to humanity with the wish for many more years of active life.

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#### THE DIRECTORY OF THE MASSACHUSETTS MEDICAL SOCIETY

This publication is being compiled with all available information up to January 1, 1936. The material will be in the hands of the printer immediately after the first of the year and the copies will be distributed as soon as possible.

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#### MISCELLANY

##### CHANGES AT THE MASSACHUSETTS MEMORIAL HOSPITALS AND BOSTON UNIVERSITY SCHOOL OF MEDICINE

The Trustees of the Massachusetts Memorial Hospitals have announced the following important appointments to the Staff:

Reginald Fitz, M.D., to be Director of the Robert Dawson Evans Memorial Department for Clinical Research and Preventive Medicine, and Howard M Clute, M.D., to be Chief of the Surgical Service. These two appointments, when considered in connection with the completion of the new wing at the Main Hospital, constitute an important accomplishment for the year 1935 and the Trustees and Staff are to be congratulated. These appointments to the Hospital Staff carry with them professorial rank in Boston University School of Medicine and, since the new wing will add materially to the bed capacity of the Hospital, the clinical teaching facilities of the School will be considerably enhanced.

Dr Reginald Fitz was born in Boston, received his A.B. degree from Harvard College, and his M.D. degree from Harvard Medical School in 1909. He served as house officer at the Massachusetts General Hospital and was later a voluntary assistant in the medical clinic of the Johns Hopkins Hospital. Following an appointment at the Peter Bent Brigham Hospital, he was an assistant resident physician at the Rockefeller Institute and later was an associate in medicine at the Massachusetts General Hospital. In 1920 to 1922, following an extensive army service in France, he was in charge of

the clinical section in medicine at the Mayo Clinic in Rochester Minnesota, and after his return to Boston was appointed to the Staff of the Peter Bent Brigham Hospital and was made Associate Professor of Medicine at the Harvard Medical School. He is a member of the Association of American Physicians the American Society for Clinical Investigation and a Fellow of the Massachusetts Medical Society and the American Medical Association. He is a member of the National Board of Medical Examiners a member of the Council on Medical Education and Hospitals of the American Medical Association and is Chairman of the Committee on Medical Education and Medical Diplomas of the Massachusetts Medical Society. His wide clinical experience and his interest in medical research and education make his appointment particularly significant at this time.

Dr Howard M. Clute was born in Maine received his S.B. degree from Dartmouth College in 1911 and his M.D. degree from Dartmouth Medical School in 1914. He served his internships at the Hitchcock Hospital in Hanover and the Boston City Hospital in Boston. For a number of years he has been associated with the Lahey Clinic of Boston and holds appointments on the Staffs of the New England Deaconess and the New England Baptist Hospitals and more recently has been Chief of the Surgical Staff at the Carney Hospital. He is a member of the American Urological Association the New England Surgical Society the Boston Surgical Society a Fellow of the American College of Surgeons and the American Medical Association. Dr Clute has been particularly active in the field of general surgery and has written on numerous surgical topics.

The new addition to the Massachusetts Memorial Hospitals completes a thoroughly modern plant with a unique arrangement of operating rooms and an up-to-date x-ray department. The private rooms and the facilities for patients of moderate means are particularly attractive.

## TWO ADDRESSES BY DR. PHANEUF IN LOS ANGELES

Dr Louis E. Phaneuf professor of gynecology at Tufts College Medical School addressed the Los Angeles Obstetrical and Gynecological Society on The Low or Cervical Cesarean Section on December 11, and on December 13 gave the annual address before the Los Angeles Surgical Society his subject being The Surgical Management of Prolapse of the Uterus and Vagina.

## AN HONOR TO DR. BARBARA T. RING

As one feature of the exercises during the meeting of the New England Physical Therapy Society at the Ring Sanatorium an honorary life fellowship was awarded to Dr. Barbara T. Ring as a tribute to the late Dr. Arthur H. Ring and for their contributions to the activities of the Society.

## RESUMÉ OF COMMUNICABLE DISEASES IN MASSACHUSETTS FOR NOVEMBER, 1935

Disease	Nov Nov 5 Yr		
	1935	1934	Average*
Anterior Poliomyelitis	58	7	25
Chickenpox	861	1324	1027
Dog Bite	654	554	381
Epidemic Cerebrospinal Meningitis	5	2	7
German Measles	91	102	57
Gonorrhea	476	596	553
Lobar Pneumonia	248	362	291
Measles	303	326	528
Mumps	674	183	320
Scarlet Fever	756	599	782
Syphilis	464	390	344
Tuberculosis, Pulmonary	257	281	318
Tuberculosis, Other Forms	28	33	37
Typhoid Fever	7	10	15
Undulant Fever	2	3	
Whooping Cough	274	643	643

Based on the figures for the preceding 5 years.

### RARE DISEASES

Anterior poliomyelitis was reported from Belmont, 1 Beverly 1 Boston, 9 Brockton, 5 Cambridge 3 Canton 1 Chelsea, 1 Concord 2 Danvers 1 Fall River 4 Lawrence 2 Lynn 4 Malden 1 Medway 1 Melrose, 2 Methuen 2 Middleton 1 Montague 1 Newton 3 Revere 1 Salem 3 Somerville 1 Swampscott, 1 Wareham, 2 Worcester 5 total, 58. Diphtheria was reported from Boston 8 Canton, 1 Chelsea, 1 Chicopee, 5 Fall River 2 Lawrence 2 Lowell 10 New Bedford 2 Peabody 1 Revere, 1 Somerville, 1 Taunton 1 Watertown 1 Total 36. Dysentery (amebic) was reported from Cambridge 1.

Dysentery (bacillary) was reported from Medford 1.

Encephalitis lethargica was reported from Springfield 1.

Epidemic cerebrospinal meningitis was reported from Boston 1 Everett, 1 New Bedford 1 Revere, 1 Worcester 1 total, 5.

Malaria was reported from Abington 1 Brockton 1 Cambridge 1 total 3.

Paratyphoid fever was reported from Haverhill 1 Tewksbury 1 total 2.

Septic sore throat was reported from Boston, 3 Chicopee, 3 Foxboro 1 Lowell 1 Shirley 1 total 9.

Tetanus was reported from Nantucket 1 Taunton 1 total 2.

Trachoma was reported from Lexington 1 Medford, 1 total 2.

Trichinosis was reported from Brockton 1 East Hampton 2 total 3.

Typhoid fever was reported from Chicopee 1 Fall River 1 North Andover 1 Springfield 1 Walpole 1 Waltham 1 Westport, 1 total, 7.



*Undulant fever* was reported from North Adams, 1, Pittsfield, 1, total, 2

There have been fewer reported diphtheria cases for the year to date than there were in the month of November, 1929

Typhoid fever remains well below last year's record low figure

Infantile paralysis continues to decline after a season of increased prevalence

Lobar pneumonia for the first time since March was reported at a lower level than for the corresponding month of 1934

Epidemic cerebrospinal meningitis occurred to about normal expectancy after a month of somewhat increased prevalence in October

Scarlet fever for the second consecutive month was reported at a higher figure than in 1934

German measles, measles, tuberculosis other forms, and chickenpox were not remarkable

Pulmonary tuberculosis remained below the five-year average for the month

Whooping cough continues to run low, while mumps maintains its increased incidence over last year

## CORRESPONDENCE

### DIATHERMY IN LOBAR PNEUMONIA

Editor, *New England Journal of Medicine*,

The article by Drs Wetherbee, Foley and Resnik, entitled "*Diathermy in Lobar Pneumonia*", published in the *New England Journal of Medicine*, October 24, 1935, has attracted the attention of men interested in the pneumonia problem. It has, therefore, seemed worth while to make a careful analysis of the data presented. As a result of such a study I should like to make the following points

- 1 The authors' plea for the use of diathermy is based in part on their belief that the specific pneumococcus antiserum has not been shown to be effective. They base this conclusion on the comparison of mortality rates for pneumonia at the Boston City Hospital in 1901 with the mortality rates reported by Dr Stewart in 1934. The City Hospital series comprised 900 pneumonia patients who were reported by Sears and Larrabee to have shown a mortality rate of 29.1 per cent. In 1934 Dr Stewart reported that the pneumonia mortality rate in hospital practice was still 28 per cent. The authors then conclude that "despite the ever-increasing use of serum and the advent of other newer methods of treatment, such as the oxygen tent, the death rate from lobar pneumonia is essentially what it was a generation ago." I do not feel that this is a fair evaluation of serum therapy. The serum is type specific, and can be used only for definite types of pneumococcus in

fection. At the present time its use is limited largely to Type I cases. Therefore, the only accurate measurement of its value is comparison of a group of Type I cases who have received serum with another group of Type I cases who have not received serum. Such figures are now available from the five-year study of the Massachusetts Department of Public Health, and are encouraging. Dr Heffron reports 406 cases treated in the first four days with the serum with a mortality of 10.1 per cent, while in 177 untreated Type I cases the mortality was 27.1 per cent.

- 2 In regard to the physiological changes which may be expected from the use of diathermy in pneumonia, the authors have not taken into account the very careful experimental work done by Drs Binger and Christie at the Rockefeller Institute for Medical Research.\* Their experiments on animals and on three human subjects, while perhaps not conclusive, should be given an important place in the consideration of the use of diathermy in pneumonia. After using small thermocouples inserted into the consolidated lung they conclude that the accepted dosage of diathermy does not heat the lung above the temperature prevailing in the rest of the body. This conclusion is at variance with the statement in the article under consideration, which says "That heat causes dilatation of blood vessels with resulting local hyperemia can readily be observed on the surface of the body when any form of heat is applied to it. It is, therefore, not unreasonable to expect similar changes in deep seated tissues which are heated by diathermy, namely, the consolidated portions of the lungs in pneumonia."

- 3 But more important than the question of the value of serum, or the physiological results of diathermy, is an actual analysis of the cases presented in the "control" and the "diathermy" groups. A study of the tables brings out the following points

- A) The present series (36 cases) is so small that one is not justified in drawing any conclusions as to the effect of diathermy on the mortality rate. This point the authors realize.
- B) Although it was originally intended that the candidates for diathermy were to be alternate cases, in the actual series this plan was not carried out. For instance, from January twentieth through March seventh there were *two treated cases as against nine untreated cases*. In most years the mortality from pneumonia is high during this period, and four deaths occurred in the nine untreated cases.

\*Binger C A L and Christie R V J A. M A 91: (Aug 11) 67 1928

From March eighth through May first, the time of year when mortality is apt to be lower there were ten treated as against two untreated cases.

- C) The age group of the controls is definitely higher than in the treated group, the average age of the controls being thirty nine years (with only four cases under thirty years of age) whereas the average age in the group treated with diathermy is thirty-two (with ten cases under thirty years of age). Since age is accepted as a significant prognostic factor in pneumonia, this difference would weight the series in favor of the treated group.
- D) In comparing the mortality rate in the treated and untreated groups it should be noted that of the six fatal cases in the control group two had uremia and a third was a chronic alcoholic with delirium tremens and a nonprotein nitrogen of 80 mg. A fourth death was in another chronic alcoholic who had had three previous attacks of pneumonia and since it occurred thirty days after admission could not be considered a primary pneumonia death. It so happens that the diathermy group does not include any case with so grave a prognosis.

Before drawing any conclusions as to the effect of diathermy on the mortality rate in pneumonia, one must then look for a larger and more carefully alternated series. I realize that the authors are interested primarily in symptomatic relief, but their article does stress an apparent lowering of the mortality rate, and therefore must be evaluated partly on an analysis of the data presented on this point.

Sincerely yours,

DONALD S. KING, M.D.

#### DR. JOSEPH RESNIK EXPLAINS A CONFUSING SITUATION

December 16 1935

Editor *New England Journal of Medicine*

Similarity of names and addresses has caused confusion in the minds of some of my medical colleagues. I therefore wish to state that I am not connected with any gymnasium or health club, nor do I carry any contract medical work.

Respectfully yours

JOSEPH RESNIK, M.D.

184 Bay State Road Boston.

## RECENT DEATH

**STRONG**—THOMAS MORRIS STRONG, M.D. of 56 Penfield Street, Dorchester died at the Forest Hills Hospital Jamaica Plain December 17 1935. Dr. Strong was born in 1848 in Rosedale, New York and graduated from Rutgers College in 1868 and from the New York Homeopathic Medical College and Flower Hospital in 1871.

His first practice was at Flint, Michigan and he was later located at Aurora, New York, Allegheny, Pennsylvania and Macon, Georgia, before settling in Boston.

For six years he was superintendent of the Massachusetts Memorial Hospitals. His practice was devoted to the eye, ear and nose with offices at the Hotel Itkley, Huntington Avenue, Boston. He was treasurer of the Massachusetts Homeopathic Medical Society for twenty five years and was a member of the American Institute of Homeopathy and the Surgical and Gynecological Society.

He was a Mason and a former member of the Society of Colonial Wars and the Sons of the American Revolution and the Boston City Club.

His widow, Mrs. Ada M. (Hodgkins) Strong survives him.

## NOTICES

### FITCHBURG CANCER CLINIC

There will be a consultation cancer clinic January 8 at the Barbank Hospital 9 A.M. to 12 P.M. The consultants are Dr. Horatio Rogers, visiting surgeon to the Massachusetts General Hospital and the Pondville Hospital and Dr. Langdon Parsons, visiting surgeon to the Massachusetts General Hospital, the Huntington Memorial and the Pondville Hospitals.

Hope has been expressed that doctors will take advantage of this opportunity to be present with or refer by note any of their patients having cancer or suspicious of a malignant condition.

#### FITCHBURG CANCER COMMITTEE,

F. H. THOMPSON, Sr. M.D., *Chairman*

WALTER F. SAWYER, M.D. *Secretary*

HERVEY B. PITCHER, M.D.

CHARLES J. LASETT, M.D.

ERSKINE R. PICKWICK, M.D.

### APPOINTMENT OF DR. C. R. ABBOTT

Dr. Charles R. Abbott of Clinton has been re-appointed to the position of Associate Medical Examiner of the fourth Worcester District.

### FIRST INTERNATIONAL CONFERENCE ON FEVER THERAPY

The first international meeting on fever therapy will be held in New York City September 1936. The use of fever induced by physical and other agencies

as a therapeutic procedure has received universal attention in the past few years. The conference will aim to collect and crystallize available data in this field. Therapeutic, physiological and pathological phases of fever will be discussed.

The suggestion for this conference originated with a group of interested European physicians. Five national conferences have been held in the United States of America. The first three sessions met at Rochester University Medical School in 1931, 1932 and 1933. The fourth assembled at Columbia University College of Physicians and Surgeons in 1934. The fifth was held in 1935 at Miami Valley Hospital, Dayton, Ohio.

It is planned to translate abstracts of all the papers into French, English and German. In order to make the printed copies of the transactions available for the conference, it is necessary that manuscripts and abstracts be submitted not later than June 1, 1936. Those interested in participating are requested to make early application.

Further information concerning the conference may be obtained from the secretary:

BARON HENRI DE ROTHSCHILD, *Chairman*,  
Paris, France  
DR. WILLIAM BIERMAN, *Secretary*,  
471 Park Avenue,  
New York City, U.S.A.

#### *American Committee*

DR. A. U. DESJARDINS, *Chairman*  
DR. W. BIERMAN  
DR. F. W. HARTMAN  
DR. L. E. HINSIE  
DR. C. A. NEYMANN  
DR. W. M. SIMPSON  
DR. S. L. WARREN

#### THE VAN METER PRIZE

The American Association for the Study of Goiter again offers the Van Meter Prize Award of \$300.00 and two honorable mentions for the best essays submitted on the goiter problem. This award will be made at the discretion of the Society at its next annual meeting to be held in Chicago, Illinois, on June 8, 9 and 10.

The competing manuscripts, which should not exceed 3000 words in length, must be presented in English and a typewritten double-spaced copy sent to the Corresponding Secretary, Dr. W. Blair Mosser, 133 Biddle Street, Kane, Pennsylvania, not later than March 1, 1936. Manuscripts received after this date will be held for competition the next year or returned at the author's request.

The Committee that will review the manuscripts is composed of men well known in the fields of research and clinical investigation of problems related to the thyroid gland.

The Association will publish the manuscript receiving the prize award in their annual Proceedings, and reserve a place on the program of the

annual meeting for presentation of the manuscript by the author, if it is possible for him to attend.

W. BLAIR MOSSER, M.D., *Corresponding Secretary*

#### REMOVAL

WALTER S. LEVENSON, M.D., announces the removal of his office from 371 Commonwealth Avenue, Boston, to 370 Commonwealth Avenue, Boston.

### REPORTS AND NOTICES OF MEETINGS

#### NORFOLK DISTRICT MEDICAL SOCIETY

REPORT OF THE COMMITTEE ON VACCINATIONS,  
IMMUNIZATIONS AND EXAMINATIONS OF WELL BABIES  
AND PRESCHOOL CHILDREN

On November 12, 1935, conferences were held with Dr. Francis X. Mahoney, the Health Commissioner of Boston, and Dr. Charles F. Wilinsky, Deputy Commissioner of Health and Director of Child Hygiene and Health Units.

Both were anxious and willing to cooperate in the development of some practical method agreeable to the physicians of Boston which would make possible a greater participation by them in the program of preventive medicine.

They realize fully the economic problems confronting the medical profession and are mindful of the fact that undoubtedly some who come to the clinics of the Health Department can afford to obtain medical services in the offices of the family doctor.

They are mindful, however, that the health of the community is the responsibility of the Health Department and that the expenditures of the city for the maintenance of these services are justifiable and essential and should be continued. They regard these services as educational in their import and serve the doubly useful purpose of not only rendering preventive service but also for the stimulation of the public in a desire for preventive measures.

They are willing to cooperate with the medical profession in an effort to get people who can afford to pay to prefer to obtain the service on an individual basis from their family physician and suggest the development of the following plan:

1 That the County Medical Societies cooperate with the Health Department in the furtherance of health education and the stimulation of the public for greater demands for preventive services.

2 That the Medical Society circularize its members and advise them to set aside certain hours in so far as this is possible for the maintenance of preventive clinics including vaccination against smallpox and typhoid, immunization against diphtheria, examinations of well babies, preschool children, etc.

3 That a reasonable office fee be established not to exceed one dollar per visit for this type of service.

4 That acceptable educational literature sponsored by the County Medical Societies and the

Health Department be drawn up to be mailed by the family physician to his patients stressing the importance of this type of service and the willingness of the family doctor to render the same for his patients

This plan patiently worked out and developed with sufficient time allowed for the laity to appreciate the advantages of this type of service will eventually result in a majority of people who can afford to pay preferring to receive this from the family physician leaving the clinics maintained by the Health Department available to those who cannot afford to pay as well as to those who have not been educated as yet to prefer the service from private sources

On November 18 1935 a special conference was held at the Beth Israel Hospital. The following were present Dr Charles F Willinsky Dr Chauncing Frothingham Dr Robert L DeNormandie Dr Frank S Cruickshank, and Dr Henry M Landesman

It was decided to have an official combined meeting of the Committees from the Middlesex South Suffolk, and Norfolk District Medical Societies with the Health Department officials in December to complete definite workable plans for those members of these Societies who wish to do vaccinations and immunizations for diphtheria and typhoid examinations of well babies preschool children, etc

H. M. LANDESMAN M.D., *Chairman*

D. L. LIONBERGER, M.D.,

JOHN B. HALL, M.D.

#### MIDDLESEX EAST DISTRICT MEDICAL SOCIETY

A meeting of the Middlesex East District Medical Society was held at Bear Hill Country Club on November 27 1935 with Dr F O West of Woburn as presiding officer and Dr A. L. MacLachlan of Melrose as secretary

At an excellent dinner Dr Charles E. Mongan, President of the Massachusetts Medical Society was royally welcomed by all the members of the district society who were present in large numbers to greet him as well as the scientific speaker Dr Howard M. Clute who presented a paper on Thyroid Disease.

Dr Mongan discussed the medical aspect of the Social Security Act, and its disadvantages to the profession. He also presented the fallacies of unemployment insurance particularly as applied to this State which does not need this legislation, in his opinion. He stated that the proposed act has been sponsored by the social uplift workers without adequately consulting the leaders of the medical profession or getting their advice.

Dr William R. Morrison Chairman of the Committee on Arrangements, urged the members to reserve June 8 9 and 10 for the next Annual Meeting and Dinner in Springfield. He stated that new members of the Society will be particularly welcome and older members are relied on to show their interest in the meetings and clinics

#### FAULKNER HOSPITAL CLINICAL MEETING

The next clinical meeting will be held at the Faulkner Hospital on Thursday January 3 at 5 P.M. In addition to the usual clinical pathological conference Dr Maurice B. Strauss will speak on Anemias in Pregnancy

All physicians are invited.

#### WORCESTER DISTRICT MEDICAL SOCIETY

The January meeting of the Worcester District Medical Society will be held in Thayer Hall at the Worcester City Hospital Worcester Mass., on the evening of Wednesday January 8 1936. The full program is as follows

6 15 P.M. Buffet supper

7 30 P.M. Business session and scientific program.

- (1) Head Injuries—Types and treatment.  
Dr Benjamin T. Burley Worcester
- (2) The Roentgen Diagnosis of Abdominal Aorta. Dr Philip H. Cook Worcester
- (2) The Treatment of Epileptics and their Relatives. Dr Foster L. Vibber Worcester

ERWIN C. MILLER, M.D., *Secretary*

#### ST. ELIZABETH'S HOSPITAL

##### INFANTILE PARALYSIS VACCINE MEETING

The next meeting of the Staff of St. Elizabeth's Hospital will take place at the hospital 736 Cambridge Street (Brighton District) Boston Friday evening January 8 1936 at 8 15 P.M.

##### PROGRAM

Address by John A. Kolmer M.D., of Philadelphia  
Professor of Medicine Temple University and  
Director of the Research Institute of Cutaneous Medicine.

Subject: Infection, Immunity and Vaccination in Infantile Paralysis

Discussion to be opened by W. Lloyd Aycock M.D.  
Director of the Harvard Infantile Paralysis Commission  
Hans Zinsser M.D. Professor of Bacteriology and Immunology Harvard University Medical School  
and John F. Casey M.D., Visiting Physician St. Elizabeth's Hospital

Physicians and medical students are invited.

#### NEW ENGLAND HEART ASSOCIATION

The next meeting of the New England Heart Association will be held at the Peter Bent Brigham Hospital Boston Mass., Monday January 6 1936 at 8 15 P.M.

##### PROGRAM

I Business Consideration of revision of Constitution and By Laws

II Clinical

- 1 A. Method of Determining Blood Volume Dr J. G. Gibson 2nd.
- 2 Blood Volume Changes in Congestive Heart Failure. Dr William Evans

- 3 Concerning the Mechanism of Hypertensive Crises Dr Michel Pijouan
  - 4 Hemopericardium as a Cause of Sudden Death Dr Marshall N Fulton
  - 5 The Early Diagnosis of Aortic Stenosis Dr Samuel A Levine
  - 6 Aortic Stenosis, Angina Pectoris, and Syncope Dr A. W. Contratto
  - 7 Is Digitalis Present in Body Fluids in Digitalized Patients? Dr Maurice A Schnitker
- All members and interested physicians are invited to attend

JAMES M FAULKNER, M.D., *Secretary*

### SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

#### CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, DECEMBER 30, 1935

Tuesday, December 31—

2 30 P.M. Pediatric Ward Visit. Massachusetts Eye and Ear Infirmary

Thursday, January 2—

\*5 P.M. Faulkner Hospital Clinical Meeting

Friday, January 3—

\*8 15 P.M. St. Elizabeth's Hospital Infantile Paralysis Vaccine Meeting, 736 Cambridge Street, Brighton

Saturday, January 4—

\*10-12 Staff rounds at the Peter Bent Brigham Hospital

Sunday, January 5—

4 P.M. Free Public Lecture, Harvard Medical School, Building D, Longwood Avenue Cancer, by D. F. Jones M.D.

\*Open to the medical profession

January 2—Faulkner Hospital Clinical Meeting See page 1327

January 3—St. Elizabeth's Hospital, Infantile Paralysis Vaccine Meeting See page 1327

January 6—New England Heart Association See page 1327

January 8—Fitchburg Cancer Clinic See page 1325

January 10—William Harvey Society 8 P.M., Beth Israel Hospital, Boston

January 27—Springfield Medical Association

February 24 to May 16, 1936—International Medical Postgraduate Courses in Berlin See page 1211, Issue of December 12

September, 1936—First International Conference on Fever Therapy See page 1325

### DISTRICT MEDICAL SOCIETIES

#### ESSEX NORTH DISTRICT MEDICAL SOCIETY

January 8—Meeting at the Riverside Tavern, Haverhill, at 12 30 P.M.

#### ESSEX SOUTH DISTRICT MEDICAL SOCIETY

January 8—Wednesday Danvers State Hospital Hathorne Clinic 5 P.M. Dinner 7 P.M. Speaker Dr Hoskins Subject to be announced later

February 5—Council Meeting, Boston

February 12—Wednesday Addison Gilbert Hospital Gloucester Clinic 5 P.M. Dinner 7 P.M. Speaker and subject to be announced later

March 4—Wednesday Lynn Hospital Clinic 5 P.M. Dinner 7 P.M. Speaker Dr Timothy Leary Subject Arteriosclerosis

April 1—Wednesday Essex Sanatorium, Middleton Clinic 5 P.M. Dinner 7 P.M. Speaker Dr Richard H. Overholt of the Lahey Clinic Subject Chest Surgery

May 7—Thursday Censors' Meeting

May 13—Wednesday Annual Meeting Salem Country Club Dinner at 7 P.M. Speaker Dr Paul White Subject to be announced later

R E STONE, M.D., Secretary  
88 Lothrop Boulevard, Beverly

#### FRANKLIN DISTRICT MEDICAL SOCIETY

Meetings are held on the second Tuesday of January, March and May at the Weldon Hotel, Greenfield, at 11 A.M.

CHARLES MOLINE, M.D., Secretary  
Sunderland

#### MIDDLESEX EAST DISTRICT MEDICAL SOCIETY

Meetings to be held at the Bear Hill Golf Club at 12 15 P.M.

January 8, March 11, May 6

K L MACLACHLAN, M.D., Secretary  
1 Bellevue Avenue, Melrose

#### NORFOLK DISTRICT MEDICAL SOCIETY

January 28, 1936—Hotel Kenmore at 8 P.M. Subject 'Compulsory Sickness Insurance' Speakers to be announced

February 25, 1936—Massachusetts Memorial Hospitals at 8 P.M. Papers by the staff

March 31, 1936—Hotel Kenmore, at 8 P.M. Dr Benedict F. Boland—"Cauterization of the Cervix Uteri Using Various Electrical Methods" Illustrated with lantern slides

May, 1936—Annual Meeting (Place, date and subject to be announced)

The censors meet for the examination of candidates May 7, 1936, November 5, 1936

FRANK S CRUICKSHANK, M.D., Secretary  
1236 Beacon Street, Brookline

#### PLYMOUTH DISTRICT MEDICAL SOCIETY

January 16—Goddard Hospital Subject and speakers to be announced later

March 19—Plymouth County Sanatorium, South Hanson

April 16—Brockton Hospital

May 21—Lakeville State Sanatorium

G A. MOORE M.D., Secretary  
167 Newbury Street, Brockton

#### SUFFOLK DISTRICT MEDICAL SOCIETY

January 29, 1936—Joint Meeting with the Boston Medical Library at 8 Fenway "Observations Around the World," Dr Walter B. Cannon

March 18, 1936—Meeting at the Boston Medical Library "The Laboratory and Clinical Story of Fatigue," Dr Arlie V. Bock and Dr David B. Dill Discussion Dr Donald J. MacPherson and Dr Augustus Thorndike Jr

April 29, 1936—Annual Meeting at the Boston Medical Library "The Treatment of Septicaemia," Dr Champ Lyons "The Pleurality of Scarletinal Streptococcus Toxin," Dr Sanford B. Hooker Discussion Dr Hans Zinsser

The medical profession is cordially invited to attend all of these meetings

ROBERT L. DeNORMANDIE, M.D., President  
CHARLES C. LUND, M.D., Secretary,  
FRANCIS T. HUNTER, M.D.,  
Boston Medical Library

#### WORCESTER DISTRICT MEDICAL SOCIETY

January 8—See page 1327

February 12, 1936—Wednesday evening Worcester State Hospital, Worcester, Mass. Dinner and scientific program Subjects of program to be announced later

March 11, 1936—Wednesday evening Memorial Hospital, Worcester, Mass. Dinner and scientific program Subjects of program to be announced later

April 8, 1936—Wednesday evening Hahnemann Hospital, Worcester, Mass. Dinner and scientific program Subjects of program to be announced later

May 13, 1936—Wednesday afternoon and evening Annual Meeting of Society Time, place and details of program to be announced in an April issue of the Journal

ERWIN C. MILLER, M.D., Secretary  
Aster

